Knowledge, Education, Media
Proceedings of Scientific-research interdisciplinary project *Digital media technologies and social-educational changes* that is financed by the Ministry of Education and Science of the Republic of Serbia

**PROCEEDINGS**

*Knowledge, Education, Media*

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FOREWORD

This Monograph contains contributions that resulted from scientific-research work of the authors, within the first year of implementing the project “Digital media technologies and social-educational changes” number 47020, which is funded by the Ministry of Science of the Republic of Serbia within the programme of interdisciplinary research.

Although rather heterogeneous, texts presented in this Monograph reflect the tendency to create functional, interdisciplinary, theoretical-methodological and empirical contribution to understanding social changes in Serbia that bring new digital technologies, tendency to provide efficient and adequate formulation of public policies, action plans, and all of this with the aim to provide specific, applicative contribution to raising the quality of media, media organizations, participation and coping with omnipresent, current and aggressive virtual social space and social networking. All the studies, theoretical analysis, empirical indicators of this Monograph provide both reference frame, matrix of movements, specific activities, applicative contribution to raising the work quality in media space of our environment, as well as the focus on more rapid, adequate implementation of European standards of quality in the sphere of media and information and communication technology.

By their contributions to this Monograph, the authors have developed theoretical and empirical perspective of the analysis of digital and virtual space, they have made visible the important aspects of social, educational and axiological changes, which resulted from diverse use and impact of digital media technology in education, media, development of knowledge economy. Digital media technologies, according to research findings of the authors of this study, represent a field, playground, digital and realistic space of communication for the most diverse social activities, customs, arrangements in social and cyber groups. Information technologies and Internet are increasingly standing in the background of mixing and relating rational and irrational, real and possible. Question of open research spirit is the following: what consequences are caused by the dynamics of relating these spheres and forms of activities?

Research thought of the author of this Monograph manifests the specific problems of creating values within „user generated content“, regardless whether it is about presented images, educational contents, videos, newspaper articles, relating contacts or exchange of opinions about different topics. All of the above-mentioned is a form of creating cultural values, and all of this represents a very complex discourse that develops perspective of research studies, entrepreneurial productive strength of the researcher and the need to domestify and make useful the often indigenous productive strength of virtual and digital space.

The question which thesis in present dynamics of digital development has the biggest plausibility when it comes to overall tendencies of cultural, social, general human development still remains open – but let it be the task for future research efforts and scientific communications.

Novi Sad 15. September 2011                     PhD Milica Andevski
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Abstract: Sudden growth of the Internet usage among the young has been followed by controversial attitudes on significance of the experience in the virtual space and the influence on the adolescents. In this paper, based on some theoretical considerations and research and qualitative studies, we will try to show how much is the Internet usage connected with overcoming the development tasks of young people. The presentation’s focus lies on the ecology of media action of a young user of the Internet. From the theoretical and empirical findings general understanding of success and failure of the Internet offers which can be made fruitful for the actual examples (MySpace, Second Life, SIMS) can be deduced.

Key words: The Internet, communication, identity, media activity ecology, the young

1. THE INTERNET USAGE AS A COMPOSITE PART OF MEDIA EVERYDAY LIFE

The Internet has long since become a component of media everyday activity of the adolescents. According to the latest information of Medienpädagogischer Forschungverbund Südwest-a, 95% of the households wherein there are the young of 12 to 19 years old are connected to the Internet (JIM 2007: 37; The Internet Study ARD/ZDF 2008). The number of the Internet users is proportionally increasing. The Internet usage by the young in the past decade has reached a certain level and the increase is not expected. Therewith, attention should be paid on whether the Internet usage falls into the activities being performed relatively often. The share of those surfing more times a week and often has risen for 83% (JIM 2007: 38). One view on the Internet usage contents points that more than a half of the total Internet usage relates to the area of communications (JIM 2007: 43).

This is attention worthy, since the Internet as a means of communication in everyday life of the young in no way represents the only alternative, because the young today, as a rule, dispose by their own mobile phones. Besides, meeting with friends is a free time activity which more times both a day and a week can offer to the most the possibility for communication. What forms of communication does the Internet offer to the young, and which ones are so interesting free activities? What functions do these communication services contain? What chances and risks are linked with it?

2. THE YOUNG AND THE INTERNET USAGE – CHANCE AND RISK

From the perspective of the parental generation it seems that the greater intensity of the Internet usage, present at the young, represents the problem. To most of the grown-ups the virtual worlds through which the young wander while sitting in front of their computers, are completely strange. However, by looking at the great dynamics by which the media everyday life has changed during the last decade, it becomes clear that the habits of the Internet usage by the young and the experience of their parents with the media have nothing in common. To the parents and to the pedagogues as well, it seems that the Internet usage bears various risks. So it appears that there is a great danger of loosing in the network in view of high temporal intensity which is needed for the Internet usage. Seeming problematic are the contents endangering the youth (violence and pornography) as well as the contact with the anonymous Internet users presenting themselves as the peers.

Already in the 90-ties, when the Internet usage amongst the young was far less spread, we have scientific papers emphasizing the Internet usage in the context of media socialization for development of identity.

- “In the network the everyday concept of identity is suspended”. “The one who wanders in the virtual does not want the authentic. (...) Personal identity is
an illusion in the world ruled by the techno-social cyborg mechanisms” (Ecarius 1998).

- “The Internet offers a pile of personal experience and the important conception is: I am many” (Baacke 1996). “The Internet pages illustrate in especially plastic way the new conception of multifold but coherent identity” (Baacke 1973). The Internet has become the metaphorical dwelling of I, „the user’s identity is the result of connection and links he/she establishes” (Ibidem).

- “The Internet will push us into a sterile environment; it is a medium for expansion of our intellectual and emotional identity” (Wenger 1998). The Internet has become a symbol of globalization. The Internet users surfing are according to the opinion of some authors when at home everywhere and nowhere. Children and the young “again themselves become the nomads. They can move from one place on the Earth to the other- and at the same time they can sit and live at home” (Ibidem).

- Through this “new nomadism” the mankind is being created again and it is creating its world again (Levy, according to Kammel 2009).

- As the technique the nowadays youth is using everyday, the Internet has proven as a condition determined by the ambient, thus ordering and determining the everyday life of one generation and its behavior (Tully 2009:61).

In relevant studies on this (Castells 2005; Bruns 2007; Gehrke/Großer 2007; Eimeren/Frees 2009) there are indications that the communication possibilities specific for the Internet and the feedback information related to it – of often unknown- the Internet users fulfill the functions for a subjective construction of identity. With regards to it, it is often about “virtual identity” as well.¹ By creating a figure and/or by taking on a certain role in one online „Rollenspiel“ or chat, the Internet users would develop virtual identities, which would have a great subjective value for them. Thereat the relations between the identities’ construction, created by the experience on the Internet, and the 1 constructions, based on the adventures in “the real world”, are very differently grasped in theory. Do the young Internet users live in “in a principled negation of space, loss of closeness and real presence” (Tapscott 2009)? Or the so called “virtual spaces” are integrated into the existing worlds and if yes, in what way?

Having in mind developmental tasks of the young, it is to be expected that the information and communication technologies for construction of new relations could be functional, especially with regards to the increased options of mobility. Thus a question is posed how the perception and reacting in the spaces are altered by the

Internet usage as well as the communicative reaches of the young (Ibidem).

3. THE INTERNET USAGE CONTEXT AT THE YOUNG

a) Specific functions for adolescence/tasks specific for development

Youth can be called a phase of transition and as a psychosocial moratorium (Erikson 1959). It is the product of increased differentiation and complexity of society. Independent adoption of social relations- especially of those with the representatives of opposite sex or accepting the own physical changes can be viewed as parts of the aspect of identity building of the young. In conflict with various instances of socialization the young develop identity constructions that suggest certain forms of the Internet usage and its application. The identity development in the adolescence is marked by typical subjects, i.e. tasks of development, that indeed influence on the interest of the young in the Internet, but that can be mastered through the communication based on the Internet.

Based on the sym of experience relevant for the identity construction, the share of communication based on the Internet is relatively small. During the Internet usage, when the attention is directed to the communication based on the Internet, other senses are not excluded, and also the relations of the Internet users with other actors of social system found in are not excluded at the time. On the other hand, the Internet based communication offers adventures that can have a great subjective significance for the young. What influence does the Internet usage have on the relation of the young towards the parents, peers, school and other free activities is highly important in view of developmental tasks, but it is easily overlooked when the attention of the science on media, as with the Internet users, is directed only on the happenings on the screen. Social situating of communication is not abolished in any case. It should be noted that social relations based on the Internet communication which is related to the social relations and developmental tasks, can be functional and non-functional. On the basis of competitive motives and partially limited possibilities of reflection, the conflicts among the motives for the Internet usage and the consequences are partially imaginable. It means that the possibility of communication through the Internet in no case eases the young building new relations. “The addiction” on computer can “immobilize” the young. Computer games but also chatting can lead to neglecting social contacts (Lohmüller 2005).

b) The Internet usage at the younger ones:
deterritorialization or transformation of space?

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¹ As it will be presented in continuance of the paper, having in mind the social-scientific research on identity, this term should be used only under certain conditions.
Under the concept of spatial metaphor special significance is attributed to the learning processes through the Internet in formal and informal contexts of learning. One can constantly read that with the Internet some new space is opened and that by a self-organized research in the virtual worlds I and new worlds can be revealed. This experience and their reflection enable continuance of the project of education in completely new dimensions (Marotzki 2000). Thereat the Internet in building the theory is constructed on the basis of spatial metaphor, the new media is semantically linked with the already familiar one.” “The virtual space” is in that way a sign for tension between two poles: the new and traditional one. The fantasies from the network as a virtual space to the same extent enable the technical innovation to shift to the area of known through the spatial metaphor and the experience with changeable spatial references of everyday life to become comprehensive. The space of everyday life is experiences as the networking of places. The electronic media becomes a symbol of networked space. It becomes a heteropathy of one culture” (Marotzki 2000).

In that way the theoretically opened spatial duality (virtual space vs. social space linked with a location) opens up an issue on the relation of the spaces and locating of those acting in them. It should be noted further that social sciences in the references on the duality of spaces and virtual spaces do not explain the systematic name “space”. Löw points out, for example, that the space is constituted as the synthesis of “social goods, other people and places into representations, through perceptions and memories, but also in Spacing through the placement (building, measuring, ordering) of those goods and people on the spot in relation with the other goods and people. The space constitution (the synthesis and Spacing) is often happening routinely in everyday life. Through the repetitive actions the spatial structures are recursively reproduced. (...) The spatial structures are a variant of social structures” (according to Tully 2009: 63). The concept of social spaces serves for displaying and analysis of social structures on the spot. Löw briefly defines “the space” as a relational order of bodies (which can be living beings but also objects) on the spot (Ibidem). Thus, if determined by the definition, Löw’s concept of space is associated with a location. Namely, he constantly points to the material context. These material contexts and social structures on the places that are important for usage of media, and especially for development of identity of the young, are systematically being followed by social-, i.e. media-ecological and structural-analytical approaches (Tillmann; Mikos; Vollbrech; Charlton/Neumann, prema Tully 2009: 64).

Based on the results of research conducted in this tradition of researches, it is known that the constitution of meaning follows in the interaction with the media offer on one side and “the space” of the media usage on the other. The significance of individual scheme of adaptation and acting cannot be understood without deliberations of everyday conditions of the context. For comprehension of the identity development subjectively meaningful and influential experiences should be placed in the foreground². Therewith, it is not questioned whether it is totally possible and logical to explore the structural possibilities of internet based communication. The systematic application of the “space” metaphor should be avoided if the question on the place is not simultaneously answered. Physical determinants of space and the placement experiences of closeness and distance are not removed but reorganized by the virtual application.

4. PRELIMINARY CONSIDERATIONS ON INTERNET BASED COMMUNICATION ECOLOGY

The structures based on the Internet communication consist of the structures of applied services of communication, i.e. the so called virtual spaces for communication, structures of interaction of a human and computer and social, regional and local framework conditions. In order to explain the interaction of concrete conditions, the media-ecological approach is necessary.

It should be investigated what are the areas in everyday channels of communications that are opened to the Internet users and what scheme of action is suggested. Only in that way can their activities on the Internet be adequately interpreted and probably ascribed to the internal psychical dispositions of the user. That is why the possibilities and limitations of everyday communication channels have to be determined. Firstly, the appearance of the interface of communication through the Internet, what actions it enables, prevents or requires-but also suggests, that is makes absurd.

Secondly, social structuring of the space for communication has to be comprised, thus the division of roles, customs, rules, routines and conventions for which validity is guaranteed in this context. Especially of great interest is the issue of presence of specific (for example specific for chat) sets of rules as well as the ability of negotiation and sanctioning. Apart from it, it is possible that the communication flows are pre-structured through the normative guidelines from the other social systems (parents, peers, employer, state) for which the connectivity is searched on the basis of communication through the Internet.

²Identity as “the unity of I-concept, feeling of one’s own value and conviction on one man’s control, which he/she develops from subjectively important and influential experiences on self-perception and personal control and which motivate him/her to realize personal demands, investigate reality and create personal values in behavior.” (Haußer, according to Tully 2009:64).
Herein as a heuristic-analytical frame a media-ecological model is looked for, according to which the communication via Internet is wrapped into the social systems surrounding it. These can be divided into macrosystems, mesosystems and microsystems. The ratio of these systems can be investigated from different perspectives. Within the education-theoretical building of the model, an individual and its perspective is a reference point on which other factors can be related to.

5. SUBJECTIVE SHAPING OF INTERNET BASED COMMUNICATION

Internet based communication-so the principle is worded-is not a process completely observed from outside, but it is at the same time an external and internal process. The sense and meaning can be constructed only through the internal activities and only in that way there can come to communication. The communication sequences consist of the chain of communicative actions. The meaning is constructed only through the internal processes (that cannot be observed directly) following it.

In the internal processes accompanying such behavior, the given signs and ones own manner of behavior have a meaning. But these signs also serve to relate to the computer, Internet and themselves. These internal processes in the first place (for the analytical purposes) are binary divided into cognitive processes having an external reference object and the processes that are self-referenced. The first group contains the presuppositions on the social and technical environment. The second group contains the thoughts, events, etc. related to the Internet users. The difference between the internal and external world is cognitive. For the construction of identity it is constitutive ("I" is separated from "not-I"). In a certain sense it prepares the first blind spot. The cognitions referring to the outside world are indeed a constituent part of the internal processes, but are not treated as such. Cognitions perceived as cognitions are self-referenced (Kammerl 2009). Since the difference between the inside and outside is the internal differentiation, it can be shaped changeably. Meaning, for example, that the esthetic judgment of the Internet users (feeling an image as disgusting/irritating) or the acceptance (believing that the chat-communication is being bugged) is treated as the characteristic of the object, that is as a real happening ("The image is disgusting". "Chat is being listened in.").

Also amongst the cognitions related to the outside world differences can be found (for example, between the social and technical environment), experienced as the external, but they cannot be actually deduced out of the given characteristics of the environment.3 Whereas the behavior of the Internet users is limited by the given material conditions, the internal processes following the behavior can surpass this frame. But since the individuals as a rule are trying to adapt their cognitive constructions to the living environment, the internal processes and behavior can be thus set to perform successfully in this environment to a sufficient extent.

The subjective constructs of communication based on the Internet are the result and the starting point of the cognitive processes. However, since it has to be assumed that a voluminous structural coupling is possible, they should be perceived as the consequences and presuppositions of the communicative action. On the basis of experience with the Internet based communication, created are presuppositions, expectations, estimations, etc. and these again determine the Internet users’ behavior. Orienting someone’s thinking and activity accompanies in the Internet communication not only the real and possible reactions of others but also the real and possible reactions of the interface. The interactions of man and computer that are necessary for communication by means of the computer are also accompanied by the expectations and the perceived reactions on the device are the foundation for development of cognitions related to it.

6. FINDINGS FROM THE RESEARCH, QUALITATIVE STUDIES

In the continuance of the paper in the foreground, from the results of an explorative qualitative study, some routines of usage and techniques the young examinees used in order to establish the relations with the corresponding micro- and meso- systems they live in will be shown.4 Some functions of the Internet usage will be to simulate the communication via Internet in a way that the examinees have wrongly concluded that there is a human interlocutor. Weizenbaum’s intention was to show a simple structure of a technique of one psychotherapeutic course of work, consisting mainly in reflection and permanent questioning and counter-questioning of the patients by the therapist. That is why by ELIZA he wanted to show that computer can only by the syntactic conversion of the input create an impression at the users that they dispose of the abilities of coding and decoding. To Weizenbaum’s surprise, his program was ascribed human qualities. This has been proven in it that the examinees have presupposed that they have been communicating with a real psychotherapist (according to: Tully 1009:66).

3 Thus, for example, already in 1966 Weizenbaum could show that by one simple program “ELIZA” it is possible...
illustrated for identity development in the context of media-ecological “homeland” of the young users of the Internet. With the question on possible ways, subjectively significant aspects of the Internet usage, we shall focus on deduction of functionality for development of identity.

Since in developmental psychology the acceptance and forming of the social relations with peers is perceived as the developmental task of the youth, in the interviews the emphasis was on the question what function on the relations has the Internet based communication. With regards to the identity development at the young, the communication functions based on the Internet, for shaping the social relations can have various links with self-perception, self-estimation and experience of the control of the young.

a) Regional and local belonging as the staring point of communication in the context of chatting

The interest of meeting other people is central for usage of chatting forums and it is shown in different activities. Of intrinsic importance for the initial sequence of chat-communication with the previously unknown chat partners is the so called checking of the age, gender, location, that is of the information on the age, gender and place of dwelling if they are public besides the user name or nickname used in the chatting. The issue on the place of residence points to a principled interest of many young people to eventually at some point the meeting face-to-face is set. The importance of spatial closeness is shown also in other media activities besides chatting. Teenagers often purposefully choose the forums that point to the spatial closeness in the names. That is what about 20 young people have stated from the mentioned sample of a chatting room “Passau” of the radio Antenna Bayern. Along with this chatting area activated on the initiative of the Internet users, there are local/regional chatting communities which regularly meet on different activities in the real life.

Typical for chatting is specific mixtures of styles wherein besides the known forms of the written communications also applied are non-verbal-iconographic stylistic elements. The typical forms and examples are the acronyms (4YO), Internet-specific neologisms (spamming), onomatopoeia (*seufz*), action words (*knuddeln*), emoticons (@, and ASCII images (of roses: @->->--). On the basis of speech elements usage, the dialects usage is not uncommon. The usage of dialects shows the belonging and thus creates the possibilities of mutual identification. Since for the identity construction the vital area is regional, that is local locating of “one self”, the significance of the dialect distinction in the Internet based communication should not be underestimated.

On the sample of eight girls “Innca” was the central place in the Internet usage. The Internet café “Innca” for girls and young women was lead by the Council for the youth of the Pasaua town as a media-pedagogical project from March 2000 to July 2003. The regular visit of the Internet cafe for the girls was very important, not only because of the Internet usage but also because of the state of belonging to this female meeting place. The most various activities around the Internet that is round the Internet cafe (workshops, games, celebrations, local-political engagements) have offered an opportunity for a certain number of visitors to gather into a group which identified itself as the girls from Innca. Communication via Internet of these young has become an occasion for outer world perception and feedback information through the actors influencing above-regional which have become relevant for the construction of the identity of young people. This related both to the group identity and individual identity. On the occasion of national LAN party for the girls, two editors of the magazine on computers “PC Action” have visited Innca and recorded a report on participation of the Internet cafe in the event organized by Lizzyne. Instead of an expert reporting the “amusing” film could be seen, which with the help of sexists clichés apparently addresses mainly to male readers of the magazine (Tully 2009: 68).

Since LAN parties are primarily visited by boys and young men, the visit of men dressed into women to the Internet cafe for girls and young women could be observed in a certain way in dual sense as the act of transgression of boundaries. The reason for entering of the editors of computer magazine on the territory of opposite sex was that the girls did not belong to typical computer-men. Since the girls and young women do not exactly belong to the readers of such magazines, the editors’ film addresses to men. For the girls presented in the film, the appearance of the editors and their film, if they have seen it, has the meaning which is related to them. Besides the issues of various social areas, different

6 From German verb *seufzen*: exhale, sigh – literally *sigh*; Eng.: *sigh*.
7 From German verb *knuddeln*: hug – literally *hug*.
8 From punctuation characters various images are created.
9 It can be found under the name “PC Action in Gefahr” on a CD enclosed by a booklet 11/2002 in the category “Special”.

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roles of the sexes (computer games as the men's domain, Internet cafe for the girls as the place wherein the men have nothing to search for, i.e. are not wanted), the matter of dialect also appeared which is relevant for the sense of belonging to a group.

In the mentioned film the Verena’s statements on the dialect are titled. It points to incomprehensibility of her statements which is not completely justifiable. The titles that partly significantly digress from what the girl is speaking should obviously be understood as a means of comic. The editors thus question the dialect as a means of communication and especially the ability of the girl's communication. Verena remembered this situation well and felt uneasy during the interview. It was clear to her that her responses to the reporters’ questions have been “translated” in order to mock her manner of speech. This was the motif to her not to edit her Internet page on the dialect any more. It is worth mentioning in this case, since Verena’s low-Bavarian dialect is a composite part of the successful integration. To the girl, half-Russian by origin, for her own self-conception it is important that she is accepted as the native. The fact that non-Bavarians mocked her low-Bavaria dialect was less painful than the fact that her low-Bavaria identity has been brought into question as such.

The film PC Action represents an example in which the institutions having above-regional influence have presented the image of others to the Internet users in Innca. The perception of outer world, related not only to the Internet based communication, was provoked by it, was important for the Internet users’ identity construction.

b) The relative status of experts in social comparison

Young people within their routines acquired by the communication via Internet and experience they have gained by such communication wherein they themselves are the objects of their perception, can situationally perceive their own performance that is infirmity and undertake the self-estimation. This situational experience for temporally stable generalizations and generalizations specific for a certain area within the identities' construction are primarily important when they have a great subjective importance. The generalizations in view of their usage of the Internet, coming to the expression at interviewing the young, are thus constantly roughly simplified displays of complex processes of organization in which the relation of a person and environment is determined. Comparatively with the situation “face-to-face”, (indeed there also exist other possibilities of communication in the Internet based communication), the social situating of communication is thus in principle not raised.

Therewith the importance of the Internet for the identity development should be understood as the issue that has to relate to the media integration in the life of the young.

The communication with their parents, peers, teachers, social workers and other persons through the communication via Internet, their estimates and the expected behavior of the young have to be taken into consideration.

The general constructions of identities evolve on the basis of multitude of presentations on one self, on self-appraisal and experiencing control. These are not restructured only through the communication via Internet, but in relation to the subjectively relevant elements are constructed from this sum of communication based on the Internet. The generalizations associated with the Internet usage do not reach only for the experience on the Internet. Instead of partial “virtual identity” it would be more logical to discuss on a specific partial identity of the "Internet users". The generalizations for example appear in the tendency of some frequent forms of the Internet in order to subscribe to themselves especially high competences in managing computer, even though their activities do not surpass the usage of simple standard applications. Habitualization of simple routine applications in the context of perception of social distinction in the immediate environment supports inadequate self-estimations and thus can determine the desired interest at the young. It concretely means that at some young people with low or secondary education, who often play computer games and/or chat, an impression is created that they could be a competition to Microsoft. This is supported by the fact that in their immediate social environment no one to a great extent is dealing with the new media, but the Internet usage by the young is estimated as something positive and important for the future.

Paul (15), for example, on the questions on his future occupation replies that he would like to “open a company for computers”. The boy, living with his mother and step father and according to his own words disposes by the computer and Internet has ambitious plans. Since the story about the success, as the one of Bill Gates’, indeed is not really possible nowadays, but also it is not unimaginable, Paul has been asked questions on his experience in programming.

Questioner: Have you already had experience in programming or similar?
Paul: Yes, we have been dealing with it.
Questioner: What did you do?
Paul: We have already programmed our own program. For others it is nothing important, but for us it is.
Questioner: What kind of program did you program?
Paul: We call it a manipulation program. When playing games on the net... and anyone having the installed program can manage the other people computer. They can format it; they can shut it down...
(…) Questioner: And in what way does it reach the other computer?
Paul: I have actually helped in designing. The others were into programming. It is such that through the net the data
are exchanged so that the coded data from our computer pass on to the other. He cannot see it. And it took us three months in order to somehow, so that my friend would succeed in it, he is already 20 years old, he understands differently, he managed to evade Firewall.

Questioner: Hmm.
Paul: He did not explain it to me, and even if he did I would not understand anything anyway, but I think that is really simple.

As it can be seen based on the several questions, the knowledge of the young on programming are not yet that extensive so that the entrance into the software branch would be so obvious. The excerpt is interesting for our issue because it informs on what kind of self-presentation does the young man show during the interview. At first he affirmatively replies on the question on the experience in programming, and then in the end, he says that he does not have any and that he could not follow the explanations of his older friend. Self-exaltation in this case would not support the situation. Paul could quickly impress the one not asking and/or the one who is not instructed in the basis of software and hardware. Further favorable factors for positive self-determination and self-estimation of one’s own competences in handling computer and the Internet, according to our estimate of the above stated social conditions of the context, could be small that is lacking the reflection of the own usage of media, inner conviction in control and positive sense of self-confidence.

If a young person during chatting feels candid, brave it does not mean that it is generally estimating itself as candid and brave. The young as the sample of the perceived differences see more the external conditions.\footnote{Above all mentioned are social conditions of the context. Thus herein one should not discuss on the Internet specific effect.}

The Internet based communication is also used so that the own ideal of one self would be confirmed by the other Internet users. But this works only when the self-presentation in the communication via Internet does not deviate too much from the actual image. Yet, this is not a feature of the Internet based communication. In the communication "face to face" as well one tends to positive feedback information and the effect of this information for one’s own self-confidence depends on the subjective meaning of the opposite and on other information.

In the study conducted it has been shown that the young between the age of 14 and 16 in most of private households and in some schools obviously have large spaces for the activities and little of the authoritative guidelines. In the social space of “the family” a huge area of possibilities is opened which the parents confine mostly by formal conditions (time, expenses) In 2003, it has been confirmed by the results of the representative WIP study. In over 70% of the households with the Internet access wherein live children and the young, the Internet usage is not being controlled in any form. On the international level, Germany is situated on the top (according to: Kammerl 2009:72).

7. THE SELF-PRESENTATION TECHNIQUES BASED ON THE INTERNET OF YESTERDAY, TODAY AND TOMORROW

The sites of adolescents as the ones mentioned in the study shown are rarely used in today's technical format. If the young people nowadays prepare the site for self-presentation they can rely on the offers of commercial providers, those that are based on modular web method will faster reach the appropriate results than when they themselves would create the page using WebEditor. Known here and relatively popular is for example the provider MySpace which was purchased by the media mogul Rupert Murdoch in 2005. At least seven percent of the Internet users between the age of twelve and nineteen, tested within JIM 2007 have admitted that here [in MySpace] at least once they have edited the contents of the page (JIM 2007: 42).

One’s own website as a means for presenting one’s own interests and wishes is increasingly spreading amongst the young. According to the figures of the mentioned study, 15 percent of the young Internet users have their own Internet page. Included herein are “somewhat more boys (17%) than girls (14%) and more of the younger than the older ones (of 12-13 years old: 16%, 14-15 years old: 18%, 16-17 years old: 15%, 18-19 years old: 13%). The formal education is [...] irrelevant for this (secondary school: 14%, secondary school in which modern languages and sciences are stressed: 15%, gymnasium: 16%)” (JIM 2007: 43).

It should be differentiated that the offer of tools\footnote{It pertains to “the tools” on a computer, applications (Engl. tools).} available also in personal Internet pages edited independently has significantly expanded in the meantime. Today there is a mass of Internet blogs based on PHP\footnote{PHP (PHP: Hypertext Preprocessor) is a specialized scripts language primarily intended for making dynamic web contents.} and CMS, which are relatively simple for installing and which on one side significantly expand (technical) functions and on the other hand limit the free area for creation. Thus realized pages enable fewer conclusions on the competences and esthetic preferences of the author. The technical environment more strongly influences on self-representation. Graphical
representation of one figure representing the user in 3D worlds is interpreted as representing of one’s own personality (Dörr 2002). Avatars are known to the wider audience through the graphic forums for chatting that is Visual Virtual Chat. But the principle is familiar also in Third-person computer games\textsuperscript{14} in which the player guides his/her figure through the world of game. In the above mentioned study, the selection of the avatars-if this possibility has been used at all- according to the statements of the examinees did not have greater significance. The figures are available during chatting, they are chosen according to personal (mostly esthetic) preferences. Are the complex graphical 3D worlds of virtual environment in which the adults acquire for them important experiences?

The success of Second Life has again actualized this question. Several thousands of persons is simultaneously online in this 3D world and there they can mutually communicate and offer each other goods and services. Similar as in the capitalist societies, money (Linden-Dollars) is readily spent on goods, status symbols and cultural events. The central activity is shaping the avatars with-partly not free- accessories and parts of body.

The great complexity and various possibilities have lead to that that great potential has been ascribed to Second Life. But is it in this virtual world really about the offer that the young adopt? In different reports it has been shown that a number of active inhabitants in Second Life is falling or stagnating. Regular visitors of Second Life can barely be found amongst the young. “It has been shown that the media fuss around ‘Second Life’ among the young has long passed. Only 4% has at least once visited this parallel world, 38% has heard about this platform, and with 58% more than a half of the examined young people have heard for the first time for “Second Life” during the testing. The concern that the young will be lost in this virtual world and thus loose the touch with reality is unfounded today” (JIM 2007: 43).

Is this form of media action in 3D worlds – from the reasons that are yet to be explained- unattractive to the young? The look on the success of the favorite at children SIMS games, which in certain points show similarity with Second Life, reveals that the format obviously does not generally agree with the wishes and interests. But in contrast to the prognosis of EA Games, this game have not been played the most by the girls between the age of 12 and 15, but primarily women between the age of 18 and 40.

More than in virtual 3D world of Second Life, in the game of simulation SIMS, there is more of an attempt to virtually display the everyday life. Similarly as in Second Life the player has to create his/her own figure for playing. Thereat the figures are rather the same in both cases. According to individual preferences the flats can be rationalized for these figures. The structural frame for the possible activities of the figures in SIMS is given more strongly. In distinction from Second Life, the options of media activities are more limited, however this form of restructuring offers more orientation as well and allows stronger focus on the probable courses of activities and media experience and thus also on the expected bonuses.

8. INSTEAD OF CONCLUSION: ADAPTATION OF MEDIA—BETWEEN ACCOMMODATION AND ASSIMILATION

The importance based on the Internet communication for communicative reach of young people cannot be comprised by derivatives of general characteristics of the Internet. Against the network globality stands the choice and integration of these options in the life of the users which in the scientific discourse have been so far suppressed through focusing on “virtual space”. The success or failure of the media offers at the young and the chances and risks arising thereat for the young depend on their functionality for specific developmental tasks, main subjects of the young and the relations with their worlds. Thereat deciding are not only the possibilities of connection media providers are offering. The media users precisely in the area of the Internet usage in their activities and cognitions show various ways of connections. They create subjective value for themselves and simultaneously integrate in their ecological environment. Thereat the success or failure of the media activity depends on the individual competencies. The young having great freedom at home and at school with regards to media are probably more interested in media offers that precisely given by the structures.

The communication based on Internet of the young can be approached from various levels of the expected behavior. Young people are positioning according to the requirements and rules in accordance with their own ideas and are forming their maxims of action by which they are orienting. But at the same time at some adolescents the control of impulse is not that much expressed so that at the lack of the social control they would orient according to the principles of activity directing the behavior under supervision. Creation of “the normative and self-responsible self-control is still in the course. Thus the conditions of the Internet usage context have greater significance than it is the case with the adults.

At the moment the mobilization of using the Internet through mobile terminals as laptop, cell phone or PDA (Personal Digital Assistant) provides the young numerous new possibilities and with it associated favorable tariffs for the young. With regards to it new aspects of communication and mobility should be expected.

\textsuperscript{14} The player sees his/her avatar on the screen from the perspective of third party.
REFERENCES

Abstract: Scientists and politicians in many countries clearly see that the transition of economy into innovative phase of development is essential for economic growth, development and prosperity of society. Innovative economies are able to generate mass flow of innovations, but they require appropriate cultural environment, science, education, conditions for freedom of creativity, environment for entrepreneurship development, as well as intelligence and creativity, then the ability for innovations to be successfully incorporated into economy. For Serbia, this means a necessity for a serious institutional reforms and overcoming cultural and value barriers. Due to everything above-mentioned, in this paper we deal with the connection between value system and innovativity of media students in Serbia, Croatia and Bosnia and Herzegovina. Research sample consisted of 426 students. Connection between value system of respondents and their attitude towards innovations is established. Research has also shown that there are significant statistical intercultural and intersex differences in relation of value and attitude towards innovations.

The expressed intercultural and intersex differences, according to our opinion, reflect differences in the line traditionalism-modernism, where Bosnian students are closer to the pole of traditionalism, because they evaluate the tradition that leads to group harmony very much. In case of Serbian and Croatian students, viewpoint in closer to the pole of modernism, individualism and willingness to change are highly appreciated.

According to Schwartz’s theory, value oppositions are central for I concept of a man and they motivate him to behave appropriately in terms of self-realizations/values. Within this paradigm, behaviour in accordance with traditionalism can lead to social acceptance and approval, and the price of its non-acceptance can be social rejection and unacknowledgement. Value willingness to change motivates our tendency towards inner freedom, creativity, curiosity, satisfaction, and its non-acceptance motivates the withdrawal from self-realization.

According to the above-mentioned, it is possible to assume that modernisation is based on dynamics of value assumptions from traditionalism to willingness to change.

1. INTRODUCTION

According to INSEAD Global Innovation Index 2011 report, Serbia is at 55th place in the world rating of innovative activities. This is certainly related to non-systematic approach to innovative development of Serbia. Indexes of ability for production and innovations of Serbia point out that innovative potential is not sufficiently used. Although overall rating has climbed from 92nd place in 2009 and 101st in 2010 to 55th in 2011, that is far from good. (see Table 1.) If we compare rating of countries from the environment (with whose students we have conducted this research), Bosnia and Herzegovina and Croatia, we can see that rating of Bosnia and Herzegovina in 2011 is 76th place (last year it was 121), and Croatia is significantly better than both countries – in 2011 it was 44th place, in 2010 it was lower by one – 45th, and two years before it was significantly lower, even 62nd place.
Innovative organizational culture is the one in which constant improvement of organization through generation and application of ideas in all parts of organization is a standard of conduct for employees! [Birdi, Wall and Wood, University of Sheffield, UK]. By this definition, space for dealing with innovative activities and a set of innovative individuals spreads multiply and ultimately – innovativeness is not a privilege of a small number of those who are „responsible“ for that (e.g. employees in scientific-research (SR) and research-development (RD)
sector), and it is certainly not the activity that gives results in previously set deadlines, amounts and forms! The existence of innovation culture implies motivation of all the employees to permanently use their creative potentials, for which preconditions are: adequate education, continuous training, as well as conditions for generation and implementation of innovations. Therefore, innovation can be a new or improved product, process, service, manner of work [OECD, 1992, according to Kutlača:2006, 7-10].

To what extent is innovativeness and innovation culture have come to life in our economy and society? Which organizational, financial, fiscal, educational and other activities are taken for the purpose of supporting and promoting the construction of innovation culture of population and establishment and functioning of National Innovation System (NIS) is Serbia? How is all that reflected at the level of a company, faculty, research laboratory? These are only some of the questions to which scientific public requires answers. In this paper, we will attempt to respond to some of them: how socio-cultural factors affect the attitude towards innovations, how the value system of an individual affects the attitude towards innovations, how the value system of society affects the attitude towards innovations.

2. SOCIAL INNOVATIONS

When it comes to technical innovations, i.e. innovations of products and processes, in methodological documents of OECD, seven types of innovation activities which can appear during innovation process are defined [OECD, 1992, according to Kutlača:2006, 7-10]:

1. Research and development;
2. Equipment (machines and tools) and industrial engineering;
3. Establishment of production and pre-production development;
4. Marketing for new products;
5. Acquisition of non-implanted technology;
6. Acquisition of implanted technology;
7. Design.

For social and innovations in organizational, cultural and other non-technological aspects, there are also other significant activities, among which the following stand out:

1. – Benchmarking, i.e. comparing organizations according to innovativeness, as well as comparing the methods that are used in promotion and implementation of innovative activities;
2. – Direct involvement of customers – users of services into the process of improving own products, processes, services;
3. – Selection and special support of employees who are expected to show greater innovation behaviour in relation to the others in organization;
4. – Acceptance of the risks of enterprises, in terms of tolerating the failures of innovation projects, with learning from mistakes, as well as rewards for effort, which does not necessarily have to be successfully implemented;
5. – Rewarding successful implementers of innovation projects as a systemic approach in organization, which in addition to financial, also has other forms, such as highlighting by superiors, through emphasizing personal skills of individuals and by creating the environment in which the people are motivated to freely exchange the ideas and share their potentials;
6. – Training for creativity and innovativeness, implying that creativity can be learned through the courses of looking for opportunity, problem identification, generation of ideas, evaluation of ideas, implementation of ideas etc.;
7. – Development of learning culture, through the support of permanent education and development of employees;
8. – Involving the employees in decision-making and authorization in all the issues of innovative functioning of organization;
9. – Providing conditions for realization of innovation projects, in which the employees get a change to implement their ideas and to be included in designing new methods of work;
10. – Creation of innovation culture and general atmosphere in economy and society of a country, which supports, promotes and encourages innovative behaviour, becomes a national priority.

Main characteristic of social innovations, which, at least, need to be parallel with technological innovations (and it would be the best as their predecessors, to make way for them), is their cultural and social-psychological nature. Social innovations are, primarily, new socio-economic institutions, result of reforms, change of the „rules of the game“, typical models of behaviour, basic assumptions, beliefs and values.

It appears that establishment of social novelties is extremely difficult, particularly its undefined parameters and results can be „played“ without actual implementation (which is a very frequent case in Serbia).

What do lack of desire and resistance towards social innovations depend on? Primarily on the fact that subject of change and innovations are people themselves, their status, habits, behaviour, values, beliefs and basic assumptions. Then, on traditional structure of society, its social institutions, complex economic and political system, model of interpersonal relations. All of the above-mentioned is related to culture as meaningfully formed construct (values and implicit theories) and characteristics of social pedagogy.
2.1. Creative industry – the most significant segment of social innovations

Activities in which innovations make the biggest part of newly created value and content of business in general are systematized within so-called creative industries of economies of developed countries of the world in 21st century. C. Markus defines creative industries as “those industries that originate from individual creativity, skill and talent and which have a potential for creating jobs and wealth by generating and using intellectual property” [EC:2005].

Into creative industries, OECD and EU classify creative activities from the set of traditional industries up to service and other activities, mostly in the field of culture, so-called cultural industry [EC, 2005].

(a) Traditional industries, i.e. activities that result in the creation of products and processes:

- Architecture,
- Other creative activities: crafts, fashion, design, cultural tourism.

The significance of this sector from economic and social standpoint is exceptional. Creativity is a driver of economic growth and key strategic resource for the increase of competitiveness in economy based on knowledge. Creative industries create more than 7% of GDP in the world, with the growth of 10% per a year [UNCTAD, 2004, according to: EC, 2005]. In developed countries of OECD, these are leading industries with the highest annual growth, which ranges from 5 to 20%. For example, in Great Britain this sector generates 110 billion pounds and employs 1.3 million people. In Table 3, there are data about the business of creative industries in 1999, with comparison to the share of USA in global market of creative industries [source: EC, 2005]. According to these data, the superiority of creative industry of USA in relation to the rest of the world is obvious, which is another confirmation of EU findings regarding the lagging behind the USA, based on which the Strategy of European Union on increasing investments into research and development of creative activities that can be the most useful in increasing the competitiveness of economies of state members of EU is defined [EC-Lisbon:2000]. In Table 3, according to the same source, there are presented the earnings of employees in four sectors of economy of USA, where significantly better position of employees in creative industries is obvious in comparison to other sectors [source: EC, 2005]. In Figure 1, the share of employees in creative industries in the number of total employees in selected group of EU and USA countries is illustrated [source: EC, 2005].

- Advertising and marketing,
- Radio and TV (including their new forms: cable, satellite and digital form),
- Film industry,
- Internet industry (including the creation of websites and portal providers),
- Industry of content for mobile telephony,
- Music industry: recording, publishing and performance,
- traditional and electronic publishing (including books, CD-ROMs, on-line databases, information services, magazines and newspaper),
- Video and computer games;

(b) Less industrialized cultural and creative activities – Cultural industries:

- Visual arts (painting, sculpture),
- Performing arts (theatre, opera, concerts, dance),
- Museums and libraries,

The findings of analysts regarding the significance of creative industries in building the economy and society based on knowledge are particularly important for our analysis [EC, 2005]:

- The first finding actually points to the carriers of the change within four leading theoretical denominators of society in which civilization moves from industrial society:

<table>
<thead>
<tr>
<th>Table 3: Key industries of creative economy</th>
</tr>
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<tbody>
<tr>
<td>(according to market share, billions of US $, 1999)</td>
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<tr>
<td>SECTOR</td>
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<tr>
<td>RD</td>
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<tr>
<td>Publishing</td>
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<td>Software</td>
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<td>Radio and TV</td>
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<td>Design</td>
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<td>Music</td>
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<td>Toys</td>
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<tr>
<td>Advertising</td>
</tr>
<tr>
<td>Architecture</td>
</tr>
<tr>
<td>Performing arts</td>
</tr>
<tr>
<td>Crafts</td>
</tr>
<tr>
<td>Video games</td>
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<tr>
<td>Fashion</td>
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<tr>
<td>Art</td>
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<tr>
<td>TOTAL</td>
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</table>

Table 4: Earnings in selected sectors of USA economy, 1999

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>TOTAL NUMBER OF EMPLOYEES</th>
<th>AVERAGE PRICE OF WORKING HOUR IN US $</th>
<th>AVERAGE ANNUAL EARNINGS IN US $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative industries</td>
<td>38,278,110</td>
<td>23.44</td>
<td>48,752</td>
</tr>
<tr>
<td>Production</td>
<td>33,238,810</td>
<td>13.36</td>
<td>27,799</td>
</tr>
<tr>
<td>Services</td>
<td>55,293,720</td>
<td>10.61</td>
<td>22,059</td>
</tr>
<tr>
<td>Agriculture</td>
<td>463,360</td>
<td>8.65</td>
<td>18,000</td>
</tr>
<tr>
<td>TOTAL USA</td>
<td>127,274,000</td>
<td>15.18</td>
<td>31,571</td>
</tr>
</tbody>
</table>


Figure 1: Employees in creative industries as a part (in %) of totally employed in 2000 [downloaded from: EC:2005].

- **Knowledge society** – concept of this society is focused on the change in modality of production, taking into account the scientific, technological and economic aspects of production – it is also named post-industrialism,
- **Risk society** – this model is concentrated on people, i.e. those who are affected by those changes – it is socio-cultural approach that leads to post-modernism and post-Fordism,
- **Information Society** or **Third Wave** – is a society in which the emphasis is on implications of information-communication technologies on the services for the end-user,
- **Creative society** – it is the most recent trend in which it is stressed that society and economy are changing due to the growth of human creativity, which has become a crucial source of competitive advantage;
- Creative industries contribute to the development of economy based on knowledge because:
  - they are both *knowledge intensive* and *labour intensive*,
  - encourage innovation activities,
  - have a great potential for generating new workplaces,
  - show big export expansion;
- **Growth** of creative economy represents a successful integration of innovation (*technological creativity*), business (*economic creativity*) and culture (*artistic and cultural creativity*) into one activity, but in more intimate and powerful combination than ever in the history of human civilization;
- Economy moves from the old corporative system, which was formed by big companies, towards the system that the people form. This change does not mean that big companies and corporations will disappear, or that the economy will consist of small and medium companies and free entrepreneurs, but it only means that the people are a creative resource of the creative age!
Change in economy mentioned in previous finding leads to that in creative era organizational unit is no longer a company, but the place of the company, corporation etc. and it will be established in places where the access to talented people exists. On the other hand, creative people will choose places where they will have conditions for both creativity and business, regardless of the organizational form of business;

The change of morphology of two value systems is interesting: protestant work ethics and bohemian ethics! The first one is conformist, based on logic and structure, dominant in structure of social institutions, companies and corporations, and by its logic, if an individual is productive and effective in its work, the institutions will be productive and effective as well. Bohemian ethics is more hedonistic, it is realized in aesthetic forms, it has spiritual and socio-political dimensions, but tends more towards intuition than logic and it is more individualistic than conformist. In creative age, it comes to transition precisely from protestant work ethics to bohemian ethics, which is a very significant change when it comes to organization and management of organizations and institutions of creative industry;

The presence of other factors that influence the transformation of today’s economy and society, in addition to technological changes, is emphasized and those factors are the following: growth of complexity and uncertainty of social and economic life, aim of innovation and competition, issues of wealth creation etc. All of this increases the requirements for specific knowledge from the part of government, market, various groups and individuals. Increase of demand for specific knowledge corresponds to increased offer of „knowledge producer”, through big expansion of high education system. By combining this demand and offer, we create conditions for a new mode of knowledge production, which is characterized by the integration of contexts of application, transdisciplinarity and heterogeneity;

We are ending this listing of findings with a location where so-called „knowledge producers” work. Those are not exclusively universities, industrial and public laboratories, research institutes, "think-tanks" organizations, consulting agencies etc. Core of the sector whose economic function is the creation of new ideas, new technologies and new creative content are: science and engineering, architecture and design, education, art, music and entertainment. Around this core, there are also other fields in which experts are engaged in solving complex problems, which requires independent evaluation and high-quality human capital: business and finance, law and health care.

Even in this field there is no statistics on the basis of which Serbia could be compared to the countries of EU and OECD. There are two main reasons for that: (Kutlača:2006, 7-10)

Treatment of activities, which were listed as creative industries, in statistics and in economy of Serbia as consumption, the activities that do not create a new value?!

Low level of the culture of patenting and intellectual values protection generally in Serbia, which is reflected in a very small number of patents, distinctive signs etc annually, whose protection is required from the National Intellectual Property Office.

All of this suggests that studying the impact of socio-cultural factors and value system in case of media students in Serbia, Croatia and Bosnia and Herzegovina, which is presented in this paper, is very significant so that Faculty of Management as a part of the project „Digital media technologies and socio-educational changes“ (Project no. 47020), which is realized with financial support from the Ministry of Science, Technological Development and Education of the Republic of Serbia, takes significant research steps in order to identify the situation of innovation culture in Serbia.

Key conclusion, based on analysis derived, is necessity of constructing and developing innovation culture of the nation, as a precondition of establishment of creative industries, which are the main drivers of development and competitiveness of economy of XXI century.

3. COGNITIVE ELEMENTS OF CULTURE

Content of the culture can be divided into two parts:

- Cognitive and
- Symbolic.

Cognitive part consists of those categories that enable for the situations, things or phenomena in society to have the same meaning for all the members. By using them, common opinion and behaviour are created.

Symbolic part includes all those elements of culture that carry and manifest those common meanings. These elements include everything that occurs as a result or consequence of common thinking and behaviour of employees.
Cognitive content of culture consists of the following elements:

- Assumptions,
- Values,
- Beliefs, and
- Behaviour standards.

In order to understand cognitive elements of the culture, it is necessary to refer to social paradigm of symbolic interactionism, which also represents the basis of social and cognitive psychology. The creators of this paradigm or, more precisely, the philosophical direction, are German philosophers Mead and Blumer. [Janičijević: 1996, 49-76].

What is the essence of this paradigm? The assumption that people belong to the objective world of meanings that surrounds them and based on them, they react, i.e. behave. People behave depending on the way in which they perceive the world around them, rather than on the basis of real perception and real state of affairs and events in the world. For example, in order to react to somebody's action or behaviour of some other man, we need to understand them first, and that understanding is determined by our individual interpretation of that action or behaviour.

Meanings that the people attribute to social situations in which they are encountered are results of social interaction, i.e. environment, previous knowledge and reality, but also the lack of interaction with other people.

Through acquiring the experiences with different people and situations, people became able to interpret them without any waste of time and energy. Based on such an experience, people make typical images or schemes of a situation, event or people. As a result of systematization and generalization of experiences, there are cognitive structures – interpretative or mental schemes. According to Fiske and Taylor «cognitive structure is organized knowledge about a particular type of stimulus». [Janičijević: 1996, 49-76]

As much as interpretative schemes be beneficial for the interpretation of external stimuli, because they save time and energy, they can also be harmful because they represent a simplified image of reality.

Components of interpretative schemes of employees in organization can be classified into two groups:

- Descriptive (basic assumptions, metaphors and paradigms) and
- Prescriptive (beliefs, values and norms).

Prescriptive components are, as a rule, conscious, while descriptive are of subconscious character. Beliefs and values can also be of subconscious character.

Descriptive cognitive components also contain generalized and systematized knowledge and experience regarding causal relations between two things, people or phenomena in the real world. Actually, this is intuitive intelligence, which can be found in unconscious. The unconscious is divided into common and individual. This common, i.e. collective unconscious enables the members of society to answer the question «why», i.e. to understand the reality as it is – evolutive intelligence.

Values are «persistent beliefs that certain behaviour or specific target state is personal or socially more desirable than the opposite behaviour or target state» [Brown, 1995. According to: Janićijević: 1996, 49-76] They are the ideal which each individual aspires to. Of course, each individual carries his value system with him, modelled through identification with persons important to him. This individual value system can be compatible or incompatible to the value system of society. In order for an individual to adapt his value system to society's, he needs to socialize. For that reason, socialization period is very important.

Beliefs are transformed values repressed into subconscious. Values are transformed by becoming established in practice over time, and also prove to be successful. Beliefs represent cognitive component of culture that speaks how the world functions and what causal and effects relations are there between things and phenomena in the real world (logic and intuitive intelligence). Stability of behaviour comes from beliefs.
Norms of behaviour have a very important role. They are specific for producing stable forms or models of behaviour.

Basic assumptions make the deepest component of cognitive content of culture. Their function is descriptive. They systematize and generalize basic human knowledge and experience regarding the way in which the world around them functions and what is the nature of things around them like. Knowledge and experience systematized by basic assumptions are general and abstract. Therefore, basic assumptions have a very big impact on opinion and behaviour of people. They are found deep in subconsciousness and, for that reason, they are rather difficult to change or influence.

Edgar Schein has started with an assumption that there should be made a difference between superficial manifestations and basic assumptions that relate elements of a specific culture. He believes that there are three mutually related levels of culture, as it is shown in the following figure [Schein, 1987.]

---

**Figure 3. Levels of culture according to E. Schein**

- **Basic assumptions and premises**
  - Man and nature
  - Time
  - Space

- **Values and ideology**
  - Higher level
  - Consciousness

<table>
<thead>
<tr>
<th>Creating</th>
<th>Creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Satisfaction</td>
</tr>
<tr>
<td>Technology</td>
<td>Status</td>
</tr>
<tr>
<td>Art</td>
<td>Family</td>
</tr>
</tbody>
</table>

- Taken for granted
- Invisible
- Too soon
- visible, but it can often be deciphered

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Basic assumptions and premises are subconscious starting point regarding the nature of truth and reality. They depend on human nature, time and space in which a man exists, as well as on the man's attitude towards the nature.

Ideology and values conceptualize principles, value norms and attitudes, ethics and rules according to which the society functions. They most frequently define intergroup and interpersonal relations.

4. PREVIOUS STUDIES

In cross-cultural psychology and related disciplines there are studies which point to the fact that basic values of a culture influence not only the economic growth, health of population, life extension, feeling of bliss and happiness, but also creative and innovative disposition of personality. [Diener, E., :2000, Baker, W.E., Inglehart, R.:2000, 18-20, Shane, S.: 1992, 1995] Despite the above-mentioned fact, relation between cultural values and innovativeness of the members of a specific society is not sufficiently investigated.

On the basis of previous cross-cultural studies, we have come to the conclusion that innovativeness is influenced by two elements of culture: **horizontality** (non-hierarchy) of society and **individualism.** [Shane, S.:1992, 10010-1028]

Innovativeness is more present in non-bureaucratic societies, because bureaucracy kills creativity. In bureaucratic societies, there is a behaviour control system which hampers creativity, imagination and innovativeness. Inventions and innovations are often followed by radical social changes which aspire to minimization by surrounding themselves with redistribution of power in hierarchical society. In individual societies, freedom necessary for creation is more appreciated. Innovators should be rewarded both materially and morally, which is a characteristic of
individualistic societies that know how to appreciate and support individualism. Psychological characteristics of independence, achievements and non-conformism are important for innovativeness and creativity, are more widespread in individualist societies.

Russian psychologists, led by Žuravljeva, have carried out empirical study of psychological readiness of citizens regarding innovations in 1993, and according to the criterion mentioned, they have made a division of socio-psychological types ranging from „active reformers“ to „active opponents“. Results obtained witness about multifactor nature of innovativeness and necessity of differentiating the evaluations of psychological readiness of different social categories of citizens towards social innovations.

In her studies, Sovetova has proven that innovativeness (both general and specific) can be related to personality traits of respondents. Accordingly, the relationship towards the new and changes (innovation component) appears as individual category of the culture of a particular people and it has historical roots and changes over time. [Sovetova, O.S.:2000]

In 2009, Lebedeva has carried out a cross-cultural study of values and relation towards innovations on students from Russia, Canada and North Caucasus, and, somewhat earlier, China. Her studies have shown that connection between values and relationship towards innovations has both universal and culturally specific character. The connection between value system of society and relationship towards innovations is established. [Lebedeva, N.M.:2009, 81-92]

In the studies of Dolinger and conducted in 2007, it was shown that creative students have a different value system them their colleagues. Results have shown that they highly evaluate independence and universalism in their value system, so that these two categories positively correlate with innovativeness and creativity, and tradition, security and power are negative and very low value in their value system. [Dolinger, S.J.:2007]

5. THEORETICAL BASIS OF RESEARCH

Dominant social values as one of the main elements of culture influence the behaviour of the members of a particular nation. Lately, the most popular and mostly used theoretical starting point for studying value system is Schwartz’s standpoint. [Schwartz, S.H.:1999, 453-464]

Relying on theoretical and empirical studies, Schwartz has grouped values into ten categories (motivation types): power, achievement, hedonism, stimulation, independence, universalism, benevolence, tradition, conformity, security.

Numerous studies have shown that this model can be taken as universal for all types of society. As individuals from different societies can attribute different meaning to the values, all the above-mentioned values are grouped into value-motivational oppositions, divided into two bipolar axis: readiness to change (independence and stimulation), conservatism (security, conformism and tradition), self-confidence (power, achievement, hedonism), emphasis on others (universalism, benevolence). [Lebedeva, N.M.:1993, 4-15, Schwartz, S.H.:1999, Diener, E.:2000]

Starting from Schwartz’s theory, we can assume that values on the pole readiness to change should be related to aspirations towards creativity and innovativeness, and values on the opposite pole conservatism should be negatively related to innovativeness.

Innovative personality traits were studied by Lebedeva’s questionnaire. This questionnaire examines the personality innovativeness index, based on creativity assessment, risk because of success, orientation towards the future and self-confidence.

6. EMPIRICAL RESEARCH

Goals and tasks of research

1. examine intercultural and intersex differences in values and attitudes towards innovations;
2. Examine inter-relationship between value system and relationship towards innovations in three groups of media students (Serbia, Bosnia and Herzegovina and Croatia);
3. Implement cross-cultural verification of universality and specificity of relationship between values of cultures and relation towards innovation in different cultures;

Research hypothesis

H0 – We assume that values of individuals are related to their attitude towards innovations and that character of that relation can be culturologically conditioned.

H1 – We assume that there are intercultural and intersex differences between values by opposition traditionalism and self-confidence.

H2 – We assume that there are intercultural and intersex differences in attitudes towards innovations (we assume that attitudes of Croatian and Serbian students towards innovations are more positive that attitudes of students from Bosnia and Herzegovina), as well as that in total sample, the men have more positive attitude towards the innovations than women.

H3 - We assume that values readiness to change and universalism influence the positive attitude towards innovations, while power and traditionalism have a negative impact.
H4 – We assume that impact of values on the attitude towards innovations also has universal and culturally specific character.

Research sample

In our study, three groups of media students were involved – Serbia, Croatian and students from Bosnia and Herzegovina – from the cultures for which we assume that they have different value systems, as well as different development level of society.

There were 426 respondents, of which 193 Serbian students, 96 Croatian and 137 from Bosnia and Herzegovina, aged from 18 to 28.

<table>
<thead>
<tr>
<th>Cultural group</th>
<th>Number of respondents</th>
<th>Age</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serbia</td>
<td>193</td>
<td>18-22</td>
<td>m 81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>f 112</td>
</tr>
<tr>
<td>Croatia</td>
<td>96</td>
<td>18-26</td>
<td>m 34</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>f 62</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>137</td>
<td>20-28</td>
<td>m 57</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>f 80</td>
</tr>
</tbody>
</table>

Research procedure

Research was carried out by on-line completing of questionnaire. Respondents were asked to complete the questionnaire with seven-level scale, assessing each of 57 values mentioned, and the question was „Which values are the most important for me and which values influence the basic principles of my life?“

Research was carried out in May and June 2011.

Research instrument

Instrument included two questionnaires: Schwartz Value Survey (SVS57) and the questionnaire of N.M. Lebedeva „Innovative personality traits“

Variables of research

Independent variables

1. 10 individual values: power, achievement, hedonism, stimulation, independence, universalism, benevolence, tradition, conformity, security.

2. 4 value oppositions – conservatism (observed through arithmetic mean of values security, conformity, tradition); readiness to change (observed through arithmetic mean of values independence and stimulation); self-confidence (observed through arithmetic mean of values universalism, benevolence; emphasis on others (observed through arithmetic mean of values hedonism, achievement, power).

Dependent variables

Innovative personality traits:

- a) Creativity – observed through arithmetic mean of answers to 5 questions,
- b) Risk for success – observed through arithmetic mean of answers to 4 questions,
- c) Orientation to future – observed through arithmetic mean of answers to 3 questions,
- d) Belief in oneself – observed through arithmetic mean of answers to 3 questions
- e) Personality innovativeness index observed through arithmetic mean of creativity scale, risk for success, orientation on future and faith in oneself.

Statistical processing of data was done using SPSS11.0

For the assessment of psychological evaluations, we have used the procedure Reliability, using the Cronbach’s alpha. For the verification of diversity, we have used Z-criterion of Kolmogorov-Smirnov for selection independence. For verification of variables independence, we have used stepwise and enter analysis, and for the control of the sex, age and their mutual impact - multicollinearity.

6. 1. Research results

6.1.1. Intergroup differences of values and attitude towards innovations

Statistical analysis of intergroup difference of students’ values according to the criterion of Kolomogorov-Smirnov is given in the following table:

<table>
<thead>
<tr>
<th>Values</th>
<th>Serbian students</th>
<th>Croatian students</th>
<th>Z - criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Me</td>
<td>Min-max</td>
<td>Me</td>
</tr>
<tr>
<td>Security</td>
<td>3.93</td>
<td>3.64</td>
<td>1.98-5.62</td>
</tr>
<tr>
<td>Conformity</td>
<td>3.79</td>
<td>4.78</td>
<td>1.45-6.23</td>
</tr>
<tr>
<td>Tradition</td>
<td>2.10</td>
<td>5.12</td>
<td>.31-4.81</td>
</tr>
<tr>
<td>Benevolence</td>
<td>4.58</td>
<td>4.20</td>
<td>2.15-6.35</td>
</tr>
<tr>
<td>Universalism</td>
<td>3.61</td>
<td>4.63</td>
<td>.85-5.48</td>
</tr>
<tr>
<td>Independence</td>
<td>4.67</td>
<td>5.66</td>
<td>1.50-7.00</td>
</tr>
<tr>
<td>Stimulation</td>
<td>3.91</td>
<td>7.14</td>
<td>.49-6.65</td>
</tr>
<tr>
<td>Hedonism</td>
<td>3.80</td>
<td>5.40</td>
<td>.02-6.95</td>
</tr>
<tr>
<td>Achievement</td>
<td>4.34</td>
<td>6.96</td>
<td>1.45-6.85</td>
</tr>
<tr>
<td>Power</td>
<td>3.25</td>
<td>6.10</td>
<td>.60-6.70</td>
</tr>
</tbody>
</table>
Priority for values security, independence and power is significantly higher in case of Serbian students, while traditionalism, universalism and value opposition of emphasis on others is highly evaluated by Croatian students. For representatives of students from Bosnia and Herzegovina, the values security, conformity, tradition, universalism, power are significantly higher evaluated than in case of Serbian students, on the level of value opposition of conservatism. Serbian students highly evaluate values independence, stimulation, hedonism, achievement, benevolence, on the level of value oppositions of readiness to change orientation on others.

Significant intersex differences were observed in case of following values: benevolence, universalism, orientation on others are more evaluated by female population, while independence, stimulation and hedonism, as well as self-confidence and readiness to change are the preferences of male population.

Research results have thus confirmed our hypothesis H1 that there are intercultural and intersex differences according to value oppositions conservatism, readiness to change, self-confidence and emphasis on others (orientation to others).

### Table 7. Statistical analysis of intergroup difference – students from Serbia and Bosnia and Herzegovina

<table>
<thead>
<tr>
<th>Groups</th>
<th>Serbian students</th>
<th>Students from Bosnia and Herzegovina</th>
<th>Z - criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>Me</td>
<td>range Min-max</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>3.93</td>
<td>3.64 1.98-3.62</td>
<td>4.24 4.98 1.39-6.38</td>
</tr>
<tr>
<td>Conformism</td>
<td>3.79</td>
<td>4.78 1.45-6.23</td>
<td>4.40 4.32 1.57-5.89</td>
</tr>
<tr>
<td>Tradition</td>
<td>2.10</td>
<td>5.12 .31-4.81</td>
<td>3.80 4.76 1.17-5.93</td>
</tr>
<tr>
<td>Benevolence</td>
<td>4.58</td>
<td>4.20 2.15-6.35</td>
<td>4.13 4.26 1.87-6.13</td>
</tr>
<tr>
<td>Universalism</td>
<td>3.61</td>
<td>4.63 .85-5.48</td>
<td>3.89 4.03 1.73-5.78</td>
</tr>
<tr>
<td>Independence</td>
<td>4.67</td>
<td>5.66 1.50-7.00</td>
<td>4.23 3.54 2.18-5.72</td>
</tr>
<tr>
<td>Stimulation</td>
<td>3.91</td>
<td>7.14 .49-6.65</td>
<td>3.56 5.54 .67-6.21</td>
</tr>
<tr>
<td>Hedonism</td>
<td>3.80</td>
<td>5.40 .02-6.95</td>
<td>3.82 8.16 -1.18-6.98</td>
</tr>
<tr>
<td>Achievement</td>
<td>4.34</td>
<td>6.96 1.45-6.85</td>
<td>3.84 3.51 2.25-5.76</td>
</tr>
<tr>
<td>Power</td>
<td>3.25</td>
<td>6.10 .60-6.70</td>
<td>3.70 5.83 .94-6.77</td>
</tr>
<tr>
<td>CONSERVATISM</td>
<td>3.48</td>
<td>2.15 1.81-4.55</td>
<td>4.12 2.39 2.76-5.15</td>
</tr>
<tr>
<td>READINESS TO CHANGE</td>
<td>1.25</td>
<td>4.87 1.64-6.52</td>
<td>3.80 3.32 2.37-5.36</td>
</tr>
<tr>
<td>EMPHASIS ON OTHERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SELF-CONFIDENCE</td>
<td>4.08</td>
<td>3.63 1.98-5.61</td>
<td>2.60 2.60 2.76-5.36</td>
</tr>
<tr>
<td></td>
<td>3.73</td>
<td>5.21 1.23-6.45</td>
<td>3.72 3.72 1.82-5.55</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001

### Table 8. Statistical analysis of intersex difference – the whole sample

<table>
<thead>
<tr>
<th>Groups</th>
<th>Men</th>
<th>Women</th>
<th>Z - criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>Me</td>
<td>range Min-max</td>
<td>Me</td>
</tr>
<tr>
<td>Security</td>
<td>4.05</td>
<td>4.98 1.39-6.38</td>
<td>4.11</td>
</tr>
<tr>
<td>Conformism</td>
<td>4.01</td>
<td>4.20 1.45-5.64</td>
<td>4.10</td>
</tr>
<tr>
<td>Tradition</td>
<td>3.27</td>
<td>5.35 .25-5.60</td>
<td>3.05</td>
</tr>
<tr>
<td>Benevolence</td>
<td>4.19</td>
<td>3.92 2.15-6.07</td>
<td>4.50</td>
</tr>
<tr>
<td>Universalism</td>
<td>3.64</td>
<td>4.93 .85-5.78</td>
<td>3.78</td>
</tr>
<tr>
<td>Independence</td>
<td>4.49</td>
<td>4.88 2.27-7.0</td>
<td>4.42</td>
</tr>
<tr>
<td>Stimulation</td>
<td>4.01</td>
<td>5.25 1.37-6.61</td>
<td>3.43</td>
</tr>
<tr>
<td>Hedonism</td>
<td>3.94</td>
<td>6.49 .46-6.95</td>
<td>3.74</td>
</tr>
<tr>
<td>Achievement</td>
<td>4.14</td>
<td>4.53 2.31-6.85</td>
<td>4.03</td>
</tr>
<tr>
<td>Power</td>
<td>3.75</td>
<td>5.83 .87-6.70</td>
<td>3.41</td>
</tr>
<tr>
<td>CONSERVATIVISM</td>
<td>3.74</td>
<td>2.96 2.19-5.15</td>
<td>3.76</td>
</tr>
<tr>
<td>READINESS TO CHANGE</td>
<td>4.29</td>
<td>3.69 2.63-6.32</td>
<td>3.89</td>
</tr>
<tr>
<td>EMPHASIS ON OTHERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SELF-CONFIDENCE</td>
<td>3.92</td>
<td>2.96 1.98-4.95</td>
<td>4.15</td>
</tr>
<tr>
<td></td>
<td>3.92</td>
<td>4.20 2.25-6.45</td>
<td>3.69</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001
Statistical analysis and intergroup differences of attitudes of students examined towards innovations according to the criterion of Kolmogorov-Smirnov are given in Tables 9,10,11.

We can see that there is no difference in the attitude towards innovations of Serbian and Croatian students, while the indicators such as creativity, orientation to future, self-confidence and general innovation index are significantly higher in case of students from Serbia than those from Bosnia and Herzegovina.

When we speak about intersex differences, it is important to emphasize that positive attitude towards innovation is much more obvious in case of men than women, through the indicators such as creativity, risk for success, self-confidence as well as general personality innovativeness index. In Serbian sample, in case of men, the indicator risk for success (Z=1.83) and personality innovativeness index are significantly higher, in Croatian sample the indicator creativity and personality innovativeness index are significantly higher in case of men (Z=1.56 and Z=1.44), as from students from Bosnia and Herzegovina, the following indicators stand out with men in relation to women: creativity (Z=1.37), risk for success (Z=1.53) and self-confidence (Z=1.66), as well as the personality innovativeness (Z=1.65).

By this results, our hypothesis H2 is confirmed, which says that we assume that there are intercultural and intersex differences in attitudes towards innovations (we assume that attitudes of Croatian and Serbian students towards innovations are more positive than the attitudes of students from Bosnia and Herzegovina), as well as that in total sample the men have more positive attitude towards innovations than women.

<table>
<thead>
<tr>
<th>Table 9. Intergroup differences in the attitudes towards the innovations of Serbian and Croatian students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
</tr>
<tr>
<td>Orientation on innovativeness</td>
</tr>
<tr>
<td>Creativity</td>
</tr>
<tr>
<td>Risk for success</td>
</tr>
<tr>
<td>Orientation on future</td>
</tr>
<tr>
<td>Self-confidence</td>
</tr>
<tr>
<td>Personality innovativeness index</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 10. Intergroup differences in attitude towards innovations in case of students from Serbia and Bosnia and Herzegovina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
</tr>
<tr>
<td>Orientation on innovativeness</td>
</tr>
<tr>
<td>Creativity</td>
</tr>
<tr>
<td>Risk for success</td>
</tr>
<tr>
<td>Orientation on future</td>
</tr>
<tr>
<td>Self-confidence</td>
</tr>
<tr>
<td>Personality innovativeness index</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01, *** p<0.001

<table>
<thead>
<tr>
<th>Table 11. Intersex difference of attitude towards innovations – entire sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
</tr>
<tr>
<td>Orientation on innovativeness</td>
</tr>
<tr>
<td>Creativity</td>
</tr>
<tr>
<td>Risk for success</td>
</tr>
<tr>
<td>Orientation on future</td>
</tr>
<tr>
<td>Self-confidence</td>
</tr>
<tr>
<td>Personality innovativeness index</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01, *** p<0.001

6.1.2. Mutual relationship between values and innovations

For verification of hypothesis H3 and H4, regression analysis (according to enter method) of values and innovative elements was carried out on entire sample and each cultural group with the analysis of sex differences, age and mutual impact of variables. These results are given in Tables 12, 13,14 and 15, only the most significant connections.

Results have shown that innovative elements are positively correlated by values of independence, stimulation, universalism, achievement, and negatively by power and traditionalism.
### Table 12. Correlation of values and attitude towards innovations – entire sample

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Independence</th>
<th>Stimulation</th>
<th>Power</th>
<th>R²</th>
<th>F</th>
<th>Traditionalism</th>
<th>Universalism</th>
<th>Achievement</th>
<th>R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>.36***</td>
<td>.15**</td>
<td>.17</td>
<td>.17</td>
<td>23</td>
<td>-.21***</td>
<td>.11*</td>
<td>.06</td>
<td>8.7</td>
<td>11</td>
</tr>
<tr>
<td>Risk for success</td>
<td>.14**</td>
<td>.22***</td>
<td>18***</td>
<td>.11a</td>
<td>18</td>
<td>-.12*</td>
<td>.15**</td>
<td>.15**</td>
<td>.09</td>
<td>12</td>
</tr>
<tr>
<td>Orientation on future</td>
<td>.24***</td>
<td>.07</td>
<td>10</td>
<td>-.23***</td>
<td>.15**</td>
<td>.15**</td>
<td>.09</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-confidence</td>
<td>.22***</td>
<td>.05</td>
<td>8.1</td>
<td>-.13*</td>
<td>.16**</td>
<td>.15**</td>
<td>.09</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personality</td>
<td>.29***</td>
<td>.12*</td>
<td>-.1</td>
<td>.12</td>
<td>18</td>
<td>-.22***</td>
<td>.19***</td>
<td>.20***</td>
<td>.12</td>
<td>18</td>
</tr>
<tr>
<td>Innovativeness index</td>
<td>.36***</td>
<td>.15**</td>
<td>.17</td>
<td>.17</td>
<td>23</td>
<td>-.21***</td>
<td>.11*</td>
<td>.06</td>
<td>8.7</td>
<td>11</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001

In case of Serbian media students, values independence, innovativeness, and traditionalism is negatively correlated. Stimulation and power are positively correlated with innovativeness.

### Table 13. Correlation between values and attitude towards innovation – Serbian sample

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Independence</th>
<th>Stimulation</th>
<th>Power</th>
<th>R²</th>
<th>F</th>
<th>Traditionalism</th>
<th>Universalism</th>
<th>Achievement</th>
<th>R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>.42***</td>
<td>.19**</td>
<td>.24</td>
<td>.24</td>
<td>12</td>
<td>-.61**</td>
<td>.19</td>
<td>.06</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td>Risk for success</td>
<td>.22***</td>
<td>.23***</td>
<td>22***</td>
<td>.17</td>
<td>14</td>
<td>-.61**</td>
<td>.19</td>
<td>.06</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td>Orientation on future</td>
<td>.15*</td>
<td>15*</td>
<td>.05</td>
<td>3.6</td>
<td>-.22**</td>
<td>.19</td>
<td>.06</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-confidence</td>
<td>.27***</td>
<td>.06</td>
<td>4.1</td>
<td>.13</td>
<td>-.22**</td>
<td>.19</td>
<td>.06</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personality</td>
<td>.31***</td>
<td>.20**</td>
<td>.117</td>
<td>13</td>
<td>-.22**</td>
<td>.19</td>
<td>.06</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovativeness index</td>
<td>.36***</td>
<td>.15**</td>
<td>.22</td>
<td>.14</td>
<td></td>
<td>.14</td>
<td>.14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001

In Croatian sample, values independence and stimulation positively correlate to innovativeness, while power and achievement wasn’t established. Correlation between attitude and values universalism and achievement is negatively correlated.

### Table 14. Correlations of values and attitude towards innovations – Croatian sample

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Independence</th>
<th>Stimulation</th>
<th>Power</th>
<th>R²</th>
<th>F</th>
<th>Traditionalism</th>
<th>Universalism</th>
<th>Achievement</th>
<th>R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>.26***</td>
<td>.33***</td>
<td>.22</td>
<td>.14</td>
<td></td>
<td>.14</td>
<td>.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk for success</td>
<td>.34***</td>
<td>.27**</td>
<td>17</td>
<td>.12</td>
<td></td>
<td>.14</td>
<td>.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation on future</td>
<td>.24*</td>
<td>.27***</td>
<td>17</td>
<td>.12</td>
<td></td>
<td>.14</td>
<td>.14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001

In case of media students from Bosnia and Herzegovina, values independence, universalism and achievement positively correlate with innovativeness, and values traditionalism and stimulation correlate negatively.
In further elaboration, we have carried out regression analysis of correlation between value oppositions and innovativeness index. Results have shown that in the sample of Serbian and Croatian students, there are values which are on the pole readiness to change.

Precisely such results have confirmed our hypothesis H3, by which we have assumed that values readiness to change and universalism influence positive attitude towards innovations, while power and traditionalism have a negative influence. This was confirmed on the whole Croatian and partially Serbian sample of students interviewed. Results have also shown cultural specificity: in Serbian sample value power positively correlates with the attitude towards innovations and risk for success, and in sample of students from Bosnia and Herzegovina, value stimulation negatively correlates with the orientation to future and self-confidence.

Precisely these results have confirmed our hypothesis H4 that impact of values to the attitude towards innovations has both universal and culturally specific character.

### 6.2. Discussion of results with conclusions

Cross-cultural study which was carried out with media students from Serbia, Croatia and Bosnia and Herzegovina has shown that there are intercultural and intersex differences in individual values of respondents. Expressed intercultural and intersex differences, in our opinion, reflect differences on the line traditionalism-modernism, on which students from B&H are closer to the traditionalism pole, because they estimate tradition leads to group harmony. In case of Serbian and Croatian students, standpoint is closer to modernism pole, because they appreciate more individualism and readiness to change.

According to Schwartz’s theory, value oppositions are central for I conception of a man and motivate him to appropriate behaviour in terms of self-realization/value. [Schwartz, S.H.:1999, 878-891] Within this paradigm, behaviour in accordance with traditionalism can lead to social acceptance and rejection, and the price of its rejection can be social rejection and unacknowledgement. Value readiness to change motivates our aspirations towards inner freedom, creativity, curiosity, satisfaction, and its rejection motivates giving up on self-realization. According to everything above-mentioned, it is possible to assume that modernization is based on dynamics of value assumptions from traditionalism to readiness to change.

Conducted research has shown that there are significant intersex differences: women estimate more the orientation to other people (benevolence, universalism), and the men values readiness to change (independence, stimulation) and self-confidence (hedonism, power). Our results completely correlate with results of the studies of other researchers: results of studying sex differences of individual value systems in 70 cultures have shown that men prefer values power, stimulation, independence, achievement, hedonism, and women benevolence and hedonism. [Schwartz, S.H.:2006, 249-288]

According to Schwartz, values of self-confidence motivate aspirations towards material, and values of orientation to others manage individual behaviour from moral aspect of caring for others.

Intersex differences can be explained in the light of social roles theory, according to which roles of men and women are distinguished both in labour market and in family. [Eagly, A.H.:2001, Schwartz, S.H.:2006, 249-288]

All of the above-mentioned points to the fact that we have confirmed our first research hypothesis H1.

Intergroup comparison of the results of our research has shown that in attitude towards innovation there are no differences between Serbian and Croatian media students,

### Table 15. Correlation of values and attitude towards innovations – B&H sample

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Independence β</th>
<th>Stimulation β</th>
<th>Power β</th>
<th>R²</th>
<th>F</th>
<th>Traditionalism β</th>
<th>Universalism β</th>
<th>Achievement β</th>
<th>R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity Risk for success</td>
<td>.20*</td>
<td>-.19*</td>
<td>.05</td>
<td>5.6</td>
<td>.23***</td>
<td>.17**</td>
<td>.19</td>
<td>.07</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Orientation on future Self-confidence Personality innovativeness index</td>
<td>.20*</td>
<td>-.23**</td>
<td>.08</td>
<td>6.3</td>
<td>.27**</td>
<td>.25***</td>
<td>.08</td>
<td>6.4</td>
<td>6.8</td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001
as well as that there are differences between students from Serbia and B&H. Significant intersex differences have also come to sight: in all three cultural groups, men have more positive attitude towards innovations than women, which can also be explained from the aspect of the theory of social roles. This points to the confirmation of our second research hypothesis H2.

Results of regression analysis of the correlations between values and innovativeness have enabled complete confirmation of our third research hypothesis H3. These results fully correlate with other foreign studies [Dollinger, S.J.:2007, Schwartz, S.H.:2006, 249-288, Shane, S.: 1992, 29-46, Shane, S.:1995, 931-952] and testify on universality of the character of correlations which we have spoken about.

On representative samples of studies of different cultures, Schwartz has reached a conclusion that hierarchical order of the values could be the following: benevolence, universalism, independence at the top, and power and stimulation at the bottom.

This order of values was also confirmed in our study, but it is important to point out that there are also cultural specificities. By combining the results of Croatian and Serbian students, we have obtained a result showing that Croatian students more evaluate security, and students from Bosnia and Herzegovina security and conformism. Precisely these last two values provide harmonic social relations and assist the avoidance of conflicts and non-impairement of group norms. Precisely the high evaluation of these values enables the maintenance of status-quo and prevents the search for new solutions and, accordingly, the innovativeness.

Value independence is most evaluated by Serbian students and it is precisely a source of creativity and it encourages innovativeness, so it enables the search for new solutions in conditions of crises in which the society is found.

Cultural specificity has shown among students from Serbia and Bosnia and Herzegovina. In Serbian sample, value power is rather expressed and it positively correlates with the attitude towards innovations, particularly risk for success. Preferring this value, according to Schwartz, can lead to the impairment of social harmony, but also to the motivation of people for the sake of group interests.

Preferring this value in case of Serbian students can be explained by authoritarianism of Serbian society and by the fact that innovations in such cultures need to come „from the top“ and risks related to new solutions can be encouraged by authority of the power or they can encourage the power itself.

The facts mentioned not only do confirm our zero and fourth research hypotheses, but they put before us a new research and practical problem: how to successfully reach innovations regardless of the cultural specificities.

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INTERDISCIPLINARITY AS A KEY OF COMPETITIVENESS IN DIGITAL AGE

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Abstract: Intensification of globalisation, scientific and technological development, rapid growth of information and communication technology usage and overall digitalisation, as well as increasing concern about ecology, are characteristics of the new world economy. Complex problems can be resolved only through interdisciplinary work and knowledge sharing. In this paper, interdisciplinarity is discussed, as a factor of competitiveness in a new, digital age, in the areas of science and technology, human resources, production and on the individual level, as well as mutual influences of these areas.

Keywords: digital age, interdiscplinarity, knowledge sharing

1. INTRODUCTION

Contemporary developmental tendencies point out that interdisciplinarity increasingly gains in importance and that it becomes one of the decisive factors of success and competitiveness at all levels. Intensification of globalisation, scientific and technological development, rapid growth of information and communication technology usage and overall digitalisation, as well as increasing concern about ecology are characteristics of the new world economy. This new economy requires a more rapid knowledge exchange, networked markets, intensive cooperation and professional education of human resources.

All these have caused that it is almost impossible for any organisation to exist in isolation. Thus, networking in any sense is becoming an increasingly common structural form (Arsenijević, 2010; Leonard et al, 1998). Networked organisations that are emerging (such as alliances, collaboratives, communities of practice) are usually described as “formal or informal collection of organisations and individuals that have entered into collaborative relations usually involving multiple channels of communication and knowledge diffusion across disciplinary or organisational boundaries” (Ratcheva, 2005). It is evident that focus on associating for the purpose of sharing knowledge and ideas, particularly at interdisciplinary level.

It was found that knowledge heterogeneity influence on organizational performance and innovativeness (Rođan, Galunic, 2004). In the case of alliances, knowledge diversity can enhance problem-solving capacity and cognitive resources. Cummings (2004) has showed that the value of external knowledge sharing increases when work groups are more structurally diverse. Most contemporary studies in this field offers empirical proofs that knowledge production tends to proceed in interdisciplinary direction or that interdisciplinary education achieve good results (Boix- Mansilla, 2006; Klein, 1990; Gibbons et al., 1994).

At the base of interdisciplinarity is the idea that complex problems cannot be appropriately handled by persons with the same or similar education - different approaches can be solved by working on problems together. Even though interdisciplinarity is usually viewed as relatively new term, the concept has historical roots, primarily in Greek philosophy. Julie Thompson Klein (1990) claims that the roots of the interdisciplinarity lie in a number of ideas of a unified science, general knowledge, synthesis and the knowledge integration. In that context, entire opus of Fritjof Capra is rather instructive (particularly see the books from 1986, 1998, 2004), and he is, considering philosophical implications of modern physics, passionately fighting for interdisciplinary, systemic approach to the observation and solution of modern phenomena.

2. AREAS OF INTERDISCIPLINARITY

In this paper, we will discuss how is interdisciplinarity as a factor of competitiveness in a new, digital age manifested in the following areas:

- In the area of an individual: increasing need for interdisciplinary competences and education of new workers, as well as new interdisciplinary professions, then
- Human resources: primarily as diversity of human resources in organizations that is less avoided and increasingly required in order to increase perspectives (structural and demographic diversity)
and then, also as a need for the formation of interdisciplinary, i.e. cross-functional teams,

- Science: linking sciences that progresses rapidly with its development, increasing the need for interdisciplinary studies along with with scientific development, which enables interdisciplinarity in the area,
- Technology: integration of technologies that becomes a decisive factor of success of big corporations (biotechnology, optoelectronics, mechatronics, bioinformatics, ...); and consequently in the area,
- Products: increasing need in the market and increasingly present trump of manufacturer’s competitiveness in the form of multifunctional products, which is conditioned by interdisciplinarity of technologies that are necessary for its production.

Technological fusion is inseparable from scientific and it occurs as a result of new insights and knowledge of interdisciplinary scientific studies. Combining technologies inevitably leads up to the creation of new products, more complex and functional. Although particularly all the mentioned areas are intertwined and mutually conditioned, the last three items in this paper with be discussed together for the purpose of easier visibility.

3. INTERDISCIPLINARITY AT THE LEVEL OF HUMAN RESOURCES

Great writers of modern management theory mention the necessity of gender, professional, national and any other labour diversity, not only for competitive advantage of companies, but entire nations as well (Drucker, 1969; Ridderstråle, Nordström, 2002; Canton, 2006). Interdisciplinarity is here achieved by diversity of perspectives that diversity of labour brings.

James Canton, famous futurologist and successor of Alvin Toffler, anticipates that by 2025, every third employed worker in USA will be a woman, that increasingly greater share will be older workers and workers of different cultures (something similar is mentioned about Europe in official anticipations of Commission of The European Communities, 2008). James suggests that precisely the diversity of labour, by opening the door to immigration, can help the USA to increase competiveness and productivity (Canton, 2006).

Phenomenon that small organizations are more frequently more flexible than big ones is well-known – precisely because direct communication in teamwork (particularly between different professionals through joint development of a product or process) is what provides them bigger adaptability in relation to big corporations that often cannot avoid bureaucratic barriers that hierarchy brings with itself, although they very often have a lot of different professionals whose interaction can lead to interdisciplinarity. With changes that digital technologies and new media bring, large corporations make a step forward overcoming these barriers, often resorting precisely to the formation of interdisciplinary teams that work online, regardless of physical and geographical distance. Many technological models and solutions of knowledge management imply this connecting and interaction of human resources, their knowledge, ideas, experiences, perspectives and creativity, thus transforming their tacit knowledge in explicit knowledge that becomes organizational property (Arsenijević et al., 2009).

There is a growing demand, especially in the higher managerial structures and in knowledge management field, for experts with different skills and knowledge. On the strategic level, their skills should be knowledge of business and politics, creativity, risk analyze, leadership and presentation skills, and on the operational level those are IT knowledge, knowledge of financial operations, risk management, flexibility, etc (Savic, 2008).

Managing diversity of knowledge and skills, and providing the combination of different perspectives bring innovative ways of improving business procedures (Distefano, Maznevski, 2000; Cronin, Weingart, 2007; van Knippenberg et al., 2004). “Knowledge related resources are the major business value of human diversity” (Lauring, 2009).

4. INTERDISCIPLINARITY AT THE LEVEL OF INDIVIDUALS – INTERDISCIPLINARY EDUCATION AND PROFESSIONS

Interdisciplinarity also becomes the imperative at the level of individuals, as a consequence of circumstances we are living in – growing digitization of knowledge, knowledge economy, rapid environmental change, the shift to a low-carbon economy and rising globalization of cultures and economies - in particular the diffusion of ICTs and nano-technologies. There will be an increasing need for the jobs, especially in the field of engineering, to be linked with environmental education, in order to design product, process and technologies that do not pollute the environment. Not only the parties to the Kyoto Protocol, but the other countries as well (as this trend is spreading) increasingly prefer that every product is developed with environmental characteristics with the help of ecological processes and technologies. „The transition towards a low-carbon economy will also have an important impact on employment, especially in energy, water and waste treatment, construction, transport, industry, agriculture and forestry. According to the International Labour Organization, the global market for ecological services and products should double and reach 2740 billion dollars in 2020” (Commission of The European Communities, 2008). In addition, ICT become interwoven in all the activities so that each profession
will become interdisciplinary, having in mind that the education will be based on studying that discipline as well as studying the application of ICT in that field.

Some of the professions that Canton (2006) anticipates to be the most required in 2020 are: consultants for knowledge management and nano-bio entrepreneurs; 2025: TV producers that interact with the public, genetic engineers and therapists in the field of robotics; 2030: space market planners, experts that work on development of holographic games, managers in the field of neuromarketing and field of hydrogen marketing and entrepreneurs in the field of renewable energy – i.e. professions that require interdisciplinary approach and knowledge.

Demands from employers for transversal key competencies are continuously growing (Commission of The European Communities, 2008). There is a rising tendency of cross-functional bonding in professions, especially in service industry. In many knowledge-intensive sectors, both managerial skills and scientific knowledge are needed. Services workers, for example, have to develop digital literacy and customer orientation skills; ICT professionals have to develop skills in management, marketing and communication; in social care and education, workers have to upgrade skills to improve the quality of services (Commission of The European Communities, 2008: 8). A subsidiary of Siemens called Siemens Energy and Automation, for example, is committed to undergraduate mechatronics education because of their job force needs.

Many studies, such as those conducted by Association of American Colleges and Universities (2002), National Research Council (2002; 2003a; 2003b) and Project Kaleidoscope (2002) point out the unsustainability of current partial approach with a classification into particular disciplines and growing necessity for the change of education in interdisciplinary direction, particularly in the field of engineering. Jenkins et al (2008), furthermore, in famous study Participatory culture, about necessary competencies in the future for using new media and digital technologies, from sociological standpoint points to the necessity of interdisciplinary approach to the development of individuals and the inability of current education to meet that. “It becomes increasingly critical to help students acquire skills in understanding multiple perspectives, respecting and even embracing diversity of views, understanding a variety of social norms, and negotiating between conflicting opinions” (Jenkins et al, 2008: 53).

The need to expand perspectives and the need for more comprehensive knowledge and competences of the new labour exists in the education market of developed countries, primarily starting from the need of employer, through a growing interest of future students for this type of studies. Higher education recognizes those needs and the number of programmes that interdisciplinary approach includes is increasing. Data on the number of interdisciplinary studies offered at the University of Central Florida in the period 1970-2009 clearly indicate to this trend:

“Interdisciplinary syntheses are among the most epistemologically complex endeavours that humans can attempt” (Stein Z., Connell M., Gardner H., 2008: 402). This complexity arises primarily from the profound differences of perspective that must be crossed to perform interdisciplinary projects. Interdisciplinarity requires integrating more few perspectives to generate knowledge of higher-level and therefore more than the sum of its parts. “These elements cannot simply be tossed together in an interdisciplinary course (or research programme) like so many ingredients in a salad” (Stein Z., Connell M., Gardner H., 2008: 402). On the contrary, creating effective interdisciplinary programmes requires reflecting interdependencies among disciplines and perspective integration and thus, epistemological sophistication. Interdisciplinary programs bring together different fields of study, offering students opportunity to integrate abilities and enabling them to develop original approaches to solution-building and a strong competitive edge. These degrees create combinations of knowledge in the high-impact areas of the future. Graduates therefore gain greater options to apply their knowledge and carving out new market niches in which to put their unique mixed skill to work.

The importance of interdisciplinary approach was largely spoken about even in the eighties of the 20th century (Newell, 1983: 113): „The integrative thinking required in interdisciplinary study which involves pulling together and synthesizing disparate disciplinary insights into a coherent whole is at the top of the hierarchy“. Interdisciplinary education enable students to develop
cognitive, intellectual and moral dimensions as described in the works of Piaget, Perry, Gilligan, Kohlberg or Benson. As Gardner advocates, “The synthesizing mind takes information from disparate sources, and puts it together in ways that make sense to the synthesizer and also other persons... This capacity becomes ever more crucial as information continues to mount at dizzying rates” (Gardner, 2007: 3).

This is particularly important in new, digital era. Merging areas of study develop human knowledge and act in response to the challenges of changing world, including up-and-coming areas that combine disciplines such as information and communication systems, new media technologies, mechatronics, space science, alternative energy technologies and ecology, computer art and animation... Lately is coming out a large number of interdisciplinary institutions, departments and studying programmes, so as to meet a global demand for individuals able to produce high quality syntheses from different knowledge. Interdisciplinary studies are today most popular in media education, informatics, mechatronics and biotechnology2.

To deal with new demands, especially in a field of engineering, students need interdisciplinary skills that spotlight information management, research process, critical and creative thinking, collaboration and technological applications. New technologies in education, like virtual learning environment with 3D options can develop students’ systems-thinking and systems-design approach to investigate how products meet external and internal demands; using prototypes students can simulate ideas and test new product ideas or find solutions that surpass established, single disciplines.

In this context, we need to mention one of the interesting anticipations of the future fields in higher education. The Chronicle of Higher Education with economic forecasters, academic experts, and business analysts, has identified five studying fields that will bloom in future at universities:

- service science,
- sustainability,
- computational science,
- health informatics and
- public health.

These fields are obviously cross-disciplinary. For example, studies of service science, sustainability and computational science engage engineering and business schools, departments of computer science, mathematics and resource economics, and such schools are brought to work close together. Many cross disciplinary studies erase boundaries, combining chemists with computer scientists or bringing together environmental science and agriculture.

In service sector, service management becomes business-centric, giving birth to fields like service operations, service marketing, and electronic services. In health informatics, digitization of medical information has stimulated growth of health-data analysis field; and new studies for medical-records administrators and librarians emerge. In computational science, the use of computer modelling and simulation is developed with the aim of advancing other fields. In a field of biology, computers are used for mapping the functions of different organs, learning about genetic abnormalities, and helping to develop new medicines. In meteorology and atmospheric science, the use of computer is directed towards modelling to predict weather conditions, studying severe storms, or identifying climate change phenomena... Sustainability is very wide and perspective area. Some educational institutions offer programmes for sustainability science or environmental professions; others have developed green architecture and business degrees; while some have merged sustainability studies with traditional liberal-arts studies, like economics. Students at the University of New Hampshire, for example, can attend an undergraduate program in ecogastronomy that combines the fields of sustainable agriculture, nutrition, and hospitality. Sustainability itself is interdisciplinary field, so, for example, an sustainability engineer who have to assess the feasibility of installing wind turbines, got to have education in physics, geography, biology, and math. New professions are promising, like green energy engineers, sustainability consultants, green-building engineers, environmental-compliance officers, energy auditors, sustainability coordinators etc.

5. INTERDISCIPLINARITY AT THE LEVEL OF SCIENCE AND TECHNOLOGY

The maturation of industries that have helped fuel economic growth in the last half century - ranging from life sciences to electronics – have caused that occurred a new need for ever more sophisticated areas of exploration and collaboration of scientists and engineers across multiple disciplines. As the pace of innovation gets faster in industry today, keeping up with technology is getting more and more difficult for almost every company. In addition to the fact that companies achieve the competitiveness by innovations, they need to follow general trend of minimalization, digitalization and environmental acceptance in increasingly demanding...
market, so they offer products that are several functions, save space, time and money; they are smart and ecological. For that reason, the companies, while developing new products, more frequently resort to combining the technologies for development of such products, consciously or unconsciously. Therefore, innovations today even more come from outside industries – a consortium of construction industry, for example, by searching for new, ecological, building and isolation materials, can make a revolution by combining construction engineering, bio and nanotechnology – and even now, green energy industry combines construction, mechanical, biotechnological, digital, ecological and other technologies. We have witnessed that in emerging fields like nanomedicine with increased technological sophistication has come the requirement of interdisciplinary research and development (Appleyard et al, 2010).

Collaborative research and development is designed to help industrial and research communities to work together projects in important areas of science, engineering and technology - resulting new and successful products, processes and services. Numerous industrial sectors are making technological advancements by managing interdisciplinary scientific exploration. These revolutionary R&D projects involve the collaboration of researchers from a range of disciplines, and also often from many types of organizations (Gelijns, Rosenberg, 1995). For example, in a research nanomedicine project, it is common to have members from biology, chemistry, engineering, mathematics, and physics (Appleyard et al, 2010). Furthermore, U.S. National Institutes of Health has funded eight project teams with researchers from public research institutes, universities, and medical centres.

Fusing science and technologies or creating so-called hybrid technologies can therefore help companies to create new products, penetrate new market and remain on the leading market position. “Technologies act in conjunction with one another: They only add value as integrated systems” (Iansiti, 1997). Science and technology fusion brings together several previously separate, existing fields of technology. Kodama (1991, 1992), and Adner and Levinthal (2000) were engaged in knowledge fusion conceptualization. Interdisciplinary research and development projects implies researchers from different backgrounds integrating their existing technical components and combining their knowledge, with the result of creation new interdisciplinary insight and science improvement (Kodama, 1991, 1992; Nonaka, 1994; Nonaka, Takeuchi, 1995). Technologies undergo fusion when the resulting technology is applied to a new application domain (Adner and Levinthal, 2000). Technology fusion is cooperative, nonlinear and complementary combination of gradual technical improvements from several separate technology fields usually with the aim of creating new, revolutionizing products:

- integrating optics and electronics created optoelectronics, which gave birth to fiber-optics communications systems;
- fusing mechanical and electronic engineering gave birth the mechatronics revolution, which has transformed the machine-tool industry;
- merging business intelligence with geospatial technology resulted interactive spatio-temporal exploration and data analysis;
- combining the fields of sustainable agriculture, hospitality, and nutrition have become ecoagronomy;
- embedding advanced electronic components into textile fibers created fibertronics and so on...

One of the most significant changes that influences the interdisciplinarity of technologies is the appearance of overlapping digital, smart technologies, that drastically change the nature of consumer products, introducing new standards in production and consumption, changing the manner of production and forcing the companies to expand the work in their field on computer technology as well (thus applying interdisciplinary approach). Smart, digital products contain information technology as sensors, software and microchips which make them able to gather, process and produce information. That is why they often described as ‘thinking’ products - smart products can operate autonomously, respond to their environment, or even communicate with other products (Rijsdijk, Hultink, 2009). Numerous examples of digital smart products can be found in the marketplace that comes from all industry areas:

- e.g. from a field of electrical, mechanical and automobile industry: personal digital assistants, car navigation systems,
- combination of smart multifunctional mobile phones and personal computers like Ipod;
- but also smart textiles industry (or so called e-textiles) like smart jogging shoes (Nike-Apple);
- and home products industry, home automation (domotics) and digital home technology integration³. Deepening the knowledge through research and development exclusively in one field, or so-called breakthrough, is important, particularly in case when a company is oriented to the strategy of „technological

³ Opportunities in these area have made digital home technology one of the fastest-growing technical career fields in the U.S. as of 2011. In Michigan you will find a few colleges that offer training to prepare for these careers. U.S. Department of Labor suggests by 2016 virtually all individuals in the electrical and electronics trades will need to be “greentrained” (downloaded for the site: http://www.ehow.com/info_7926059_colleges-digital-home-technology-integration.html).
niche". However, relying exclusively on breakthroughs is not the key to success in today's world economy because it concentrates on the R&D effort too narrowly (within one speciality). Combining technologies is a wider approach and gives results in the long run.

The basis of success and superior competitiveness of Japanese industry and its abrupt breakthrough to global market in the second half of the 20th century lay precisely in this interdisciplinary approach of combining the technologies. Many famous Japanese companies have made significant breakthrough and acquired leadership positions by launching the products made by technology fusion: beginnings of optoelectronics are thus born in Sumitomo Electric Industries, Nippon Telephone and Telegraph, and Nippon Sheet Glass that fused glass, cable, and electronics technologies to develop fiber optics; as well as in Sharp, that integrated electronic, crystal, and optics technologies to produce the first commercially-viable liquid crystal display; the beginnings of mechatronics are established in the company Fanuc, that fused electronic, mechanical, and materials technologies to produce an affordable computerized numerical controller... In these cases, the companies added one technology to another and came up with a solution greater than the sum of its parts (Kodama, 1992).

In much appreciated book Technology Fusion and the New R&D (1992), Kodama points out that combining technologies is one of the most significant characteristics of Japanese practice, while on the other hand; American industry was too oriented on specialization. This orientation lies in the fact that breakthrough tradition in the United States stems from the defence-driven technology policy (Kodama, 1992). Regardless of great achievements within one field, American industry in that period remained uncompetitive in relation to the Japanese, so it treated consequences for a long time, and some it also treats now. It was already mentioned that almost all fields of development of technologies are interdisciplinary and that they reflect this already in this interdisciplinarity of combining the technologies. Many famous Japanese companies have made significant breakthrough and acquired leadership positions by launching the products made by technology fusion: beginnings of optoelectronics are thus born in Sumitomo Electric Industries, Nippon Telephone and Telegraph, and Nippon Sheet Glass that fused glass, cable, and electronics technologies to develop fiber optics; as well as in Sharp, that integrated electronic, crystal, and optics technologies to produce the first commercially-viable liquid crystal display; the beginnings of mechatronics are established in the company Fanuc, that fused electronic, mechanical, and materials technologies to produce an affordable computerized numerical controller... In these cases, the companies added one technology to another and came up with a solution greater than the sum of its parts (Kodama, 1992).

On the other hand, Canton (2006) presents technological anticipations, which are different than already mentioned ones, about so-called convergent technologies, based on integrative systems, called NBIK:

- N - nanotechnology,
- B - biotechnology,
- I - information technology and
- C - cognotechnology (or neurotechnology).

Nanotechnology implies manipulation of the matter at the level of an atom, by which new medicines, fuels, materials, and machines can be created. Biotechnology represents a science about life and it can lead to releasing the potentials of DNA, application of genomics to health care and extension of a lifetime. It is already known that information and digital, smart technologies and networks change all the fields of life: communications, work, creativity, entertainment etc. Cognotechnology is work on the treatment, management and change of intellectual capacity and functioning.

Biotechnology already is one of the most significant and influential interdisciplinary technologies.

Biotechnology is even now one of the most significant and prospective interdisciplinary technologies. The U.S. Department of Labor and Statistics reports that the overlapping field of biotechnology ranks among the fastest growing interdisciplinary industries in the United States (http://www.imdiversity.com/villages/Channels/pharmaceutical/pharma_overview_new.asp).

Neurotechnology is today a global $150-billion-a-year industry with cutting-edge research in the U.S., Europe, and Asia (NeuroInsights, Neurotechnology Industry Organization (2009)4. Furthermore, the National Science Foundation estimates that within the next 10 years, the worldwide need for nanotechnology workers will rise only in US from the current 20,000 to two million.

Although there are differences in anticipations, we can see that almost all fields of development of technologies are interdisciplinary and that they reflect this already present trend of networking and connecting. What is, however, more significant is that these interdisciplinary technologies, as it is the case even today, will increasingly integrate in one greater whole – unique technology and science.

That it already happens, it is obvious from the following: progress in biotechnology in the creation of new generation of medicines – based on genomics and use of DNA – it can be achieved only through computerization and innovations on the Internet. Sequencing of DNA and appearance of new medicines and personal medicine is possible only through digital, information technology

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4 For example, Medtronic, Minnesota company in a field of neurotechnology was marked on Technology Review's 2010 list of the 50 most innovative companies in America, for its deep brain stimulation technology. The technology improves certain neurological conditions by using implanted electrodes to stimulate areas of the brain (http://www.metromsp.org/sidebar/why_nationalrankings.htm)
(about beginning and possibilities of integrating nanotechnology with other technologies you can see more from the sources: Roco, Mirkin, Hersam, 2010). As Canton stresses, work in the field of genetic programming in relation to new generation of microprocessors in the company Intel, IBM studies of nanodiscs for storing data, as well as logical circuits of the company Hewlett Packard based on nanotechnology that are meant for future computers are obvious examples of integration of these technologies and increasingly stronger trend of interdisciplinarity. Interdisciplinary technologies give birth to future interdisciplinary, comprehensive science and technology.

Today, there is an increasing number of conferences on the development of scientific thought in the direction of interdisciplinarity, governments allocate greater funds for financing interdisciplinary studies, increasing number of interdisciplinary scientific-technological centres throughout the world are opened... Moreover, scientific computation is becoming central to the scientific method. It provides a more rapid development of science and easier sharing of knowledge. New trend are also the scientific open source journals, as well as integrations of digitalized scientific libraries, which make the latest scientific research easily available. Science digitalisation is a rapid transition particularly evident in the past two decades, deleting boundaries between disciplinarians and nations.

6. INTERDISCIPLINARY TEAMS

At organizational level, one of the most frequently applied and highly efficient concepts of networking for the purpose of sharing the knowledge is the formation of interdisciplinary teams. Today’s terms of globalization and facilitated communication through ICT provide for interdisciplinary teams to be particularly present in case of big, multinational companies with a big number of employees and business units that function in different countries and cultures. The same terms of facilitated communication contribute to the fact that geographically dispersed interdisciplinary teams are increasingly gaining in perspective.

Interdisciplinary team is a team consisted of members from different educational, experiential and professional background or expertise, formed for a common purpose. The effectiveness and uniqueness of interdisciplinary teamwork lies in its potential to integrate different knowledge and make a synergistic result. By the interaction of individuals from different professions that work on resolving the same problem, the conditions for direct knowledge exchange, learning are created, and primarily for expanding the perspective and creativity that occurs as a consequence of the conflict of ideas. Interdisciplinary, also called multidisciplinary, transdisciplinary or cross-functional teams, are increasingly encouraged and present in health research, services, policy and education, but also in business and production.

Interdisciplinary collaboration requires the understanding that each discipline has a unique part, contribution and individual responsibility in the project, and needs a common technical language. The process of fusing different disciplines requires knowledge combining and exchanging among individuals who have some level of shared knowledge and experience, and the ability to absorb knowledge depends on common ground. Knowledge fusion projects require participants to experience problem-solving processes and discuss, observe, reflect, and interact together (Nonaka, Takeuchi, 1995; Seufert, von Krogh, Bach, 1999).

Creation of interdisciplinary teams (often called as multidisciplinary or cross-functional) is a technique that is in organizations often used for the purpose of developing new products or processes. It is used as a technique in parallel engineering and knowledge management. In great part, it stems from Japanese production philosophy that is prone to integrative approach through connecting the teams, production and business departments and technological knowledge at the organizational and even whole technologies at the industrial level. Excellent example of the creation of interdisciplinary teams and departments within companies for development of new products can be found in a book written by Nonaka and Takeuchi (1995) in the case study of the company Matsushita in developing home bakery.

Many engineered products and processes are created by integrating multiple technologies which combine a range of disciplines. Interdisciplinary engineering teams have become a standard expectation in industry, increasing the complexities of design problems faced by engineers. Interdisciplinary education of engineers (such as in mechatronics) are therefore needed and welcome in such teams. Modern projects, such as those in defence, aerospace and vehicle design need involvement of multiple disciplines. Separation of disciplines essentially disappears in today global and digitalised, modern industry.

Interest in multidisciplinary team working has begun to grow since the nineties of the 20th century (Leathard, 1994; Mathias, Thompson, 1997; Barr et al, 1999; Zhao, Anand, 2009). In recent studies, Appleyard et al (2010) have introduced the notion of a “knowledge fusion capability” - the ability of interdisciplinary research and development teams to combine knowledge from multiple disciplines. As Zhao and Anand (2009) have proposed a direct positive relationship between a team’s knowledge fusion capability and their performance, Appleyard et al (2010) have accordingly gone further and argued that a knowledge fusion capability of interdisciplinary teams has influence on its performance as reflected in
knowledge improvement (on individual and collective level), effectiveness, efficiency, quality, productivity and performance in general.

7. CONCLUSION

All the fields of interdisciplinarity that we have discussed in this paper are actually consequence of these occurrences and they are mutually interwoven and conditioned. It is obvious that interdisciplinarity of science wouldn’t be possible without interdisciplinary education and training of scientists; that integration of sciences leads to new knowledge and basis for combining technologies, that without interdisciplinary teams it wouldn’t be possible to lead interdisciplinary projects of research and development, that multifunctional products are a direct consequence of connecting the technologies, but also they are indirect consequence of all the above-mentioned.

Increasing orientation towards interdisciplinarity is logical having in mind that mankind is on its way to overcome fragmentistic paradigm, as it is imposed by industrial revolution, which has introduced classification of jobs and, therefore, the work, and consequently the classification of education and science into fields and subfields. Mankind is already on the path of interdisciplinarity, which is evident from the fact that competitive, i.e. systemic engineering has exceeded the serial (as representative of fragmentistic, industrial paradigm); that integrative sciences gain in strength, such as ecology with its systemic approach, bio and nanotechnologies which combine biology, chemistry, physics etc., knowledge managements (as multidisciplinary sciences); more intensive expansion of digital and smart technologies that are intertwined with all other fields of human activity; with increased networking through the Internet and higher interests for clusters, alliances, networks and other forms of cooperation, not only in business sector, but also in educational, scientific, non-profit, health and every other... Increase of interest and popularity of Eastern medicine in the West also point to the path of mankind towards interdisciplinarity: Eastern medicine, as well as many other activities, are characterized by holistic approach. Finally, there are findings and awareness of the existence of spiritual intelligence that has a unifying role and gives a man the power to observe the things at systemic, interdisciplinary level – to connect things.

In addition, man slowly overcomes Nazism and fascism, and he more and more celebrates diversity and multiculturalism. Multiculturalism does not only enrich the culture of the region, but it also improves social cohesion, tolerance, strengthens the regulation. This is greatly contributed by globalization and development of communication technologies that provide hyper-linking. In the end, many regions and countries, such as Vojvodina, are proud of their multiculturalism.

References:


MEDIA DIGITALIZATION AND REPORTING IN CRISIS SITUATIONS

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Abstract: In this paper the term of crisis situations as risky incidents and processes that are very complex for a reporter and media team is analyzed and defined. The author considers the advantages provided by media digitalization during reporting of crisis situations as well as the elements influencing on better quality and speed of information transfer. Especially pointed are the possibilities given by the media activity as well as “the translation per request”, which are important segments when the information consumers decide to follow certain contents on the crisis situations’ subject. In this paper it is ascertained that media digitalization opens up a new chapter in the crisis situations reporting because the quality of final media product is significantly increasing.

Key words: digitalization, media, crisis situations, reporting, interactivity

The possibilities provided by the media digitalization is analyzed in this paper, in the light of its application in crisis situations reporting as the media phenomena that are present almost every day in informative media contents. Digitalization is a word often mentioned and which is possible to hear at every step and its perhaps best determination was given by Nicolas Negropont when he wrote: “Searching for the structure in signals, in the way of their generation, we go beneath the surface appearance of bits and reveal blocks from which image, sound or text originate. This is one of the most important facts in digital existence” (Negropont, 1998: 176).

The media digitalization on the other hand opens an entire sequence of technological and technical possibilities which have so far been little familiar to the wider audience that except the experts circle only superficially understands and correctly apprehends the essence and the very concept of digitalization. Exactly due to the reasons it is important to explore and structurally process the interaction and causality explicitly occurring between media digitalization and model of journalistic reporting in crisis situations. Even though I have had opportunity to see “in vivo” the possibilities of reporting in digital technology from various forms of crisis situations abroad, in our country it is still insufficiently analyzed and deliberated problem, leaving a great space for manipulation but also for evil-minded usage of available technologies.

New media technologies bring changes on global media scene, especially relating to reporting in crisis situations where of vital importance is primarily transfer fast but also correct and precise information. Besides cellular phone, I-pod and other technological segments in the focus of our interest are digital media that is digital television as the most important segment of reporting the crisis situations. The digitalization’s advantages, viewed from the aspect of reporting in crisis situations are:

- greater possibility of transfer of quality and important information to the information consumers;
- the possibility of the consumers of the information interested in crisis situations following the program-informative contents exclusively interesting for the target group;
- simultaneously greater number of the programs with the subject of crisis situations can be followed, especially in the cases of high risk and while the crisis is still in the course;
- the possibilities of interactive communication of the information consumers and media;
- crisis situations can also be followed by the hearing impaired people, that is the special needs people;
- for the reporting in crisis situations special capability in digitalization is translation per request.

The digital media enable better quality of the transferred information which is especially important if it about crisis situations, as the events and processes in which every information is important because it often brings the data on the lives of great number of people. It should be reminded that when the tsunami happened in the south East Asia in 2004, the reporting problem was precisely the bad signal emitted by the analogue television. Poor image and unintelligible tone in the first wave of reporting on the crisis situation have added in an additional confusion and panic amongst the information consumers, especially if we know that a great number of European tourists stayed at the moment in the region struck by the tsunami (amongst which was a certain number of tourists from Serbia in Thailand). Digital technology to a significant extent settles the technical-
technological segment which comes to the expression especially in the crisis, so that the proceeding to digital signal is a great advancement in the qualitative sense (Robin, Poulin, 2000). It should be stressed that digitalization enables stereo and high-quality “surround” tone, with the possibility of several tone channels with one video recording, which are new technological possibilities that we can use as well at reporting in crisis situations. “Good quality of display represents literally more than just satisfaction to eyes. Observing experience usually includes other senses as well. Collective sensation is, as a whole, truly greater than the sum of all of its parts” (Negropont, 1998: 120). Greater qualitative advantages are also provided by the digital radio, pointed out by Dejan Pralica: “One of the first advantages of this radio of the future, in relation to the traditional radio, is a very high quality of sound, without possibility of any interference, rustles, weak signal, program interference and similar (the sound quality is as the one on a compact disc). DAB (Digital Audio Broadcasting) uses new high frequency ranges for several services in one block of frequencies which is also called multiplex” (Pralica, 2011:14).

When speaking about the media digitalization and crisis situations one of the most important elements is the possibility of following programs specialized for the segments, namely the source of informative programs on the crisis subject. It is especially useful if we know that in certain part of the world a great crisis situation occurred and the information consumer out of personal or professional reasons wants to follow the development and settlement of the crisis in detail. Then the digital television is of precious help because we have the option that the analogue system did not enable. Also appreciable opportunity is using the EPG electronic guide through programs enabling us simple and easy searching through the programs which is handled faster and simpler in relation to tele-text used in the analogue system. The mentioned approach is of great importance for crisis situations but at the same time the digitalization leads to the information consumers’ fragmentation which has been noticed by some authors: “By introduction of the digital services actualized is the issue of the audience fragmentation and public sphere fragmentation, decrease of social integrative function of media, decrease of the income on advertising (due to extreme audience fragmentation), or yet, the media concentration, detachment of those segments of society that cannot follow up the costs of transferal to the digital emitting, etc.” (http://www.scribd.com/doc/45910851/Uticaj-digitizacije-i-novih-medija-na-na%C4%8Din-%C5%BEivota).

The possibility of following greater number of programs, that is more than one video content simultaneously (“on demand”), is also the capability provided by the digitalization (Fawzi, 2006: 14). The option is useful for the media, experts in crisis reaction as well as for specialized services that can to a certain extent follow the crisis through media (that system is used in the world, especially when it is about large forest fires taking up larger region).

The hearing impaired persons so far have mainly sporadically had the possibilities to watch certain informative contents wherein the interpreter is engaged, whereas digital television enables titling and automatically synchronized following of the contents. Thereby the circle of potential consumers of information meets the needs of the group.

On global level there are specialized media houses dealing with tracking the crisis situations and reporting from crisis regions such as is let’s say Algazira or CNN but there occurs the problem of language barrier. Digitalization provides us with the possibility to, even though we do not speak some of the world languages, by “translation per demand” as one of the options, follow and completely understand the reporter that is the media contents (Lekakos, Chorianopoulos, Doukidis, 2008 : 21-22). The possibility is especially useful in crisis situations because the language barrier and incomprehension of only one word can lead to wrong perception on the whole crisis (such as is the number of victims and the amount of the flooded area of a region). Generally the system of interactivity provided by the digital television is one of the most apparent advantages in relation to the analogue system (Sukosd, Isanović, 2008 : 125-126).

Digital television opens up also an entire sequence of capabilities that can be used in crisis situations such as the digital studio that is virtual studio, which is especially useful under field conditions. “Specialized programs for electronic graphics are developed by which decor and scene in studio can be graphically realized-generated. The procedure of setting up of such unreal-virtual scenography is known as virtual studio. The basic problem at generating the virtual scene is establishing the relations between the visual angle of the camera to the existing (real) scene and new virtual scene (which is generated by electronic graphics)” (Zdravković, 2009 : 158). Since our interest is the mentioned issue of crisis situations in which often there are examples of the injured and misfortuned, the definition and explanation of the media phenomenon should be put forward.

The crisis situations imply according to logic or reasonable observation some violence, certain force, human or natural, influencing on the life and property of certain community. In essence it the determination from the communicational aspect is totally correct because there is no crisis without some kind of violence, whether physical, systematic, psychic, occurring due to natural forces, tectonic disturbances and similar, and we, as the information consumers, are daily witnesses that such contents are increasingly present in the media.
If I observe human violence, I can conclude that it is present since the origination of civilization, and, as Erik Hobsbaum notices, no matter how civilized person opposes it, it is present and it seems that it will always be. “Liberal rhetoric has ever succeeded in comprehending that none of the societies functions without a certain degree of violence in the policy, even in the quasi symbolic form such as the strike guards or mass demonstrations, and that violence has various levels and rules as everybody knows it in the societies where it is a part of the tissue of social relations, and to what the International Red Cross is constantly trying to remind the barbarized warring parties of the twenty first century” (Hobsbaum, 2008:36).

A good example of the media misuse in spreading the hatred and calling for the violence is given by Graham Spenser pointing out the importance of the media in inciting violence in the conflicts around the world: “Within Ruanda for example, the radio stations such as Radio Ruanda and Radio “Mille Collines” have played a key role in spreading fear and hatred and have been a verified instrument for the orchestrated killing” (Spencer, 2005:76).

In our country, the form of hatred speech have so far been present to great extent through various media forms and in the crisis such as demonstrations, criminal violence and wars and the pattern was used as mandatory part of the reporting. Media digitalization thus provides a wide area for media liberalization, but it is also a double-edged blade because due to the interactivity various radical groups and individuals can (mis)use it. “Violent rhetoric is thus very frequent. The forms of its manifestations are more and more perfidious. Minor eristic genres are almost being developed based on the phraseologies of satirical, ironic and parody character. The recipient is left in the state of indecisiveness (Stanojević, 2007:86).

If we start from the issue that in the very term of crisis there is some violence, it should be emphasized that therein contained is also a certain threat regardless whether it relates to the economic crisis or the attack of street hooligans. The digital age has enabled us tracking numerous crisis “in vivo”, which on one hand is good and on the other it sensibilizes the information consumers to scenes of violence. The digital era has enabled a true media “boom” of the civic journalism exactly in the field of crisis situations, best proven by the “facebook” revolutions bursting out in Arabian world and demonstrating the power and force of digital society. As the social phenomenon, the crisis can be determined on the basis of several elements but one of the often mentioned definitions is worded as follows: “Crisis is defined as an intimation of a threat that will have negative consequences if not managed correctly” (Coombs, 2007:5). Coombs thinks that there are three types of crisis that can influence on: 1. public security, 2. financial loss and 3. loosing respect (Coombs, 2007).

Thus, crisis is a dangerous, unexpected state for which a serious management is necessary for overcoming it and Enrico Quarantelli compares the crisis management to military strategy which he considers as the only adequate for suppression of the extraordinary, sudden events (Quarantelli, 1986). The comparison in crisis situations is frequent because the American journalist Eric Landquist who wrote on the hurricane „Catherine“ in entrefilleu „How to define a disaster“ says: “I have received several e-mails from the army members who have advised me to if I really wanted to find something on crisis planning I had to go into reporting from a war area” (Lundquist, 2008:37). When debating on the crisis, Quarantelli points out making a similar retrospective view: “It is the field of tactics. If we compare it, good planning of a catastrophe includes general strategy which leads to preparation for unexpected, urgent call of community” (Quarantelli, 1986:69).

In our digital age when at one end of the world a crisis happens it is known in a split of the second by all the media users and from the narrower media aspect a crisis situation implies two elements: both violence and a threat, reflecting in the postulate that a crisis situation is: “... any event in which human life that is material movable and immovable goods are endangered” (Valić Nedeljković, 2007:5). Crisis situation represents a significant phenomenon for media and thereat it can be defined in various ways and according to the sequence of the elements that are characteristic for various areas of activity in a community.

The crisis situation as its foundation has a crisis which determined, manages it and brings to it all the important characteristics. That is why crises should be observed in a broader context, classified and determined by Coombs according to the attributes of responsibility in the crisis that is the degree of human factor influence on the phenomenon (Coombs, 2007). The fact that any body of authority can hardly influence on the appearance of an earthquake but it can influence on the phenomenon of ecological catastrophe or traffic accident by insisting on respecting all the procedures and bear responsibly towards the situation.

Coombs determined the first group of crisis as a minimum crisis responsibility and called them crisis of victims including: natural disasters, crises of rumors, crises at work that are specially dangerous for digital society (attack on a site and similar) and crises arising out of spite/evil intention (intentional damage caused by a person outside or inside an organization) (Coombs, 2007).

The next Coombs’ element are the incident crises and they are considered as a low crises responsibility of the
authorized and are divided into the crises caused by threats/challenges, crises caused by a technical error and injuries due to manufacturing error. Media digitalization is just a suitable polygon for intentional evocation of crises by various terrorist groups or individuals ready to misuse their knowledge. Great crises responsibility of the authorized according to the division is at the crises caused by human error (industrial incidents, ecological disasters,...), crises caused by human error in manufacturing process (due to human error a product is potentially dangerous-nuclear products and similar) and crises due to organizational oversights (management oversight some actions due to which a crisis arises) (Coombs, 2007:12). The mentioned author has pointed out that numerous researches as the focus have the relationship between the types of crises responsibilities and threat to reputation of some company, organization or community. At determining the crises situations there are several opinions on the nature and thus the crises in a system are possible to be determined as: “The situation of facing face to face with individual, group and organizational challenges that are incapable of overcoming by a normal, routine procedures whereat in the stress situation fast changes are created during work”(Barton according to Millar, 2004:147). Considering the possible division of crisis situations den Millar has come to the division on:

- natural forces such as hurricanes, earthquakes and epidemics;
- intentional acts that are the consequence of mistakes, bomb setting, threats or taking hostages;
- unintentional acts such as explosions, fires and leakage of chemical material. (Millar, 2004:139).

Not only theorists and experts gave definition of extraordinary or crisis situation but also some journalists have tried to view the problem from the aspect of media, and thus Miroslav Mikljunac simultaneously asks and answers on the subject observed: “What are actually the media extraordinary situations? At shortest, those are the events for which a day earlier we could not be certain that they would happen, and on which people even a day after would like to obtain many additional and detailed information. Those are unfortunately most often great accidents, natural disasters but also large demonstrations, mutual conflicts of large groups of people, confrontations of people and police, war affairs, different kinds of armed settlements, races, chases and even funerals” (Mikljunac, 2007).

Crisis situations have thus come to explicating what the inciter of every crisis and on which to a great extent the media reporting, especially in the process of digitalization, and it is the logical cycle of crisis. Several authors (Coombs, 2007; Quarantelli, 1986) are introducing the thesis that every crisis possesses certain phases that are similar in all crisis situations because they have a characteristic sequence of events: 1. the period of announcement or the announcement time, 2. period of visible origination, 3. development and escalation, 4. period of crisis decrease and 5. media react in the moment when crisis is visible and easily spotted and then follow all the elements till the recovery and research of the consequences, that is till determining the concrete responsibility of the competent ones for the crisis.

Determination of the term and defining the crisis would be incomplete if the crisis life cycle would not be stated which Steven Fink divided to: crisis announcement (Prodromal Crisis), acute phase of crisis (Acute Crisis), chronic phase of crisis (Chronic Crisis) and phase of resolution/recovery from the crisis (Crisis Resolution) (Fink, 1986:62). Media actively participate in all the phases except in the first one which is latent and the persons responsible, whether it is about bearers of public functions or managers of companies sometimes attempt in the first phase to cover up the crisis situation and it mainly form the media.

If we agree with a large number of authors thinking that crisis and crisis situation is a complex, unpredictable and difficulty controllable process, phenomenon or act, we can conclude that with such phenomena which are always associated to some violence or threat, as a rule, great attention of media is paid. As the process of digitalization is developing so is the crisis more interactive and faster processed by the journalists and reporters. If famous people are the issue, then also the media to which informing is not in the foreground will report on the crisis situation, that is those determined as the tabloids, yellow press or musical-entertaining electronic media. I think that the given concept and definition of crisis and crisis situation is acceptable for the media that should perceive and understand the phenomenon as an important professional challenge but, at the same time, as a safety risk. From the point of view of media I believe that every crisis situation has the following phases and elements which I have divided into:

- obtaining unchecked information on crisis situation existence;
- confirmation of the information and going of the journalist on the field;
- media processing of the crisis situation;
- following of the secondary elements of crisis and long term consequences arising out of it;
- media coverage of judicial epilogue of the crisis situation;
- reminding on the given crisis if it was destructive according to the number of human victims (for

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1 On the observed issue Coombs wrote independently and as a co-author. For more details reference to: Coombs, Holladay, 1996; Coombs, 2004; Coombs, Holladay, 2002.
Every crisis situation that we follow requires from the journalist hard work for the purpose of tracking all of its phases which to a significant extent depends on the series of factors that can be divided into: Number of victims, geographical distance, short term or long term consequences, manner of manifestation, public interest protection and the profile of media reporting on the crisis. It was valid for analogue systems as it is for digital as well, because besides the advantages provided by the digitalization; all other elements remain the same.

Figure 1. Graphical presentation – Crisis situation communications

Life cycle of a crisis for media starts at the moment when they receive the first information on the existence, although there is a possibility that the crisis is lasting for a longer period of time. As soon as there are the indications, the next phase is checking the truthfulness of the first information after which the reporters (if there are the possibilities), go out on the field that is position themselves so that they can follow the crisis "in vivo". Depending on the nature of crisis, the media house possibilities and capabilities and training of the reporters, the crisis is media processed ("covered") and followed. There we come to the significance of digitalization providing greater quality of the image and tone but also the possibility of choosing the program contents by the information consumers. Depending on the decision of the media house editor and management, the crisis situation is necessary to be followed also in its secondary forms of manifestation, especially if it is about great crisis leaving significant consequences on the health and life of people that have not been directly endangered. The judicial and any other epilogue is important to be followed so that certain crisis situation would be clarified to the end and represented to the information consumers as a complete media story. The awareness on the importance of recall on certain crisis exists in media and every year on significant dates, the media actualize a crisis from the past with the estimation whether the crisis situation can be expected in the future (for example, tsunami, earthquake, large fire or terrorist attack).

In the chain of crisis situation communication there is always a three-degree interaction on the line media-crisis, media-departments for urgent reactions and media-information consumers. In the first communication chain, the media are engaged in reporting of the crisis situation and in the second segment specialized departments are an important source of information. Finally, media form their reporting on the place of crisis with information and facts collected from competent departments so that they would place to the information consumers thus formed addendum. The process is much faster and more efficient in the process of digital than in the process of analogue network.

It should be pointed out that it is also important to mention the factor of risk which is unexceptional element of crisis information observation. Risk is a frequently mentioned word implying exposure to greater or smaller danger. “We separate crisis and risk because we believe that risk is a natural part of life and crisis can be evaded. Naturally, some people live with more risks than the other. For example, some people have chosen to live near the oil refinery, on a sea-shore where there are hurricanes or in the area subject to forest fires” (Ulmer,Sellnow,Seeger, 2007:8). In every crisis situation present to a significant extent is the risk for security, sometimes even for the life of reporters. Experts for crisis communication have deduced a formula for calculating the risk which according to the author Amanda Ripley (Ripley, 2008:33) is:

Risk = Probability x Consequences

The same author, Ripley (2008) thinks that it is a basic formula for calculating risk whereas somewhat more complex formula would include the following elements (the same):

Risk = Probability x Consequences x Fear / Optimism

Naturally it is about a setting attempt to translate the risk into the framework of mathematics but the fact is that it is about everyday challenge because as noticed by Ulmer, Sellnow and Seeger: “Risk is daily present in our lives. The air we breathe, water we drink, car we drive and buildings in which we live in, all of it bears some elements of potential risk for our welfare” (Ulmer,Sellnow,Seeger, 2007:154).

In media activity, based on the analysis I have identified three phases concerning crisis situations and the division is characteristic both for electronic and press media. The division is performed on the basis of: Journalistic genres, available information in a given moment, speed of reaction, amount of news, reports and reportages as well as on the work of the journalists themselves-the reporters on the spot. I have made the division in the following way:
1. The first wave of crisis situations - reports, news and other genres are sporadic and base on announcements in media and on small number of snapshots or in some graphical illustration on television whereas radio is based on announcements in the first moment. Then we have more reliable information, officials’ statements, live transmissions on television, phone reports or inclusion of crisis headquarters’ chiefs in radio shows.

2. The second wave of crisis situation – implies the crisis situation reconstruction, searching for the organization responsible for the attack, deliberation on the responsibility of the competent bodies for the crisis, establishment of the final balance of killed, missing or injured, material damage estimation. In the second way are the interviews, life stories, reportages on the survivors, participants in rescuing.

3. The third wave of crisis situation – in-depth reaction on the crisis situation – implies: Analyses, comments, feuilletons- in pres, detailed interviews, reportages, special shows on television, live visits, stories of the survivors that have been injured, witnesses of the persons being buried under ruins, special final products- in radio journalism, radio dramas, commemorations and documentary forms.

It should be pointed out that the frame division of crisis situations is deduced from the aspect of media according to the duration in the following way:

- The first phase of crisis situation lasts from 12 to 24 hours;
- The second phase of crisis situation lasts from 24 hours to a month;
- The third phase of crisis situation lasts up to six months;
- Crisis of long duration is a constant for one area (East Coast, Darfur, Caucasus,...).

The classification is general and it does not always have to be the case in crisis situations, but it is given rather as the frame, for the purpose of easier determination of crisis duration.

Those working in media are found on a special test because in crisis situations tested are all knowledge and abilities, especially ethics, truthfulness and objectivity as the imperative element of journalist’s profession.

Media digitalization is an important segment in evading the monopolization of media market by political power bearers, because the digitalization also expedites human right on free approach to information and contributes to strengthening the freedom of expression, as well as to the overall freedom of media (Fenton, 2010). We can conclude that media digitalization if observed from the point of view of reporting in crisis situations is multiply useful and offer a sequence of capabilities in relation to the analogue media system. Some of the advantages have been presented in this paper, and those are the most important ones, namely the most obvious when it is about media reporting from crisis situations as one of the most complex forms of journalistic and media work in general. Besides higher quality of sound and image, which is obvious in the digital system, there is also a set of options/capabilities that provide to the information consumer fast, precise and timely data, which is of crucial significance when it is about reporting in crisis situations. From all the stated we can conclude that the digitalization will open up a new chapter in reporting in crisis situations because not only the information consumers but also the journalists and editors will have an entire sequence of facilities and advantages in relation to the analogue era.

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CONTRIBUTION OF WEB SITE TO SCHOOL ETOS

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Summary: In this paper will be presented the results of research in which web sites were analyzed in primary schools in Vojvodina in order to obtain answers to the question of whether primary schools recognize the importance of their own web site in the ethos of the school. Here is analyzed the contents and structure of the web sites of primary schools, particularly the elements that contribute to the reputation of the school, for example. Special features of the school, marking the event, school communication with parents, students and the environment. It also analyzes the contribution of site knowledge management school teachers and students in elementary school. The results show that a large number of primary schools lacks its own website, a school that it use its own lack of opportunities for enhancing the reputation of the school, promoting efficiency and promoting positive behavior.

Keywords: web site, school ethos, the promotion of school.

1. INTRODUCTION

The development of new technologies has caused the development of new communication tools. Internet and web environment is increasingly becoming a common channel of communication, including the school needs to use them. ,,Web site presentation of the school becomes necessary - not only as a marketing tool, in terms of communication with the school and its potential active students and parents, but also with the social partners" [7]. The survey was conducted on a sample of 40 schools and it revealed that school principals school web site is primarily perceived as a marketing tool. Web site or the school web site has many more possibilities of marketing the school which already serves. Today's school principals should have developed skills leaders (managers) and pedagogical management. Director Manager is a market-oriented businessman. It is an important area of “activity of modern principals application of new technologies in the function of information, communication and learning. Directors are expected in addition to computer literacy and leadership role in the affirmation of its application, especially in the process of learning and teaching, as well as in business schools. Director as the head of an educational institution is primarily determined by its leading role in which he included the responsibility for achieving the mission and goals of the school. It has long been perceived educational value of the environment for learning. Flexibility in the organization of space for educational work, virtual learning spaces, distance learning, part of the everyday life of contemporary learning process. Such a situation is more complex and involves equipment that is extensively modernized. In addition information technology is imposing as a means and as a source for learning. From the director of the school is expected to secure space for learning not only to be operationally functional, but inspiring and educational. Also, schools not only should possess the right equipment, but the equipment should be easily accessible and durable in operation [8]. The school is an organization or an open system that constantly interacts with the environment, and that environment is the population, parents of children, other Educational Institution, Ministry of Education with their bodies. School from the environment takes the material, energy and information through the process of transforming back the appropriate service, and education of children. Development of school as an organization includes, among other things: community involvement in school work, networking and collaboration with other schools and educational, cultural, scientific and other institutions, knowledge and monitoring of educational trends and new technologies that may affect school work, listening to the needs of the public, increasing the transparency of the school: the web site with access for students, teachers, parents, citizens, the establishment of journals, various celebrations, events [1].

2. SCHOOLS OPENNESS AS INSTITUTION

The school should not be closed institution. It nowadays more open and connected to parents, students, with similar institutions and the local community. The school should have a detailed plan of promotion and public relations. Her goal today is not only to nurture and educate young people, but to offer them a vision that will understand how to function in society, to prepare them to experience the world as friendly and receptive, and not as strange and full of fears. "The mission of educational institutions is that with the cooperation of family and community, taking into account current trends in society
and education provide a safe, modern and maximum applicable learning environment that encourages intellectual, physical, social and emotional development of students by encouraging them to become and to develop as: lifelong learners, independent thinkers, respected individuals, responsible citizens” [4]. The openness of the school as an organization is only possible with open communication with all users. Management of the school is not possible without a comprehensive communication. Communication is a prerequisite for directing activities and to improve schools. Director uses today many channels of communication that he uses in relationships with employees, but also the realization of contact with the school as an institution to its students, parents, local communities. By that means of communication are used as speech, correspondence, letters, reports, school newspaper, posters, billboards, telephone, email, websites, multimedia presentations and the like. Communication should be adapted to entities of educational-upbringing process [8]. External communication in school is applied in meetings, meetings of assets at the county level, visiting other schools, through websites and media promotions, using print verbal means. In this way, school staff and students realize the connection with the proximate or remote environment, communicating their ideas and attitudes. Schools often use presentation to promote their work [3]. Many schools in the world understand the need for active and good web site, through which they can communicate with students, parents, potential students and their parents, the local community. Parents often search for Web sites of schools to learn about the characteristics of the school, with its mission, mode, particular types of learning and attitude towards students. Those who are more skilled introduce different form of e-mail, allowing them to collect information from parents. The future of the school lies in social networking. For this reason, the school should use all possibilities of communication with the environment, and most of those features that are used by individuals (mostly students) in everyday life. Web site of the school is a medium that students of a school recognize as definitely related, and so do parents today.

Schools Web site (Web presentation) should be made so that it is technically easy to maintain and operate. The school site is primarily an information system. A good school site should follow the following objectives:

- introduces visitors to the school - the mission, character, appearance,
- it should identify the great information from the Internet, educational resources and thus facilitate the realization of their curriculum,
- Provides the ability to post student work (painting, music, literature ... ) [5].

In terms of content, Web site should possess most of the following elements:

- general information about the school (name, address, telephone and email contact information, brief history)
- information about employees, calendar of work, schedules,
- important documents related to education and teaching (Act on Basic Education System, the Evaluation Regulation, House rules, the Regulation on the safety of students,
- photo and video gallery with a record of important events at school,
- descriptions and the results it achieved in the school, the projects that participated,
- results from the competition,
- proven useful links to educational sites,
- forum for students and teachers,
- blogs
- possibility of giving opinions on various areas of work through surveys,
- students' market for the exchange of textbooks ...

3. SCHOOL ETHOS

The ethos of the school is one of the key areas that are measured in the process of self evaluation of schools. Self-evaluation is the process of identifying good and weak points in the school, in order to create a basis for quality development planning. The area that indicates the success of schools in terms of quality relationships in the school is called the ethos and includes:

- Reputation and feature-Schools (Schools ID card, information about employees, the school newspaper, website, cultural and sports events)
- Promotion of expectations and performance (eg results of the competition)
- Cultural behavior (eg, house rules, rules of student behavior)
- Respect for persons - equality and fairness
- Aesthetic and functional development of space
- An interactive relationship (forums, e-mail)
- Charity event
- Partnership with parents, school board and the local community (including parents in school life and work and school learning, the school’s role in the local community)
- School joins the environmental, humanitarian and cultural actions in the local community [4].

In the new and much more specific standards of quality of educational institutions which the Institute Education for Quality passed in 2010. year. Area 5 - Ethos is defined, among other by the following parameters:

- results of students and teachers are supported and promote which include: the results of students and teachers to highlight and promote the public, the
school is organizing various school activities for students in which everyone can have the opportunity to achieve results / success, students results who have disabilities are specifically promoted;

- the school has developed cooperation at all levels: the school was organized in cooperation managerial, professional and advisory body, the school develops and nurtures various forms of active participation of parents in school life, school work with stakeholders in the community, the school operates a system of regular information to parents activities and schools activities;

- school environment is friendly for all: schools hall is arranged to show the welcome, the organization of school space is dominated by student work, schools must have an elaborate system of resolving all forms of violence, of which clearly shows that negative attitudes towards violence and to resolve network problem of violence in which we use provisions of the Protocol on Protection of Children, students from violence, abuse and neglect.

The area of ethos can in many ways be further supported by the existence of good and active web presence of the school or the existence of a web site. As a new medium which is widely accepted, the website can help to widely promote the success of students and it is simplified the establishment of cooperation and communication with parents by providing timely information about school events in it, problems encountered, and invitations for them to be adequately involved in their resolution. Web site provides timely notification of all employees and others with which schools are working, much faster than other media. Web space of the school is certainly part of its environment, so the website should possess outstanding features of schools (if it has them), but also clearly highlight the vision and mission of the school. The ethos of school involves mutual cooperation between pupils, students and teachers, teacher collaboration, means of democratic relations, respect of rules and equality. Good schools ethos involves cooperation among students, helping each other, teamwork, and healthy competition. In today's school where the students must not only be subjects in a formal educational process it is necessary to encourage cooperation among teachers with students, collective action and participation of students in making ideas, but also make proposals for activities in school and participation in their organization. Collaboration among teachers, sharing experiences from older to younger colleagues, team work on joint planning and design of teaching, consultation and mutual support are the foundation of good school climate and is an important element of schools ethos. Schools that pay attention to the ethos of school promote the success of each individual. Such schools are not afraid to address the data about their school and therefore recognize the web site as an important tool in promoting, but also as a means to build the democratic values of their students. The quality of mutual relations in school affects the quality of school culture. Culture is created and shapes the behavior and response of employees and their interaction. The school culture is the key to understanding what it takes to be successful. School culture consists of norms, values, beliefs and other cultural features. It strengthens the various rituals and social ceremonies. Cultural and sanctified schools among other things, are trying to develop a unique sense of purpose and values of the mission, a sense of responsibility for the success of all students, collaborative management of school activities, special occasions, which promote the positive achievements. Dil and Peterson [8] describes good school as a place where:

- Teachers have a common goal consecrated and excellent teaching,
- Dominated by norms of behavior such as collegiality, professional development and hard work,
- Ceremonially celebrate the achievements of students, innovation by teachers and parents' contribution,
- There is an abundance of success, joy and humor.

The quality of school ethos can be determined by testing procedures for school to create conditions for good cooperation between teachers, to encourage good relations between teachers with students, to build the sense of identity and self-confidence of students, to improve relationships and discipline among students. In raising the quality ethos of school web site can offer the possibility of exchange of views through a forum (for teachers, for students), electronic survey through which you can get valuable information about the quality of school climate, the working atmosphere at school, how much is tolerance and friendship present in school, how much are specific aspects of students is respected in the school starting from the ways of learning, through social, national and cultural characteristics. It is extremely convenient for the promotion of various events taking place in schools such as marking the Day of school, the school year, Open Days, activities related to projects at school and so on.

4. METHODOLOGICAL FRAMEWORK OF RESEARCH

Research goals:

- Determine how existing web sites of schools contribute to the ethos of schools,
- Determine how many elementary schools does not have a web site;
- Determine whether existing web sites of primary schools provide most information of one-way communication,
- To determine whether elementary school of its web site use to improve the ethos of the school.
The study sample consisted of 157 elementary schools in Vojvodina. In particular, the analyzed Web sites of those schools that have developed themselves a web site. The study used a check list of 12 indicators-content elements of websites that are directly related to the ethos of the school.

5. RESULTS AND DISCUSSION

Of 157 primary schools that were selected as the sample, 74 schools or 47.1% of schools have opened a web site that is located at the base of the Secretariat for Education. These sites are uniform made and have the following information: basic information about the school (address, phone, fax, email addresses, photos of the school building), just a few sentences about the history of school, the principal information (short biography with picture), the school board, linguistic structure of school, the data with which the schools cooperated, information on projects or programs that were implemented or are being implemented in schools, how is school specific. These websites are mostly static and are intended for the local population. In particular are analyzed Web sites of those schools that have personally created a web site. In the analyzed sample of these are 49, or 31.2%, which means that the randomly selected one third of primary schools has its own active site. From this we could conclude that something a little less than half of the sampled schools understand the importance of having a web site. Given that more than half of schools do not have an opened a web site, it can be indirectly concluded that these schools do not realize the importance of media in promoting the ethos of the school. In further studies are specifically analyzed the possible indicators of school ethos on the website. Selection of the 12 indicators and the results are as follows:

Table 1. The number of specifics indicators of school on a web site

<table>
<thead>
<tr>
<th>N</th>
<th>Valid</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Minimum</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Percentiles</td>
<td>25</td>
<td>5,00</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>6,00</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>8,00</td>
</tr>
</tbody>
</table>

According to Table 1 mode is 5. Of the possible 12 indicators (in check list) most schools have represented five indicators specific of the site. The range of indicators represented at the school sites is from 0 to 11. According to the data in Table 2 the first quartile is of the presence of five indicators, which indicates that 25% of schools have represented on own site to 5 specific indicators of their school. Second quartile is of the sixth indicator, which indicates that 25% of schools have represented on its website six indicators. So we can conclude that about half the schools that have a web site with only half of the indicators of school ethos. The third quartile is of the presence of eight indicators, which indicates that 25% of schools have represented on its site 7 or 8 indicators of its specificity. 25% of schools have between 9 and 11 indicators specific of its site. Based on these data we can conclude that only a quarter of elementary schools that have a web site that really uses its ability to raise the quality ethos of the community. We can add to it more then quarter then number of schools has 7 to 8 indicators, for which we can say that generally use the web site features to raise school ethos.

Table 2. Representation of the indicators of the specifics of school on a web site

<table>
<thead>
<tr>
<th></th>
<th>Freq.</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No indicators</td>
<td>1</td>
<td>2,0</td>
</tr>
<tr>
<td>With one indicator</td>
<td>3</td>
<td>6,1</td>
</tr>
<tr>
<td>With three indicators</td>
<td>3</td>
<td>6,1</td>
</tr>
<tr>
<td>With four indicators</td>
<td>3</td>
<td>6,1</td>
</tr>
<tr>
<td>With five indicators</td>
<td>14</td>
<td>28,6</td>
</tr>
<tr>
<td>With six indicators</td>
<td>5</td>
<td>10,2</td>
</tr>
<tr>
<td>With seven indicators</td>
<td>7</td>
<td>14,3</td>
</tr>
<tr>
<td>With eight indicators</td>
<td>7</td>
<td>14,3</td>
</tr>
<tr>
<td>With nine indicators</td>
<td>3</td>
<td>6,1</td>
</tr>
<tr>
<td>With ten indicators</td>
<td>2</td>
<td>4,1</td>
</tr>
<tr>
<td>With eleven indicators</td>
<td>1</td>
<td>2,0</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>100,0</td>
</tr>
</tbody>
</table>

By analyzing the existence of certain data on the sites of primary schools there are interesting results. Only 35.4% of elementary schools are offering visitors the documents related to education: the Law on Basic Education System, the Evaluation Regulation, House rules, Regulations on students security and the like. Even 20.4% of schools did not set the address of the site, which could be considered negligence. A fifth of schools (20%) have no data on student scores from the events, which raises the question of whether school is not deemed it necessary to promote achievement by their students or want to hide the failure results from the competition. Most of the selected schools consider it necessary for parents or students have the option of telephone or electronic contact with the school, because 75.5% of schools provide telephone or e-mails for contact. However, when it comes to data by telephone or electronic contact with teachers, the situation is much worse, because they are found in only 14.6% of sites. That communication is mostly one-way indicated by the fact that only 8.3% of schools have a forum for students or teachers. It is known that today's generation of students in primary school already widely use Facebook to
communicate with each profile, to engage in forums and comment, so surprising that elementary schools do not offer their students the opportunity to discuss a specific topic on the site of their school. The existence of a forum for students is showing the students that the school respects their opinion. Forum for teachers allows employees to give their opinion or suggestions about a particular topic to be discussed at a meeting of teachers’ councils, Departmental Council and the like, and thereby positively affect school climate. 79.6% of schools have a photo or video gallery of photographs of important events at school, while 42.9% of the schools recognize the website as a space to promote the works of their students. In addition to the analyzed parameters, appeared as early as some that are present in a very small number of sites, such as access to contents of the school newspaper, school anthem, data with another schools, which also contribute to the ethos of the school. In the sample analyzed, the sites were not found data on the humanitarian activities in a school which included or were very organized, and it is certainly a field that should affect schools and point to the importance of such activities for students and the school itself. This should certainly be an integral part of the vision of the school. Very few schools state information about projects in which it participated or participates, as could be expected, given that this type of work in primary schools has not yet come to life.

6. CONCLUSION

Modern school is an open system that constantly interacts with the environment. This includes community involvement in school work, networking and collaboration a companion to schools and education, cultural institutions, but first with parents and students. Modern school is transparent, it is not afraid to show the results of their work, but also listens to the needs of users and environments in order to correct its work and further developed. The area that indicates the success of schools in terms of quality relationships at school, but also how many schools pay attention to the relationship with the environment is called an ethos. In improving the ethos of the school web site can play an important role. School Web site is an information system that informs visitors to the school - the mission, character, appearance, identify excellent information from the Internet, educational resources and helping the implementation of its curriculum, it gives students the ability to post, but the teachers' work and results, and thus promote the success individuals. It helps to quality communication and interaction between students and teachers, thus strengthening mutual relations in school and the school culture. The research is part of this work does not aspire to a broader generalization, but showed footage of the current situation and draws attention to the not elaborate field of the promotion of elementary school. The results show that a large number of elementary schools in Vojvodina do not have its own web site, a school that it use its own lack of opportunities for enhancing the reputation of the school, promoting efficiency and promoting positive behavior of their students and teachers. Among the selected specific ethos, primary schools generally have half. Specifics of the school such as special features of the school (the coat of arms, anthem, vision and mission), data on student scores from competitions, forums and surveys for teachers and students, as well as information on the humanitarian and project activities are present in trace amounts on existing web sites elementary schools, so are the elements that should become part of the web sites of primary schools. They contribute to the ethos of the school and provide support and promote the success of good relationships at school and with the environment. School principals should be noted that the web site required a medium which is necessary to include the channels of communication with employees, students and the environment. Website design is one of the specific of a school that has significant potential in contributing to the ethos of the school as a community.

References:

PROPOSAL OF RESEARCH TYPOLOGIES FOR THE ANALYSIS OF JOURNALISTS PRODUCTS IN CYBER-MEDIA

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Abstract: One of the aims of this paper is to try to present some of the modern scientific trends in the development of methodological tools that can be used for analyzing the level of messages changes (particularly those engaged in journalism) under the influence of the traditional result of convergence of digital media. The paper will try to propose a methodological framework for future studies in which it would be possible to build a new journalistic discourse in time of great media convergence. Therefore, we suggest that the basic methodological framework for the analysis of text, such as content analysis and discourse analysis, expand by paratextual elements such as hypertext, multimedia, interactivity and memory (memory) as a specific digital discourse and to the position of disciplines such as linguistics, documentation or semiotics. Our intention is to formulate and implement methodologies and typologies that will be able to precisely describe the characteristics that define the cyber-journalistic products on the Internet. We will try that on the basis of previous work and our experience suggest not only a typology, but also criteria for the definition of journalistic genres on the Internet.

Keywords: convergence of media, messages, methodologies, media, typology, journalism

1. INTRODUCTION

One way to explore online journalism is to analyze its message. This is one of the earliest trends since journalism and hypertext connected thanks to digital technology.

Our hypothesis is that the convergence from analogue to digital way of producing journalistic products led to major changes in the way of writing and therefore products offered on the Internet. Therefore, as new features are increasingly applied hypertextuality, multimedia, interactivity, use of various sources of information, which is affecting journalistic routines and rhythms that are different from the practice of traditional media.

Among professionals and scientists now there is agreement as to internet publications deserve journalistic status, at least the same as it has traditional media such as print, radio and television (Flores and Miguel Vivar Arrut, 2001; Estévez, 2002; and Parra Álvarez, 2004; meat, 2006). More important than the growth of digital publications is their qualitative consolidation of the media market. Companies that deal with communications, and not just those considered, almost without exception, that the Internet is a strategic factor in their future (Cornella, 2002; Cerezo and Zafr, 2003; Aguado, 2004).

The first attempts at cataloging cyber media are assembled on the basis of methodological scheme established by Jacques Kayser (Kayser, 1974) for analysis of French daily newspapers (with certain modifications). Attempts at classification of cyber media are still very rare, and in some areas of systematic and fragmentary processes of this kind could hardly be found. It is understandable that in times of Internet, when access to the communication system was available only through academic or government (state) institutions, there was no particular need to review any kind, not even journalists typologies of new media.

The exponential growth of Internet users has resulted in the mid 90's of last century, in establishing commercial networks and the Internet in parallel with this, a growing number of available news sites. This is precisely the time when they made the first attempts to create a balance sheet of journalism online in order to use the Internet to better exploit commercially. Then internet publications were described by the following parameters: a) historical summary of the project, b) news production system c) the originality of the project and d) interaction with the public.

As a reference parameter of the system was taken the research work of Tanjev Schultz (Schultz, 1999) put
forward at Indiana University about the consensus reached by 100 U.S. dailies and weekly online and commercial type. While the Schultz’s research was concentrated on the aspect of interactivity, an initiative from Brazil extended the scope of research including other characteristics identified as characteristics of online journalism: multimedia, hypertextuality, personalization and memory.

2. TYPOLOGIES OF CYBER MEDIA

Online media can be classified according to: what purpose or what they aspire to (Alonso and Martinez, 2003), the public to whom are intended, according to the application of professional, structural, editorial and ethical criteria for journalistic work, the use of the possibilities offered by cyberspace (López, Gago and Pereira, 2002), and even on the basis of constancy of renovation and updating content.

University of Santiago was one of the first who proposed the classification of cyber media, taking as a reference level of dynamism in this regard is the proposed text layout calculations based on the degree of adaptation of hypertextuality, multimedia, interactivity and frequency of updates. This proposal corresponds to the interest of highlighting the autonomy of the online medium as independent entities than traditional media.

The task of typology of cyber media is to present a taxonomy or classification of the new communications reality that occurred under the guise of information and communication technologies. The importance of developing the typology is based essentially on the fact that they are used for structuring, organizing and understanding reality, because of his frequent change, innovation, remains scattered, blurred and / or poorly defined. The current discourse of cyber media simply requires practice and study of the typology because, currently, some of these media more or less consolidated, while others are still under definition or conceptualization.

Plotting cyber media typology is useful because it covers three levels of knowledge: first, the initial phase of questioning (what are actually structures called cyber media), etc., which possess characteristics (identification / definition of these characteristics), and third, the dynamics of the between them can be found, that is, what kind of relationship also affects what kind of interaction between them dominate.

Among other typologies are important because they analyze a scenario that is characterized by a plurality of forms and levels of communication so it is imperative that we pay attention that the traditional mass communications expand and deepen to be able to include other proposals which are increasingly in the media.

Faced with the object of study such as ours (typology of cyber media), we believe that the study should not be close to the claims (any attempt to provide definitive and final classification). Instead, it is necessary to understand the phenomenon that the more cover taxonomies and divisions, the more likely that we will understand the complex realities of global and cyber media (classified in a certain, more or less defined categories), as well as the characteristics and dynamics that are established between them.

2.1 Proposed division of cyber media

It's easy to assume that the typology of cyber media differ according to the concept or idea we have of the media. Approaches and definitions of what they have achieved cyber media are equally open, rich and varied, as well as internet communications, and far from being a real confusion. On the contrary, they complement each other provides us with a wealth of typology and allows us to understand the phenomenon of online communication from different angles.

Below is a list of some of the most important typological proposals of cyber media who have been in circulation. From our perspective, and without wanting to be too exhaustive, we could say that there are four great lines of division:

- typology focused on the activity or the development of cyber media,
- focused on the typology of models of communication,
- typology focused on the elements that make up the cyber media,
- the typology centered goals of cyber media.

3. THE DIVISIONS ON THE BASIS OF ACTIVITIES OR THE DEVELOPMENT OF CYBER MEDIA

Under the typologies of cyber media are classified the activities or the development of cyber media, are those initiatives which are classified according to how the media use self-inherent elements of (potential). In this regard it is important to consider the proposal of Lopez Garcia and associates (2005) who expressed the classification according to what they understand as "the level of dynamism of the online media." Here's how they explain: "The concept of dynamism, inherent in the definition of cyber media, refers to the degree of use of new media opportunities that are offered in online format - hypertextuality application, multimedia, interactive technology and frequent updates.” It is therefore very useful to determine the level of online media dynamism on the basis of an “adaptation degree” by the following indicators:

- hypertextuality,
- multimedia,
- and interactivity
The authors explain the relationship between the degree of dynamic adaptability and cyber media: "The term 'degree of adaptation refers to the degree to which the potential parts of cyberspace - multimedia, hypertextuality, interactivity and refresh rate - custom molded and shaped the content of a particular user of online media. The higher the degree of adaptation of each of the four indicators, the greater the degree of cyber media dynamism."

Beside this typology with the classification by level of dynamism, these authors have contributed to yet another typology which, in our opinion, may also be involved in what we established as a typology focused on the activities or the development of cyber media. In fact, this is a double typology: on the one hand it is a typology of cyber media containing technical information on the other hand, cyber media, which contains general information.

As the authors point out, the Internet has changed, the tradition-based rules, those disciplines that deal with the specifics of journalism and research facility was divided into four broad themes: politics, economy, society and culture. It is now necessary to introduce new categories such as, among others, cyber media containing economic information, political information, social information, scientific information, medical and technical cyber media, those containing information on new technologies and so on. The authors also explain that the other typology that could be applied to cyber media containing professional information, a generic division (taxonomy) is based on the level of dynamism, as we have already explained.

As for the cyber media containing general information, the authors should decide or to classify on the basis of dynamics (as in the case of professional cyber media) or for a typology based on geographic criteria in accordance with what is traditionally for the general press and audiovisual media: "Traditionally, the general press (not only print media but also audiovisual) are classified according to geographical criteria, so talk about the general press on four levels: national, regional, provincial and local" (López García et alii, 2005).

4. THE DIVISIONS BASED ON CYBER MEDIA COMMUNICATION MODELS

Suggestions for the classification of cyber media studies and communication models found on the Internet are very important, especially when their goal is to offer a clear perspective of the global effect of all elements (including cyber media and other forms of communication) on the World Wide Web. There is a twofold problem: cyber media and other forms of communication it is necessary to first identify and then group them in different communication logic or meaning (sense) (different models). Guillermo García López, the author of this kind of typology explains the difficulty:

"To offer a clear, systematic, precise and detailed collection of very different forms of communication that enabled the Internet ... it is very difficult when we consider not only a wealth of communicative forms that exist on the network, many of them are complementary and mutually interchangeable, but the fact that this field (theory and different types of content models of online communication) one of the least studied among all fields that cover the subject "(López García, 2005).

Starting from the advanced hypothesis by a few decades ago of a systematic expansion of communication technologies and the impact of media on everyday life of Marshall McLuhan, and taking into account the typology of the early Internet, developed by Slevin (2002) and Morris (2002), taxonomy of López Escobar distinguishes between interpersonal communication media and collective communication media (López Escobar, 1997). So he, in the first group, makes a distinction between "synchronized communication (chat rooms, P2P networks and online games) and desynchronized communication (email, distribution lists, sniffs groups, forums and discussions, wikies, research, virtual the community. "under the collective communication media, the author makes a distinction between" means the presentation (personal pages, weblogs, websites of associations, institutions and companies, "and" global media (portals and cyber media)."

Within this general classification, cyber media Web sites are those whose main task is the development and transfer of news content, that is, those web sites that have online social role of mass media. Their different features are basically: a) receive the proper and responsible journalistic content (as opposed to other types of deals such as for example the sale of products, discussion areas, etc.), B) subordination and their current news topics and c) the use of journalists and professional criteria in generating content (López García, 2005).

The author establishes a distinction within the field of cyber media:

- On the one hand a distinction is made between the cyber media that are "conventional media" on the Internet (printed newspapers, radio stations and television channels) and who, as we saw earlier, gradually began to deploy their content on the Internet, and those media which were developed exclusively for the Internet.

- On the other hand, attention is also paid to the distinction between general and specialized cyber media.

- Finally, the differences according to whether the content of cyber media professional journalist or not. This distinction is in principle contrary to a third specific cyber
media, as we saw earlier, arises on the Internet simultaneously with the development of two types of practices: on the one hand there are the so-called counter-information or "alternative communication media." Such cyber media do not give up the only criteria of news values of traditional journalism, but give up and configuration and management of their own work as a community of users, unlike the media companies that are almost always responsible for generating our media content. On the other hand it should be mentioned various practices related to what is called "citizen journalism" that in the most extreme cases, including the development of journalistic media in collaboration with the public.

It should also say that in our country there is a large civil media, specifically in relation to the "alternative media" that we mentioned earlier. Some experiments are worthy of respect had a great response from the audience, the public involvement and quality of content. However, the big media is becoming common for the design of their contents include the audience, as well as tools used for participation (such as the ability for the audience to comment on published news) and systems offered by Web 2.0 (such as the insertion of videos from YouTube, etc.) offers as part of the main cyber news media.

4.1 The divisions in relation to the elements that make cyber media

A characteristic example of typology focused on the elements that make cyber media is what puts them by type and content more or less dominant in this medium. One possible typology would be one that relates to intangible and tangible service and info-media content.

Another example of typology focused on the elements that make cyber media proposed by Alonso (2005) to distinguish based on various degrees of participation / involvement of the subjects participating in the cyber media. He presented a double level: on the one hand, the main difference is made between the types of agents (representatives): the manager or user. It then deepens each of these elements: the manager can be a producer or presenter (content), while the user can be passive, active or determining.

4.2 The divisions in relation to the targets of cyber media

The typology focused on goals and outcomes includes the classification of cyber media to answer the question why the cyber media is established, developed and elaborated. These outcomes can have many dimensions, but the most concrete examples are given by Alonso and Martinez (2003): cyber news media with the prevailing order, cyber media with the aim of service, cyber media is aimed at info-mediation or mediation.

5. PROPOSED CRITERIA FOR CLASSIFICATION OF JOURNALISTIC GENRES IN THE CYBER MEDIA

Previous studies of genres in online media were descriptive, investigative and conservative character - no more than the initial approach to research in this area, and as such they are valid and effective. The analysis can, in principle, deal with the expressive forms the basis of similarities and differences compared to traditional models of genre of the print media. In other words, only continued with the practice of characteristic - the comparison of print and digital editions: conceptual definition of the object of study ranging from the theory of genres in journalism consolidated in recent years and adds to the theoretical futurology about the new forms of expression and trends in the construction of messages.

Genres are models that allow the presentation of mass media content in an appropriate and understandable way. Researchers assume that the media is a criterion that defines the discursive monkshood, and they are not even questioned. This separation of the media under the influence of acceptance of the methodology to explain the media analyzed, resulting in a lack of dialogue between researchers in the same area. On the other hand, studies of journalistic genres in print journalism theory were laid in the foreground and the favored objects of social activity in relation to their products.

Today, the area of research in journalism and still tends to dismiss the false paradigm of journalistic activity: the boundary between news and opinion. The initial typology are anglophone origin, and the most widespread are those that are based on the difference between story (story) and commentary (opinions and explanations) and the difference between news and comment. For example, some authors range from the criteria that strengthen the differences between the purpose of "reproduction of reality" (information) and "reading of reality" (commentary). Other typologies are proposed do not depend on the purpose behind the writing, but the function of each text. Other proposals are accepted and recognized into account the criteria that are more or less linguistic, pragmatic and rhetorical (Borrat, 1989). There are other, subsequent typology, developed in the nineties, which differ from the first model that we specify. Exhaustion categorical paradigm of classical genres, critical to some authors, is reflected in the inability of the old system to reflect new areas that have emerged in recent years in the print media and, more recently, digital media. For the latter, but the tentative proposal worked out (Díaz Noci and Salaverría, 2003)
5.1. Theoretical and methodological basis for research of genres on the internet

The necessity of a rigorous methodology for reviewing and proposing new procedures for observing the phenomenon of online journalism (Kopper et al., 2000) is a consequence of changes through which the traditional theoretical and practical paradigm of the discipline passes.

In the field of communication there are qualitative, quantitative and experimental techniques whose validity is proven and that could be used within a renewed perspective on the study of genres ranging from the development of online news content analysis. This type of testing identifies the formal and textual elements or characteristics inherent in online media and valid approach for the realization of the initial state of the types of questioning.

Determination of the larger and more general configurative structure associated with functional typologies (Huerta and García Berrio, 1992) also show that the language stays a valid criterion for the empirical observation of these functions in order to develop taxonomy of online journalistic texts and, consequently, the theory of online journalism genres.

Since 1995 the area of linguistics pays special attention to the theory of genres. In addition to David Botlera and Marshall McLuhan, linguist favored documentation and computer science - especially Americans Thomas Erickson, Shepard and Watters, Yates and Sumner, Ryan & Associates, Crowston and Kwaniski, and Tom Campbell. These researchers addressed the role of technology in shaping the distinctive genres, and the theory of genres taking scientists such as Carolyn Miller, Charles Bazerma, Carol Berkenkotter, Devitt, Huckin, Freedman and Medway in the North American school genres, and the Vijaya John Swales Bhatia, interested in the pedagogical implications of genres and Michael Halliday who dealt with the application of genres in teaching languages. For his part, new rhetoric (Toulmin, Perelman and Olbrechts-Tyteca) approached us Observations on the purpose and context and focused on communication situations that create new media to the point of consolidation of what is now the main problem of the theory of genres - be it on linguistics, semiotics and discourse analysis - that the situation of communication exchange. Here's how it is summarized Irene Machado:

"The classification has been replaced by interactive relationships. The concept of genre left the hierarchical scale and turned to the evaluation of interactions. Consideration of genres at the time of digital culture means checking not only the way messages are organized and articulated from the perspective of manufacturers, but also their activities in the communicative exchange, which means, in the process of their restructuring by means of (equipment) mediation "(Machado, 2001).

The power of social rhetoric in this way is in certain key concepts: rhetorical situation, rhetorical standardized actions, rhetorical communities (Miller, 1984), discursive communities (Swales, 1990) and repeat (Bazorman, 1994). The fact that this situation makes it possible to repeat their classification by analogy and similarity. By separating the similarities and differences are constructed types (Machado, 2001). Regularity properties of these situations lead to repetition in form and content. For Bazarman, the notion of repetition is associated with the recognition (recognition). Discursive community today understand as "a group that works together. It supports its range of genres with the presence of traces of the rhetorical power of confirming and community activity. " Genre as social action gives us a less technical and more social and historical vision (Marcuschi, 2004). One of the immediate challenges in linguistics is to connect and establish relationships of concepts and discursive communities rhetorical notion of virtual communities and communities in order to reach a more operational definitions necessary for the study of digital genres. At the same time, the context does not appear in linguistic research, perhaps because they understand the communicative exchanges in the area where the spatial and temporal constraints disappear, allowing synchronous or asynchronous exchange in the network of any size and without geographic limitations.

For its part, driven multimedia semiotics of new media, communication system hybridization, became part of the defense and explores the concept of genre in an environment where it appears as an anachronism. Irene Machado draws attention to North American researchers in the field of documentation (especially in Erickson), and the Mikaila Bakhitin. His discussion of the genre, previously limited only to the field literatute, Bakhitin.
transferred to other areas. His concept of dialogism deceived all those who wanted to work with everyday discourse, or those who have had the need to understand the sphere of recognition and even to analyze hybridization and pluralism. Revised, reinterpreted and put into a relationship, the concept of genre accepted by most researchers is what Bakhtin called a "relatively stable types declaration".

The main research methods are the pragmatics of communication, discourse analysis (with Charaudeau and Maingueneau as the main references), critical discourse analysis (Van Dijk), cultural studies, theory of interaction (Goffman) and the theory of classification.

But what is particularly interested in journalism is the analysis of changes making news in the digital media. The parameters are designed based on aspects such as time (immediacy / constant updates), the number and types of interviewees (interactivity), text format and its extensions (hypertextuality), the level of automation of operations, a means of storing, searching and handling of texts (memory) and wealth and diversity of characters, that is, text, audio, characters and images (multimedia).

Besides the style, themes, and functions, all other criteria are common to the two fields. Style, theme and function follow a tradition of linguistic analysis are also elements of journalistic genres since the 1960's. These and other parameters are composed of several aspects, such as text format (continuous text, a sequence of independent, fixed structures) and the relations among the participants (the famous, anonymous, hierarchy). Also, for each of these elements it is possible to extract more aspects.

These methodological approach takes into account the characteristics determining the configuration of digital texts and their classification. About this pleading and noting the scientific community, as well as basic features, hypertextuality, multimedia, and interactivity. This was, however, can be added and some other features: a) the time dimension, which implies simultaneity and asinchronost (Bardoel, 2002), b) a permanent renewal of information - or by replacing the reservoir, c) how long to keep news on the network or when connected with other subsequent news, d) memory and personalization (Machado et al 2004).

Memory (memory) combined with immediacy, hypertextuality and interactivity is a turning point in comparison to previous analysis of the media.

Here we propose a series of feature-based first, on the dominance of certain rhetorical and other techniques, and second, the potential of hypertext, especially resulting in the typical structures that are measurable, third, the potential of multimedia, and fourth, the interactivity.

6. PROPOSAL OF ANALYTICAL CRITERIA OF ANALYSIS (VARIABLES)

6.1 Rhetorical criteria

Rhetorical criteria takes suggestions from journalism and editing in which the study of texts has a significant response, and the basic postulates are based on procedures proposed by the more Quantilian (inventio - multi-linearity and multiple crossings; dispozitio - hypertext structure; elocutio - multimedia resources: action - interactivity ; memoria - memory).

Rhetorical classification criteria:

![Diagram of Rhetorical Classification Criteria]

Dominance criteria (prevalence) of a certain type in each text (narrative, interpretive, dialogical and confronting genres) completed the analysis of hypertext architecture of each item, examining the existence and use of multimedia, interactivity and temporal features. In this way the inherent characteristics of digital texts, which distinguish the new model, are the main variables for his analysis and an analysis of genres associated with it. There are similar procedures related to the characteristics of digital media, whose efficiency is achieved in determining the degree of hyper media proved - to what extent the media can be considered cyber media (López et al., 2005). The proposed analytical methodology related to the descriptive test hypertextuality, multimedia, interactivity and temporality, is a proven, well established and therefore it is justified to use them operationally.

6.2 Hypertextuality

Studying hypertextuality is one of the priorities of researching types and techniques of their discursive constructions. The aim of this research is to examine the digital texts on the basis of new prototype structure with which they are associated. Empirical research requires hypertext genres adjusted operating method that enables determination of how the online news forms and receive an upgrade to a coherent, gathered around the content of nodes and links, fail to meet the basic functions of the traditional form, their meaning and communicative efficiency. Therefore, the analysis should focus on simple size categories based on conceptual analysis: composition and structure of hypertext.

The composition (composition) refers to the degree of use of links and nodes, it is a parameter of the hypertext that
can be evaluated by quantitative and qualitative analysis. Node, that any type - text, audio, visual, audiovisual, graphics - a unit of information that is shown on the screen when the link is activated and can be identified by words, a group of words or icons so that when clicked, leads to the second node with different content. Using nodes - understood as a unit of information - organized and coherent links, we get digital text, in this case informative, in the expression or form hyper-document. This product is not as long as deep.

Thanks to the ability to create a structure of nodes, links become the main nucleus of the hypertext system, therefore we need such exhaustive taxonomy of links created on the basis of different criteria that can be combined and adapted to each case, the objective analysis of the research review. In this regard it would be good to propose a taxonomy based on typologies that are sufficiently recognized and involved in the origin, purpose and method of research hyperlinks), as well as documentary and narrative function performed by links and, in all cases, the special features are the unit of analysis.

As for the analysis of hypertext structure and typology are sufficiently identified and classified (Díaz Noci and Salaverría, 2003; Powell, 2001; Orihuela and Santos, 1999; Codina 2003), and essentially divided into structured axial hypertexts (eight) and network structured hypertext. Structured hypertext axial (thrust) is divided into linear and branched structures of the structure, and the third class of parallel structures that are often a combination of several linear structures that basically have a diversified structure. Based on all this, pooling together all levels (and eventually all nodes), we get the folder structure. This type of analysis is useful in determining the amount and types of coherence established between nodes – intra-nodal, and structural inter-nodal (Engebretsen, 1999, 2001). It also allows determining the breadth and depth of the genre and capacity upgrades macrostructure of content that explain the rhetorical aspects of the genre and not just formal. To describe these structures are proposed a variety of tools such as graphic design schemes that allow the visualization of full navigation capabilities, and what kinds of content that are linked between nodes.

6.3 Multimediality

And communication professionals and researchers have a unique relationship to multimedia as something that is inherent characteristic of online journalism. This quality, which consists of combining different communication codes - text, image, sound - in an information discourse, certainly a key concept to explore characteristics of online content and journalistic genres. These elements can be assigned only to each other or in an integrated manner.

Multimedia Language:

The first contributes to the theoretical definition of the field of communications was given by Feldman, 1994; Dahlgren, 1996; Jankowski and Hansen, 1996; Tannenbaum, 1998, Cuenca, 1998; Salaverría, 2001; Deuze, 2004. On these foundations in recent years research has been conducted in which different methods were applied.

To date, the most commonly applied method in the analysis of multimedia content analysis was a means to study communication format used by cyber media, with the aim of calibrating the level of use of text, sound and iconic codes. In short, these studies have addressed the indication "new multimedia".

Although there are other studies that used content analysis techniques to assess multimedia sources (Beyers, 2006), probably the most influential work in this field of study that was done by the European Network COST A20, under whose auspices conducted a broad analysis of multimedia formats and content in 16 European countries (Van der Wurff and Lauff, 2005). The validity and applicability of this methodology were later tested in other similar surveys of digital printing. Other studies have dealt with the degree of development of multi-media specific to certain genres developed multimedia. Among these are the most important genres of interactive infographics (Schroeder, 2004; Cores, 2004) and multi-media reports (Larrondo, 2004).

6.4 Interactivity and participation

Analysis of this variable is focused on the study of its various dimensions. The first of these is the type of interactivity allowed, Inclusion (Open Source Journalism) and authorship (user participation is allowed but not to the extent that it can intervene in the production of news) (Light, 1998). This can be further extended depending on the type and degree of interactivity. These structures could be described like this:

- Random: The user has no prior knowledge of where the suggested links will take him, which adds an element of surprise and spontaneity.

- Fixed: Can be changed only by the author.
- Contributory: Allows the user to make intervention on the content (in general, to add content as forums).

The degree of dialogue a particular unit of content should also be carefully considered. Interactivity has different forms, some of them more fit (forums, chat rooms), and they can have or not to have a moderator and may be in the form of communication, "one on one." There is also a form of asymmetrical communication, where on the one hand we have a single interlocutor, and countless other interviewees (e.g. interviews with readers). In a similar way, you should take into account the temporality of particular forms of communication, which means bear in mind that it can be synchronous and asynchronous.

The matter which would be observed is a way in which interactivity is achieved. These techniques can be a dialog (e-mail, forum, chat room, message) or can be personalized based on different forms: Internet search engines or systems for user interface customization to individual needs (Paul and Fiebich, 2002). Given all these variables, we can draw the following table.

### Table of interactivity and participation

<table>
<thead>
<tr>
<th>Type of interaction</th>
<th>Degree of participation</th>
<th>Temporality</th>
<th>Technique</th>
<th>Intervention of the medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interactive</td>
<td>1. Symmetrical</td>
<td>Synchronism</td>
<td>Dialog</td>
<td>Moderation</td>
</tr>
<tr>
<td>2. Author</td>
<td>2. Asynchronous</td>
<td>Asynchronism</td>
<td>Forum</td>
<td>Moderator</td>
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<td>Interact</td>
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</tbody>
</table>

### 6.5 Temporality

Characteristics of new media and have caused significant changes in the length of time for production and time perception. Events in the cyber media discourse may reflect at a much more vivid way without worrying due to limited space. A density of event, measurable variable that is determined by the number of events per unit time, is much greater because of digital technology that allows for much less discrimination against those events that should not become news.

Let's start by the difference between synchronism and asynchronism which separate print sharing from audiovisual media. In the case of cyber media, the previously sharp boundary had drawn far paler. Audiovisual news now includes not only synchronized reception. Instead they can now be sent to the audiovisual archives, and can be "removed" from the Internet to a user used when it suits him. This leads to the proliferation and ubiquity of information. All this adds new elements: the surge - a period of continuing life as a news product and the extension of its importance - a time when news is available and without being outdated, it has not closed himself or herself to be in circulation because it provides context to another, fresher News.

On the other hand information may be subject to continuous updates whether it is the accumulation - add new data, references, documents, or linking (linking) to a major news story, or it is replacing - new digital text replaces the previous, already outdated, as often happens with the latest news (Palimsest effect). These characteristics give us this table:

### 6.6 Info-graphics

A case that requires special research are digital info-graphics. Authors such as Peltzer (1991) indicate that the first example of the use of graphics in journalism (info-graphics) released the world's 1806th in the London Times. This discursive form, according to him, has become particularly important 80's of last century, especially with the graphics revolution promoted by the newspaper USA Today. According to Stovall-in (2004), other print media and have used graphic journalism, for example, Chicago Tribune, USA Today, but he did so effectively giving the value of innovation and design pages based on continuous research of the public who are searching for the type of audience and above primarily through high-quality graphics, especially maps of weather reports. According to Stovall-in:

"Graphic Journalism combines words and pictures to represent ideas and information in a way that is not possible to present only the text or illustrations themselves. The best graphical reporting helps viewers to understand and visualize information. It provides insight into the subject and provides opportunities for viewers to find the meanings and interpretations behind those who were intent journalists" (Stovall, 2004).

Although it has been a long time since that the press uses info-graphics systematically, we can say that the research whose focus is on this type of information sources remains a rare and scattered. Although this observation is true for print media, the same can be said for the so-called multimedia or animated info-graphics. This can be explained by the fact that this phenomenon is new - recall that the first prize for info-graphics awarded only in the late 1990s (Salaverria and Cores, 2005).
Bibliography of printed info-graphics is rich, especially in terms of titles published in the United States, France, Portugal and Spain. Multimedia info-graphics are most often mentioned in the broader study of digital journalism, particularly in the chapters devoted to discussions on journalistic media in cyberspace, but no special work on this issue other than technical character, that is, those that explain how to use the tools and programs to produce info-graphics informative nature.

In Valer’s work (2001), for example, there is also clearly descriptive chapter that leads to the typological classification info-graphics proposal based on the elements that constitute them (interactivity, motion, and the hypertext design) in relation to the form in relation to what he calls the qualitative characteristics. As he has done for info-graphics published in print media (2001), he proposes a typological separation of collective and individual Info-graphics. Proposes a number of features that digital info-graphics can turn into a visual matter on a journalistic genre: (1) utility (informative, cost effective, and functional and mixed several of them simultaneously) and (2) visuality (understandable, aesthetic, iconic, rhetoric - the study of dynamics and their verbal typography). Salaverría and Cores (2005) info-graphics classified as a form of a new genre. However, they prefer the term "multimedia info-graphics", arguing that "he, in itself, regardless of the means hypertext structure in which it appears."

We could say that the appropriate form for the construction of theories about this object through a case study applied in all its complexities as it favors the two main focus areas: understanding how info-graphics are used, based on studies of print quality and consequently, why the source of information was adopted (accepted).

6.7. The typology we propose is as follows:

- Independent info-graphical journalism is more unusual. It appears as a completely separate form of narrative of events, usually through a combination of complex sources. Info-graphical coverage is just one of the variants. This is based on the assumption (Teixeira, 2005) that reports can be defined as text that can provide deep contextualization of the event or certain aspects of the current problems.

In addition to this broad division into groups and subgroups, it is important to say that any of the categories can be individual or complete, and when they were together two or more cases of info-graphics form one single case, much greater complexity.

Finally, before each info-graphics is what we call the proto-info-graphics, or embryonic forms of info-graphics, which is characterized by the absence or insufficient presence of one or another of its essential elements such as a home page that serves to position the reader and the other complementary elements that are essential to understanding. In this case we talked about the first generation of info-graphics. Empirical research should provide a certificate herein typology info-graphics on the Internet and at the same time make possible the reason for their use and function.

7. CONCLUSION

As previously stated, the new digital technology and cyber media open up new and different possibilities of journalism and greatly influence a change in content, structure and mode of production, distribution and use of journalistic products. In an effort to find out more and more precise about the level and extent of changes that are under the influence of digital technologies and habits, occur in the field of journalism and cyber media, we advocate the use of a multidisciplinary approach, and the use of qualitative and quantitative research methods. In this work a great help to can give us at least a basic typology of standardization based on the elementary characteristics of cyber media, such as hypertextuality, interactivity, multimedia, the use of info-graphics, temporality, and others. of which is discussed here.

We are aware that this is an extremely difficult and risky business because of the speed with which technologies change the way of preparation, appearance and manner of journalistic products in cyber media, but we are also aware that no research effort to invent a methodological tool and customize it a new context, a real insight into the breadth and depth of change will be difficult to obtain. Without innovated and adapted to the methodological tools, we find it difficult to manage even to accurately describe the basic characteristics of (cyber) journalistic products on the Internet, let alone to understand the new modes of communication in cyberspace or to determine the degree of adaptation possibilities of new media products. The contextualization of information and
understanding of the meaning of messages that say nothing. The convergence of traditional (analog) to digital media from professionals who deal with this issue, not only requires a mere statement that the changes occur and description of consequences, but requires adaptation of analytical and methodological tools to monitor their understanding and, ultimately, and methodological tools to be able to change, improve and lead.

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DIGITAL MEDIA IN THE PROCESS OF KNOWLEDGE CREATION

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Abstract: Digital media literacy sets foundations for the creation of a new and different environment that suits the needs and habits of contemporary generations of students matured at the time of intensive growth of Internet use. Their growing up and intellectual development, regardless of different social and cultural environments which they come from, are today more than ever affected by different technologies, skills of their use and individual expectations of students. New generations have new needs. They have grown on networked markets and they realize that they can obtain more information, better information and more support from each other than any other company of enterprise.

Activities related to learning in unstable and variable environment, increasingly relied on modern achievements and digital technology are practically increasingly difficult to structure and determine in advance. Activities of independent management and problem-solving are considered to be focus point in knowledge acquisition through contemporary learning process. Studies tell us that teachers in Serbia mostly have basic knowledge about the use of information and communication technologies and that they cannot follow their students who grow up with digital media.

Tasks that are set before new school are not possible to be realized in the milieu of old paradigm that neglects increasingly larger scope and different structure of knowledge, as well as modern digital media as the most influential carriers, sources and knowledge mediators. Therefore, we believe that digital literacy of teachers and students, as well as designing and practicing on digital technologies, is a foundation for teaching process and learning without which it is not possible to build educational systems and processes in XXI century.

Key words: digital media, digital literacy, learning, knowledge

1. INTRODUCTION

Contemporary systems for learning imply different designing of learning environment, dynamic organization of material that implies relatively individualized learning environment, possibility for independent research, networking, communication and interaction of those who learn, as well as completely different way of evaluation. We are engaged in electronic learning for some ten years. During that period, it has grown from the bold idea whose effectiveness should be proven into a widely present, and in some countries even basic way of learning. Learning is adapted to modern tendencies in the sphere of the sources of data, storage, keeping and sharing information. By adapting the learning to modern ICT trends, we actually make the learning easier to new generations. Activities related to learning in unstable and changeable environment, increasingly relied on contemporary achievements in digital technologies, are practically increasingly difficult to structure and determine in advance. Independent management of learning, based on problem-solving and cooperation, offers a possibility of using personal tools for independent construction of new knowledge through relying on possibilities that modern digital media offer as tool and social educational networks as a source of knowledge.

Processes \(^1\) of technological diffusion of Internet and ICT also depend on knowledge structure that is present in the environment through which diffusion of these technologies takes place. Educational staff will be developed when level of investments in their education becomes sufficient. Namely, when we speak about the phenomenon of digital divide, we most frequently refer to unequal possibilities of approaching the resources of Internet and information-communication technologies (ICT) in general, thus basing that inequality on economic factors. That is true, and economically observed, development of infrastructure necessary for wide networking of particular groups or entire nations primarily depends on the level of investing in that networking. However, in that process, it would be wrong to neglect the development of knowledge structures and investment in education for their development.

In studying the development of information society, main trends that are carefully observed are those that refer to the number of users, manner and quality of approach,

\(^{1}\) Milovanović, Goran, 2008, Digitalne podele: jezik, kultura i rod na svetskoj mreži, Centre for studying information technologies, Belgrade Open School
share of state, civil and private sector in the application of information technologies etc. of course, close future will have to bring a bigger number of comparative studies regarding Internet and ICT use in general, in relation to specific characteristics of users, cultures and processes in which they are used because when technical issues of access are solved to a satisfactory extent, efficiency of global exchange of communications primarily depends on knowing these information. "If the things we use and the people with whom we spend a lot of time define a great part of what we are and what we would like to be, then information technologies can generally be seen as the biggest candidate for the position of main guru of human behaviour in 20th and 21st century".  

However, achievements of modern media represent one of the biggest civilizations step forward of the age which we live in. It is about the phenomenon that has won the world in a relatively short time and which is embedded in overall life of contemporary man. Rapid development of science and technology has provided rather rapid strengthening of information-communication potentials of mankind. Our exposure to media and media messages is enormous, so it happened that knowledge changes form and structure mostly under the influence of changing knowledge mediator – media. Informative role of the media is increasingly transferred into persuasive role, because in contemporary society the media formulate messages in accordance with cooperative or commercial interests, with spreading the belief that all messages are organized in the interest of the one who receives messages.

Does modern education follow these trends?

2. NEW GENERATIONS AND NEW NEEDS

For decades, science thinks about information habits of the young people: generation H, generation Y, millennial generation, Google generation etc. There are beliefs that new generations are “digital natives” and that they have completely different behaviour and needs. Differences between generations are seen through unique lifestyle that is based on common environment (social, economic, cultural, technical) during previous years related to various global events in narrower and wider environment. Growing up in different social and cultural environments is affected by different technologies, skills and expectations. Many people have adapted to changes in an enthusiastic way. This, of course, refers to millennial generation. Google generation has already grown up with computers and their use as an obligatory part of life. Boomers were thrilled with changes, and many were equated with previous or the following generation, depending on preferences and expectations. Generations H and Y are seen as common, as well as Y and Google, they are seen as „digital natives”. Generation Y – Also known as millennial, generation D, net generation, echo boomer generation, was born between 1980 and 1995. As young, it has made a contact with digital world. That is the last generation prior to Internet expansion, it has experienced the end of Cold War, social and economic contradictions, collapse of Soviet Union, Yugoslavia, introduction of western model of living in India and China. Today, they are in late teenage years, the twenties, at college of faculty. Forms of communication are web, mobile phone, Tablet PC/phone, I-phone, Kindle Book Readers, computer games. Characteristics: optimistic, innovative, interactive; a little worried about privacy, group-oriented; they feel a bit bored, live for work, but do not work for living; expect a job that suits their style rather than to adapt to work environment, work from home, career break; they are familiar with technology as a part of life, their motto is – prefer the work than knowledge; they expect visually attractive interface and physical space; know skills very well, in education they require support, work in short periods with particular specification and expect to finish everything in their own way. Generation Z or Google generation – also known as Facebook generation, new silent generation, alpha generation. It includes people born after 1995. They have always been familiar with networked digital information. Today, they are teenagers of school age. They use social networks, messages, IPod for communication. Characteristics: always online on the network; use several sources of information simultaneously; require superior graphics, speed and easiness of using the Internet are implied; impossibility of concentration; they prefer scanning and rewriting to writing and thinking; they are superficial, they are not good in finding good information, even when they use technology, but they are certain that they are good; gossiping and mocking rather than knowledge, prefer being online to thinking and learning. They love images, sound and video more than text.

In short – it is about generations that are completely relied on digital media. They are their first, and often basic, sources of knowledge, they are their eyes and ears, with them they directly look at the environment, but the entire world as well. Those are generations that live global information although they often do not understand it and that imply for all the information to be available to them „here and now“.

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A study conducted by Centre for studying information technologies of Belgrade Open School in April 2010 tells us how does a day of modern teenager, who has grown up with modern media, look like. Focus of the research was on the behaviour of Serbian high school students on the Internet. Results show that Serbian high school students completely fit into above described image of their peers from around the world. Sample consisted of 300 high school students from all over Serbia. Although sample is not representative, the results obtained could be taken as indicators of trends in online behaviour of the young people. Research results show that almost two thirds of examined high school students have more than three years of Internet experience, so they can be seen as Internet users who should be familiar with media specificities, as well as limitations and possibilities that this medium provides. Data that 86% of respondents go online a few times per day is illustrative, and almost a half spend more than 10 hours per week online, according to their own estimations. Almost 62% of respondents state that they spend more time online than in traditional learning (from a book), and 25% believe that they spend equal time online and learning. More than three quarters of examined high school students recognize themselves in descriptions such as: „When I am online, I am always multi-tasking – I do more things simultaneously. I find myself spending more time on the net than I have planned. When I start to work something on the Internet, it frequently happens to do something completely different, because I simply get carried away...“. Four out of five teenagers, from this research, spend more than a half of time online on some of social networks.

Modern generations are related to digital-information age, i.e. for all the things that it is – cyber space, virtual reality and digital information and art. In the world, digitalization of media space goes on practically simultaneously – by which McLuhan’s phase „global village“ has obtained another dimension. In addition to uniting the media world through the prism of digital, it is also united through the need of winning new paradigm of literacy. For here described, new generations, completely relied on digital technologies, it should open the way to more secure walking through the world of traditional media positioned and harmonized with requirements that are set before them by information-communication technologies, as well as through virtual world of social networks, multimedia contents in traditional and modern media. That is particularly important because the process of digital globalization and media competition go on simultaneously, and hunger for information grows bigger. User of media messages is no longer a passive observer. He participates actively, creates media content, analyzes them, interprets and evaluates. Convergence of primarily television technology, communications and Internet for the user of media content has created one completely new space in which the user is active and creative participant in that space. It opens many questions such as – can he do it? What knowledge he has regarding media messages in modern world? Who has and based on which programmes made him media literate so that he could and knew how to participate in the process described? These questions gain in importance especially when we have in mind that among users, as it is shown by domestic and foreign studies, persons of age from 15 to 25 dominate. Such composition is not surprising if we have in mind the characteristics of Internet as medium: provides communication and familiarity with persons of the most diverse interests which is rather important for the users at that age; it is inexhaustible source of information about a wide range of subjects, particularly the subjects about which it is difficult to get informed from other sources; Internet is entertaining and dynamic medium, which is very important for the young people and it provides an illusion of anonymity to them; which is, again, very important in that age. At the same time, these questions remain open, perhaps even more seriously open when it comes to teachers on which population at this age is oriented. Studies show that education is necessary to both of them, whether it is about modern media technology or modern media constructs.

Domestic conditions also point to the fact that prior to adjusting our educational system to the characteristics of media culture, traditional and digital, i.e. development of media literacy that follows achievements in media world, and which implies: ability to find, process, interpret, understand and evaluate traditionally and digitally transferred information, it is necessary to work on education of generations of teachers who will be able to keep the pace with „Y and Z generations“, who grew up on “hypertext” and in digital culture, both in the field of using media content – construct, and in the field of its use, construction, deconstruction and its evaluation.

3. DIGITAL TECHNOLOGY IN TEACHING

Teachers and professors in the world, for some ten years, use tools such as wikis, blogs etc in teaching, and they have observed that instead of discussing pre-set topics, pupils and students very efficiently discuss the most diverse topics with different people scattered all over the world.

On the other hand, domestic study „Research of ICT in Serbia, review of the situation, development perspective, which was introduced in 2009 by the Association of informatics teachers in Serbia“, and which has included 4918 teachers from 112 schools throughout Serbia, points how far are we from global trends of using digital media in teaching. In addition, research results show that teachers in Serbia have only elementary, not necessarily sufficient knowledge regarding the use of computers. We

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transfer only a few segments from large-scale study, which, in our opinion, sufficiently illustrate the abovementioned, and they also speak in favour of our assumptions: that we pay insufficient attention to education in this field, that teachers haven’t recognized the significance of mastering digital media for the needs of teaching as well as for better understanding the generations with which they work, that there doesn’t exist sufficient motivation of teachers to deal with modern achievements in media domain, although their students have grown up in that world.

One of the questions that has opened a series of dilemmas and indicated that there is no harmony between the needs of contemporary students and possibilities of contemporary teacher, at least when it comes to modern technology it was: „Which motive was crucial for training to work at a computer?“ Distribution of answers has unequivocally shown that motive of “adopting elementary knowledge from the field of computer science” is the prevailing one, which means that there is no existing knowledge from that field. Modernization of teaching and application of new teaching methods are present with barely 22% of responses, and in that case more from preparing the class then the teaching itself. Even these responses point to the viability of our assumption. Elementary knowledge that the teachers will adopt cannot be sufficient to cope with the knowledge of their students who, as we have already mentioned, spend more than 10 hours per a week at computer. That attitude is even weaker motivator for any kind of innovations in teaching, because without mastering a serious set of tools, teacher is not able to initiate the modernization of his own class with modern achievements in the field of media. Of course, it would be foolish to suggest that it is only about subjective reasons for such attitude.

Let us mention also that a percentage of respondents who use Internet in teaching of for preparing the teaching is only 58.95%, and it significantly drops in relation to the extent to which Internet is generally used. “Chi-square” test has shown that there is no difference between women and men, as well as that there is no statistically significant difference between age categories, in favour of the young, of course. In addition, „chi-square” test has shown that there are statistically significant differences between groups of subjects and following the novelties. By analyzing relations of those who follow novelties in ICT and those who do not follow them, it was observed that the informatics and electro group of subjects are the ones that follow the novelties the most, and biology and physical education to the smallest extent.

In addition, results of the research mentioned here show that exceptionally small number of respondents does not believe that use of computers in teaching raises the level of motivation and achievements of student. Somewhat less than a third of respondents have said that they are „not sure”. Additional analysis ha shown that in this attitude there is no difference between sexes, but that there is a statistically significant difference in the age, which is lost when the youngest population, which is much less uncertain than the others, is excluded. In addition, there is a statistically significant difference
regarding this attitude between type of school where teachers work (elementary, vocational and gymnasium). There is also the attitude on insecurity particularly expressed with teachers in elementary schools.

In addition, teachers who are familiar only with basis of computer work, who are not familiar with multimedia packages, who are not familiar with media construct, they have no knowledge about manipulative-interactive role of the medium as teaching instrument that enables different types of thinking-motor activities to the students in relation to particular parts of teaching instrument or in relation to its whole. This implies an active relationship between students and teaching instrument, which includes change of structure and contents of teaching instrument, change of different internal relations and functions, decomposition and reconstitution in particular fictional form and the like. All these activities should provide a deeper understanding of subject content which teaching instrument refers to.

Obviously, tasks that are set before new school are not possible to implement in the milieu of old paradigm that neglects increasing scope and different structure of knowledge, as well as modern digital media as the most influential carriers, sources and mediators of knowledge. Education for the world of digital media, i.e. modern media education of teachers, the condition is change from old to new school. Change of educational system and media education of teachers, the condition is change from old to new school. Change of educational system and media education of teachers, the condition is change from old to new school.

Among assumptions mentioned, our study „Media literacy in school of postmoderna“5 also fits, by which, among other things, we have, on a sample of 120 teachers of secondary schools in Novi Sad, measured the use of media contents in teaching, aim of using media content in teaching. Research has shown that TV package in teaching is never used by 41.17% and rarely by 35.29%. Radio package is never used by 68.06% of respondents and rarely by 10.92%. Texts from newspapers are a little present in teaching (never 18.48%, rarely 43.69%, 12.60% respondents did not answer). Texts from textbooks dominate, just as the books – most frequently 61.34%, often 23.52%. Computer as instrument of teaching is occasionally and regularly used by more than 73% respondents, and contents from Internet for preparation of teaching is used by 62% respondents, and it is about text contents. Answers according to most frequently selected goals that respondents achieve by using media content in teaching process, from the aspect of our research point to the conclusi on that respondents


network. It is specific for them that they absorb the information rather rapidly, that pictures and video are used equally good as ordinary text, simultaneously and from multiple sources. They function by the speed of Internet, so they expect momentary replies and feedback in the same speed. They are inclined towards a random approach to media, at their own request, they expect the continuous communication with friends and they are prone to creation of own media content, as well as ordering a book or CD through the Internet.

The way in which new generation of Internet users changes markets is rather impressively described in document The Cluetrain Manifesto. For the first time published on the Internet in April 1999, document begins with the statement that “markets are conversation” and then it continues with redefinition of relations between producers and consumers: “Markets become smarter, more informed and organized. People in networked markets realize that more information, better information and more support they can receive from each other than from company or enterprise.” In the same direction, with a reason, it is also spoken about more demanding students (augmented learners), as well as hyper organization. It has occurred that model of electronic learning, when the content is produced by publishers, when it is structured and organized in courses, and students only consume it, is turned on its head. Content, devised in a new way, is more used and less read than before, where the content can be produced by the users themselves. The very structure of contents, is more similar to conversation language than classical textbook text, because content is permanently used and rearranged in accordance with the interests and needs of students. Final form of contents is distributed and stored so that it could be used and reshaped by other students. Formally speaking, instead of using advanced and enterprising learning-management systems, trends in media and advanced learning suggest using so-called overlapping applications with an open code. It is about an approach that learning does not depend on previously designed teaching content, but it increasingly depends on the way in which that content is used.

Each learning organization significantly depends on selected pedagogical approach. Approach to learning which we speak about is based on designing educational social software from the positions of social constructivism. According to the concept of social constructivism, learning is considered social and active process. Activities of problem-solving describe the learning process in which users are oriented on solutions. For socially constructivist approach, it is very important that the pupil/student by himself and independently tries to solve the problem.

In other words, users should manage the process of problem-solving by himself. “Individual determines by himself how he will continue the work, based on individual and unique needs, perceptions and experiences, determines what he knows and what he does not know, determines available sources and resources in order to encourage learning and finally, formali zes and tests his beliefs.” In the environment described, by material for learning we imply resources or tools that are used for solving problems. As long as they are not actively used in learning process, they are not learning material. “Resources are media, people, places or ideas that have a potential to encourage learning. For learning process, it is important that the resources are contextualized, so that situation significance and sense would be determined. On the other hand, it is necessary for the resources to be re-contextualized so that they provide the use of information derived from other resources. When contextual sense is established, information become organized as knowledge, they function in broader contexts of meaning, contain relevant models, predispositions and interpretations.”

Activities of independent management and problem-solving are considered a focus point of learning process. In other words, described concept of learning process means that it is not necessary to structure or predetermine activities of users in learning process. activities are developed based on independent problem-solving. Logical consequence is the need for learning environment to be open always. Openness of learning environment provides pupil/student the possibilities of multiple activities, which are initiated by problem or project in this constructivist learning environment. At the same time, he is surrounded by a series of different tools and resources that help him to solve the problem.

32-42.
http://www2.parc.com/ops/members/brown/papers/situate dlearning.html
New learning environment implies networking into social networks and independent creation of learning environment. New learning environment increasingly resembles the tool for personal portfolio of users. That is also the tool for continuous development that encourages individuals to assume responsibility and to show the results of their learning.

Concept of creating different learning environment, oriented and controlled by users themselves, based on creation and participation in social networks, refers to teachers as well. By opening own blogs and pages on the Internet, they also participate in learning social networks and active learning process of students. Therefore, in this learning environment that already functions in the world, learning process is not performed within management system, but it is developed through user independent management of the work that is reflected in personal blogs and wiki, which are available not only to other users from micro-environment (school, faculty), but also to teachers and their micro-environment that starts with students.

5. CONCLUSION

Expansion of media and media-mediated information has caught our education unprepared. In corpus of didactic, technical, methodical and other preparation of teachers for educational process, situation with teachers' knowledge from the domain of media pedagogy, media didacties and media culture is worrying.

The approach to electronic learning presented in this paper implies that focus should be transferred from learning management system (LMS). Practically, it means that, instead of integrating all the functions in one system, we should separate them in more individual tools and in that way support different needs of users in accordance with their different possibilities. All of that does not require monolithic, expensive packages, nor it refers to the programming of new softwares. It is about widely available free tools and their use in social context whose environment is dynamic, in which relations rapidly change unlike stiff and limited environments defined by computer codes.

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12
MEDIA AS CREATORS OF EDUCATIONAL AND CULTURAL PATTERNS IN KNOWLEDGE SOCIETY

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Abstract: Media in contemporary society represent powerful instrument of influence on educational and cultural paradigms. Their power is strengthened by absolute presence, activity and role that they have in everyday life of a man. In this paper, partial results of one broader theoretical-empirical research on artistic interests of the young, i.e. media as creators of educational and cultural patterns, awakening of intellectual curiosity and encouragement of interested socialization. The question of choice and quality of contents that media, as intermediaries and transmitters of cultural patterns and values, place is discussed as very important. Author, based on the results of his own, as well as other relevant studies, concludes that media are rather present in everyday life and educational communication, that they represent a significant factor of cultivation and interested socialization of the young, so it is necessary to strive for a multimedia approach and more intensive and comprehensive cooperation with educational institutions.

Key words: media, artistic interests, educational and cultural patterns, knowledge society

1. INTRODUCTION

One of the most significant characteristics of the present is contained in the announcement of the Council of Europe (1993), where it says that decisive role in each social, economic and cultural development belongs to information and communication. This fact assigns to the media the role of intermediary, through which culturological image of a nation is modeled: information are received, the latest scientific discoveries are adopted, general culture is developed, aesthetic and artistic values are cultivated, cultural-artistic, educational, entertaining contents are offered... As aesthetics in media receives increasingly significant role, they – as a product of development of technological civilization and electronics – become one of the main factors of interested socialization and aesthetic cultivation of children and youth.

The growing role of the media comes from the fact that through words and pictures they offer behavior models, which are often more alive, distinct, with many details, more clear and specific than other models (Đurić, Đ.,1999, 20). Media are, undeniably, extremely efficient and attractive although their role is interpreted differently. Some theorists believe that radio and television primarily need to be considered stimulants, while others believe that they have become extremely aggressive at the present moment, etc. according to chronological order of appearance, television is the youngest means of mass communication, but it is imposed as the most expressed due to its characteristics. In broader sense, cultural function of television refers to its entire impact on the auditorium, and in narrower sense, it refers to cultural programs only. In that way, it becomes one of the most significant agents of socialization and cultural behavior. In increasingly vivid rhythm of contemporary life, it, in a way, distracts us from enjoying in traditional forms of culture (book, exhibition, concert, theater etc.) because it increasingly gains the title “mosaic culture” (since it is irreducible to narrower understanding of culture that involves only artistic creativity), while, on the other hand, it seems as a strong factor of encouragement and development of aesthetic culture and awakening of intellectual curiosity. Television also appears as one of the forms of cultural substrate that unites the characteristics of other media, particularly radio, film, theater, press, and in a way, book as well. Precisely for that reason, it is considered that television and other media are rather present in everyday life and that they represent rather significant means of education – particularly in the 70’s of the previous century when the first program model for media education was created up to these days when these processes are characterized by education for assessment of artistic values and understanding of the media.
2. RESEARCH STRATEGY: MEDIA AND EDUCATIONAL AND CULTURAL PARADIGMS

Media, as polyvalent determinants of visual perception, in educational communication obtain new content, spatial, temporal and organizational dimensions. Contents are heterogeneous, space is not limited by anything, time is in service of each user of information resources, while organization is individual, partner, team, collaborative an common (Stevanović, M., 2004,216).

In the quest for knowing basic facts of the development of cultural-educational and artistic interests, we have determined that interactional relation between variables of personality and contents as stimulation is always correspondent to particular social milieu. Operationalization of the variable “artistic interests of the young” has provided us with more thorough observation of the problem of informing the youth through mass media.

Based on the data available, we can conclude that significant percentage of the young is informed through the means of mass media and that they, viewed globally, spend a lot of time engaged in that activity. Television holds primacy in this regard, and it is followed by reading and listening to radio-shows (see Figure 1).

With television, the situation is quite different, because it affects more senses simultaneously, requires the viewer to concentrate (on it), “refuses to serve as background … with it you need to be up to date” (McLuhan, 1971). Television program, unlike radio programme, is chosen exactly in accordance with the existing interests. By fulfilling, on a daily basis, a few hours of leisure of an average viewer, television through its “mosaicness” provides, although in passive form, superficial satisfaction of numerous interests that exist in auditorium. It aligns “tastes”, presents conventional norms and offers the products of mass culture, but it can also in that way encourage the initial interest for some field (McQuail, 1976). However, its limitations in the aspect of forming the interests are obvious: it does not reach the deepest layers of interest which, according to the definition, imply personal activity and self-realization.

To the question “Which shows from the field of culture and art do you watch on television?” we have obtained rather interesting replies. Taken as a whole, the majority of participants have replied that they never or rarely watch shows about the interpretation of prose or poetry (Em 2 -81.38%), as well as recordings and broadcasts of concerts of classical music, opera, ballet, etc.(Em 6 - 75.00%); this trend is followed by informative shows - Em-1 (chronicles, reviews, interviews with artists, introductions of critics etc.(58.88%), then short TV exhibitions – Em 4 –(displaying art works, exhibition in the studio etc. –53.05%), then mosaic shows from the field of culture and art with stories about the music (Em 9 - 49.44%) and recordings of theater plays Em 5 -(adaptations of drama text, the original TV drama) (see Figure 2).
Among the shows from the field of art and culture on television that the respondents mostly watch (often or occasionally), films are in the first place (Em 3 - 92.77%), then recordings and broadcasts of concerts of other types of music (Em 7 - 76.38%), then music shows that combine sport or playback performance with the conversation with performers or authors (Em 8 - 58.05%), and finally film music, music as basis of some shows, EPP messages or announcement and advisory credits (Em 10 - 49.44%).

It can be seen that the young show preferences towards those music programs whose content is mostly oriented towards popular music. We could, in relation to this, ask the question why is classical music insufficiently listened (only 17.5% respondents listen to it)? It is possible that the respondents do not like the choice of classical music that is offered by TV centers, or the way of its road that TV centers could take in presenting classical music (such as some foreign stations did).

When it comes to reading the press and books, it is necessary to say that studies of readers’ interests of children and the youth are so dispersed and specific that it is almost impossible to bring some more general conclusions about this phenomenon. We should not neglect the fact that monthly and daily press increasingly occupies the attention of the young (because their number on the market constantly grows) and distracts them from the book in the true sense of the word.

Research results have shows that the respondents mostly read entertainment sections Ct 4 (60.56%), then sports Ct 3 (50.28%), educational Ct 2 (44.72%), informative Ct 1 (36.94%), then cultural chronicle-texts about cultural and artistic manifestations Ct 5 (28.89%); then follow the expert advices Ct 6 (27.78%), and 5.83% of respondents says that they do not read the press at all. One number of the students reads something else Ct 7 : articles about celebrities, motoring, fashion, film, comics, horoscope etc. Reading cultural chronicle would be at the fifth place, if we would rank these indicators.

Based on categorial, i.e. logical data according to the parameter Ct_ (reading columns in the press), cluster analysis at distances was also performed, as well as factor analysis on distance matrix. In that way, distance index was obtained at the table of logical data according to Kulczynski and interest groups were isolated Ct_ (see Table 1).

Table 1: Cluster analysis on distances – overview of hierarchical classification

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Distance Ct_5 (reading cultural chronicle) in relation to other parameters Ct_ is big, and in case of some parameters (e.g. Ct_8) it approaches the maximum (DST=.9714), for the other parameters, distance is somewhat smaller: for Ct_7 DST=.7947, for Ct_3 DST=.7502, for Ct_1 DST it amounts .6230, for Ct_4 DST=.5739, for Ct_6 DST=.5685, and the least for Ct_2 DST=.5015;

3. CONCLUDING REMARKS

There is no doubt that media are significant factor of the formation and development of artistic interests of the children and the young, so it is necessary to strive for multimedia approach and its relatedness to educational organizations, i.e. education for so-called “peacekeeping co-existence with the media” (Nagy, A., 2004). Broad application of media in educational processes inevitably imposes the need to explain/understand the phenomena of mass communication, studying the language of media and their use in changing the position of student from passive recipient towards active participant that studies and creates his educational path all by himself.

Based on mentioned considerations, it is possible to, in the form of pedagogical implication, conclude that the editors of TV and radio programs, as well as the editors of magazines and newspapers (daily and weekly) had to take more care about the choice of contents that they Toplice.

place. The issue of their quality is presented here also, because low quality contents (we primarily refer to music shows and sections in newspapers) can have a negative impact on the young, especially those that are less critical towards offered contents from “heterogeneous and in no way defined guidelines of media material”(Stevanović, M., 2004) and do not recognize the works of true artistic value. Having in mind the fact that means of mass communication are very important for cultural life in our country, the issue of developed cultural concept of editorship because, by transferring cultural patterns and values, media influence the raising of general cultural level of the nation.

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DIGITAL TECHNOLOGIES AND TEACHING LITERATURE IN THE UNIVERSITY

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Abstract: A conflict between verbal ways of knowing and visual ways of knowing seems to be as old as western civilization. The paper deals with the ways digital technology changes both reading as a social practice, and the process of mediating literary tradition in teaching literature in the university. Being both a canonic text and a teaching device, book lends its status to the electronic media. The paper tries to question the proposition that technological knowledge is fundamentally different from the realm of literature and even diametrically opposed to it. The tense and fruitful relationship between literature and technology springs from the impression of writers and literary scholars that their activities are irreconcilably different.

Key words: Technology, literature, teaching.

The main question raised in discussion on the ways we read and teach literature today has imminently become the choice of the method: how should we approach literary text now that the visual seems to be prevalent over the verbal, now that digital technologies demand more space from us while cunningly offering to save our time, obviously becoming increasingly hostile towards the textual practices? The paper will focus on the analysis of the possible ways to make digital practices closer to reading literature in the classroom, starting with the assumption that the common goal of verbal, visual and virtual components in the communication is to transcend the human desire and introduce it to the vast choice of artistic and pragmatic expression.

Digital technologies impact on every aspect of our lives and are vitally important to the growth of the society and culture in the 21st century. University students are naturally among those who need opportunities to develop knowledge and skills with digital technologies, so that they are equipped to respond to rapid changes in society, education and culture. Therefore, they need to be addressed in an appropriate technological idiom when teaching literature is in question.

Frequently referred to as the “new media”, the digital and interactive technologies are by no means synonymous with information and communication technologies (ICTs), since there are older, nondigital media (such as telephone, for instance) that are also included into ICTs. The contemporary tendency to consider all ICTs to be new media can be explained by the fact that all technologies are increasingly being digitized: mobile phones, for instance, are digital, interactive, and also increasingly multimedia. Furthermore, new media are merely a subcategory of current digitally based media technologies, whereas digitization tends to diminish the differences between what are called “new media” and ICTs. A new media object “on the screen” does not have a one-to-one relationship to the codified object of zeros and ones in the computer databases. There is no intrinsic motive for the relationship between bits and their form, hence giving desire and fantasy an important role in this interfacing with bits.

Digital technologies are used as a medium in widely varied fields of human reality: communication, entertainment, and science. The digital revolution turns the world into a huge database: a world of computerized, codified objects accessible only via interfaces. Using computers, we enter cyberspace, a mental space which is conceptualized so as to codify the objects of the computers. Defined as the mental realm of the human-computer interface, cyberspace engendered cyborg, the term combining “cybernetics” and “organism”, which NASA scientist Manfred Clynes coined in 1960. Whereas the word initially referred to a human being whose bodily functions were aided or controlled by technological devices, nowadays the term more generally describes the dependence of human beings on technology, so that we can think that all who enter cyberspace become cyborgs because they depend on machines for their online life.

New technologies have readapted and reinforced systems for capturing the multitude of voices at the margins, and cyberspace has offered new ways to construct gender and identity by helping us transcend our grounded identities. Tweeting, blogging, browsing and networking became the verified strategies of both advertising and activism. Donna Haraway, who conceived the metaphor of a non monolithic identity of a cyborg, half-machine and half-person which travels within cyberspace, wishes to offer a political strategy for diverging interests. Her concept of the cyborg is a rejection of rigid boundaries, notably those separating human from animal and human from machine, and a means to explain how fundamental contradictions in feminist theory and identity should be conjoined, rather than resolved, similar to the fusion of machine and organism in cyborgs.
From a philosophical perspective, there are three fundamental domains: the matrix, as the “noumenal” dimension of codified objects consisting of zeros and ones (the database); cyberspace, as the “phenomenal” mental space of the conceptualization or representation of code objects; and the interface, as their crucial medium. The interface is the gate leading humans into cyberspace, connecting us to the matrix while simultaneously, because of its particular formations, still separating us from it as a whole—thereby preventing the psychotic realization of desire.

The computer screen functions in cyberspace as a space of fantasy and desire. The world as a database cannot reach us without the help of the media that open it up, and this probably explains the appeal of the print culture, since the issue of the book being a product of a technology is not that transparent, since we do not need gadgets or equipment to start reading.

The print culture started its centuries long dominance in Europe as a promising way out of the number of difficulties that accompanied the scribal culture, which ended in 15th century with the advent of the Age of Gutenberg. In her study The Printing Revolution in Early Modern Europe, Elizabeth Eisenstein reminds her reader of the difficulties the scribes encountered when transcribing texts and emphasizes that they “had only one version to consult and no certain guidance as to its place or date of composition, its title or author” (Eisenstein 1983: 6). The author pays her respect to the scribes by suggesting that “the more thoroughly we are trained to master the events and dates contained in modern history books, the less likely we are to appreciate the difficulties confronting scribal scholars who had access to assorted (oral or written) records, but lacked uniformed chronologies, maps, and all the other reference guides which are now in common use.” (Eisenstein 1983: 7).

Eisenstein perceives the printing press to be the most revolutionary discovery in the development of the mankind, stating it “brought about the most radical revolution in the development of the history of Western civilization” (Eisenstein 1983: 106). Digital culture ultimately changes the semiology of the sign, bridging the gap between the verbal and the visual, and deepening it at the same time. The dominance of the print culture has been questioned ever since the computer mediated communication began its expansion, creating a false alarm about the death of the book, but also offering a false encouragement about the indispensability of the print media. Since the invention of movable type in the fifteenth century, western civilization has depended on the written word as its primary means of communication, and the book as the most authoritative source of information. The development of photography, motion pictures, television, and computers has challenged the long-standing balance between the visual and the verbal, leading to the multiplication of the visual material available in everyday life, as well as education. The proliferation of images influenced the popular culture, as well as the tenets of various theories that claimed to have an exclusive insight into the language and the nature of the sign.

Cultural theorist Guy Debord claims that the proliferation of images in contemporary culture has emptied those images of any reality, turning the viewers of images into passive recipients of mass-produced commodities. The result of the process is alienation:

The origin of the spectacle lies in the world's loss of unity, and its massive expansion in the modern period demonstrates how total this loss has been: the abstract nature of all individual work, as of production in general, finds perfect expression in the spectacle, whose very manner of being concrete is, precisely, abstraction. The spectacle divides the world into two parts, one of which is held up as a self-representation to the world, and is superior to the world. The spectacle is simply the common language that bridges this division. Spectators are linked only by a one-way relationship to the very center that maintains their isolation from each other. The spectacle thus unites what is separate, but it unites it only in its separateness (Debord 1967: 22).

Jean Baudrillard in Simulacra and Simulations seconds Debord's claim that images in our culture have been detached from any verifiable meanings. The result is an existential awareness of the arbitrariness of meanings that seems quite different from the assumptions of the early modern times:

The transition from signs that disseminate something to signs that disseminate that there is nothing marks a decisive turning point. The first reflects a theology of truth and secrecy (to which the notion of ideology still belongs). The second inaugurates the era of simulacra and of simulation, in which there is no longer a God to recognize his own, no longer a Last Judgment to separate the false from the true, the real from its artificial resurrection, as everything is already dead and resurrected in advance.

When the real is no longer what it was, nostalgia assumes its full meaning. There is a plethora of myths of origin and of signs of reality – a plethora of truth, of secondary objectivity, and authenticity. Escalation of the true, of lived experience, resurrection of the figurative where the object and substance have disappeared. Panic-stricken production of the real and of the referential, parallel to and greater than the panic of material production: this is how simulation appears in the phase that concerns us – a strategy of the real, of the neoreal and the hyperreal that everywhere is the double of a strategy of deterrence. (Baudrillard 1994: 6-7).

The semiology of visual images has been considered most carefully in Roland Barthes's essays, and he frequently
Heisenberg. The fields of science and technology are not worlds apart, since many critics nowadays resort to different. However, literature and science are not the same. To come to terms with the theories of Einstein or Nabokov and even Ernest Hemingway as attempts to representational practices of the writers such as James Joyce, Virginia Woolf, Lawrence Durrell, Vladimir Nabokov and even Ernest Hemingway as attempts to come to terms with the theories of Einstein or Heisenberg. The fields of science and technology are not in splendid isolation from art and culture, as is shown by the visual media revolution. The development of cinema, television, and digital information technology has provided the kind of intellectual distance necessary for students of information technology and culture to perceive the effects of the printed book upon literature. Increasingly, literary, art, and cultural historians have discovered important relations among paper-making, print technology, modes of publication, economic factors, creativity concepts, and the specific works of art and literature produced.

The coming of computer-based information technologies with their emphasis upon process, system, and code has enabled students of literature and the arts to perceive that they, too, function as forms or subsets of information technology. Literature has, in many ways, demonstrated that it operates systematically, applying the methods of rational thinking and sharing the principles with those of mental activity. For instance, the computer programming has been shown to share methods used in argumentative writing, while understanding literature as a set of processes, systems, and codes (or semiotics) reveals that in many aspects it clearly functions as an information technology in itself. Complex forms of argument and patterns of rhetoric thus appear to be a branch of information technology, as are the major literary genres, including the novel, the epic and the drama. One of the most obvious and interesting forms of convergence between literature studies and computer science has come in the area of computer-generated narratives: computer scientists working in artificial intelligence perform the same operations as folklorists, narratologists, critics and theoreticians of storytelling – they all break down stories into component parts or structures and attempt to show how meaningful narratives can be generated from these parts.

One of the burning questions that humanist scholars raise nowadays is whether books will become obsolete in the age characterized with the advent of new technological developments. Digital technology was not the first to endanger reading as cultural practice: one of the first challenges to the reading matters was the film industry, which used the works of literature as filming material. This resulted in the abandoning of literary works in favour of their filmed versions, neglecting the fact that film radically changes the message conveyed in the original work. In the age in which the technologies of knowledge and communication flourish, the reading of the original literary text is radically different in comparison to the period in which the literary canon was established.

It is wise to start the examination of the relationship between literature and technology with a perspective of a novelist who discusses the issue of technology in the classroom. Some fifteen years ago, Serbian writer Mirjana Novaković published a long story "The Gospel According to A Thirsty Woman", a futuristic variation on Bible stories positioned somewhere in between dystopia and satire on education. The story is set in a nameless city that used to be known as Belgrade, but with a newly acquired anonymity forced upon it. The inhabitants are forbidden to use personal and proper names, obliged to undergo plastic surgery and expected to live happily in self-sufficiency and detachment, without friends and relatives. Such a seemingly egalitarian society turns education into a teacher’s worst nightmare, since discipline and rigor is mostly unwelcome: students are, for instance, allowed to press charges against those professors who insist upon acquiring the basic knowledge in science. Equipped with the handy arm-joint computers which carry out all arithmetic and logical operations faster and better than humans do, students are encouraged to pursue a daily routine of much play and little work, to use the drug called “hyperextasythree” and visit the “rage” parties. The motives of intellectual laziness, listlessness and overindulgence obviously aim at criticizing a culture of uniformity which subdues individuals without offering an alternative, but also hint at the apathy induced in the Serbian "lost generation" of the nineties.

The first attempt at disobedience, quite feeble and ineffectual, is closely connected to the technology in the classroom: a group of students has been temporarily forbidden to use their arm-joints because an infected disk had been inserted into the computer network. The punishment obviously aims at taking the disobedient back into the technological past, but it unintentionally points at the soft spot of the control-freak society: there is always a virus, threatening to change it irrevocably, a virus of rebellion.
This minor offence anticipates an even more serious threat to the community: a secret resistance movement comes into the lime-light after the female narrator (whose name we will learn at the very end of the story) has met the tribe of the thirsty and found out about their nameless goddess, called only She or Her. During a short nap in the classroom, the narrator hears a voice announcing that “the one who calls Her name will become thirsty”, “so thirsty that nothing will ever be able to quench that thirst.” (Novaković 1996: 51). This is the beginning of her quest for truth. Thirst is an inverted parallel of the Biblical motive: while the followers of Jesus Christ never get thirsty again after having tasted his creed, his nameless female counterpart aims at causing eternal thirst. Unlike the Christians, the followers of Her cult are not meant to be peaceful and content once they have found their religion. The Female Christ can be seen by her followers, but is never really present: She is either a voice coming from afar or a gentle immaterial touch, which equals her to a virtual entity. This Messiana works miracles and walks on water the same as Jesus Christ, but otherwise she is an epitome of human imperfection: when She decides to assume the shape of a human being, she becomes a bespectacled, plain looking girl in ragged clothes. Unlike the citizens of the Open Society, the goddess has never been subjected to either genetic modification or plastic surgery. The narrator pities Her for being “so tragically ruined before her life even begun”, confused by the fact “that there is someone who has less, who is worse off, doomed to inherit all of her parents’ inadequacies” (Novaković 1996: 59). This lament over a scapegoat marks the beginning of the narrator's emotional awakening. Naturally, she blames an unsuccessful genetic modification for this outburst of feelings, but her emotional awakening shows how the influence of the societal values gradually weakens. For instance, the narrator stops using the hyperextasythree at approximately the same time: thus her resistance to the Utopian rules becomes resolute.

The story by Mirjana Novaković indicates that not only digital technologies have become an indispensable part of literary inspiration and production, but also that technologies of teaching have to be designed according to the shift of focus and interest brought by the new technological era. The conditions for literature have changed considerably over the past decades, not least owing to the development of digital technology, which have seriously affected the production and distribution of books, as well as the consumption of the text. Furthermore, digital technology causes a renegotiation of what authorship and distribution of literature are.

Used for three basic purposes (to train or practise, to assist learning, and to enable learning), technology can help the educator find a more efficient way to teach literature. It is of utmost importance to investigate the connection between literature and digital technology and to deny the widespread concern that digital media will have a negative impact on literature and the book as a medium.

There are many options for the publication of fiction in formats other than the printed book: any classical work of literature can reach us in the format of an audio file, e-books for various types of reading pad, there is also digital publication on the Internet, as well as new printing systems, such as print-on-demand, which is used as a quick printing system if only small numbers of copies are required. The issues of authorship and distribution of literature have substantially changed, but as the general accessibility of the book is wider, it seems that the demand for books has dropped.

Numerous articles and books have been published during the last thirty years that have examined and reexamined what is at stake by bringing computers into the classroom, or asked questions about the role of technology in teaching. It is important to understand the potential roles of digital technology in teaching literature, its pedagogical applications and its importance in examining non-digital text. What should also be discussed is how digital formats change the reading and interpretation of canonical texts, and how they contribute to evaluation of the non-canonical ones.

Digital technology has imminently changed book publishing, seriously affecting its efficiency. Book publishers used to struggle mightily to conceal an author’s errors, but readers now get regular glimpses of mistakes that enable access to unedited minds. Before digital technology unsettled both the economics and the routines of book publishing, most publishers employed copy editors and proofreaders to filter out an author’s mistakes. In the past, there were manuscript, galley proofs, revised proofs and blue lines in that order, so that the changes were marked at each stage. Today, there is pressure to publish more books, as well as to publish books more quickly, and thus publishers are forced to skip steps. The authors of today are also to blame for the changed quality of the printed text, as their use of the word processor has resulted in a substantial decline in discipline and attention. The result is that the manuscripts are longer than they were three decades ago, produced with less effort and consequently less care.

The use of technology is often compared to fetishistic operations. Such an opinion holds that technologies disavow the limits of ordinary life and provide us feelings of pleasure by opening up a realm of seemingly unlimited possibilities (Nusselder 2009: 121). These possibilities, however, do not strengthen our ties with the literary text. The nature of the text changes, becoming more fluid and less stable, but this also implies that literature becomes easier to grasp with the use of digital technologies which makes it possible to have all the necessary data close at hand.
The features of accomplished teacher development and teacher learning include vision, motivation, capability, reflection, and community. The contribution of digital technologies to teacher learning is noticeable in making them more prepared and better equipped for the impasses of critical readings. The development of increased computer memory and faster processing, together with the extension of the internet and its associated technologies, is closely associated with the compression of time and space and “the death of distance”. This death of distance can refer to obliterating distance in history and knowledge as well.

The story of Mirjana Novaković ends in storytelling: the main character Catherine starts telling her story of the female goddess, revelation and betrayal to her fellow students. They listen attentively, showing us that every story about technology ends in disclosing hidden plots. Thus technology and literature share a common goal: to tell us, to help us and make us understand.

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EXPERT AND AMATEUR KNOWLEDGE IN WEB SITE PRODUCTION

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Abstract: One of the main traits of virtual communication is dissolution of the borderline between experts and amateurs. However, in institutional and organizational context of state and educational institutions, non-government and mass media organizations the production of web sites is still given to the professional graphic designers and programmers. This paper provides a discussion of different models of web site production conceived as negotiation between two types of knowledge: expert knowledge of professional web designers and laymen knowledge of their clients.

Keywords: web site, amateur knowledge, expert knowledge

1. INTRODUCTION

Virtual communication, which dominantly permeates communication practice, has greatly affected the changes of established social roles. In media study, these changes are discussed primarily from the standpoint of the changed roles of communication centres (mass media organizations) and audience, which is „demassified” into individual users. Main characteristics of mass communication through traditional media (press, film, radio and television) are changed significantly because one-way communication becomes two-way, individual not only gets a chance to comment on mass media contents, but also to speak publicly. At the core of this new relation, there is relativization of absolute positions of recipients and senders. Extreme activation of the members of mass audience can be found in the appearance of „citizen journalism” where the relationship is not only altered, but it is also replaced, so that citizens communicate messages that typically were in domain of mass media organizations.

Changes of established social roles under the influence of virtual communication are also visible in other spheres. Alvin Toffler wrote about proactive consumers, who will participate in designing the product, by which not only the product will be changed, but the role of consumers as well (Toffler, 1983). Today, the concept of prosumer is widespread and it does not refer only to participation in creating products or services, but also to consumers who behave like professionals, i.e. buy products (cameras etc.) which they can handle almost as if they were professionals.

Changes in these relations implicitly or explicitly change the status of professional and amateur knowledge. As paradigm of this change, we take the appearance of wiki media, particularly Wikipedia and its branches, which provide an opportunity for amateurs to create a knowledge corpus through collaboration, referring to the knowledge that previously were in exclusive competence of experts.

Web design represents only one of the field in which it comes to the changes in relations between amateurs – in case of web design, those are clients, purchasers of web sites and users themselves, and experts – web designers. In this paper, we will try to problematize this change and to offer a few models of relations that appear when amateur and expert knowledge meet.

2. WEB DESIGN

By web site, as analytical subject of studying, we imply a coherent textual unit that:

- “unfolds in one or more interrelated browser windows, the coherence of which is based on semantic, formal and physically performative interrelations;
- is established on the background of, and in an interplay with, a certain internet and textual environment; and
- is clearly distinct from the web as a whole, as well as from the web sphere, webpage and web element”.


By web sphere, we imply thematically close, not necessarily hypertextually related web sites, while web pages and web elements make an integral part of some web site. Each web element has certain morphological segments that can be observed as independent units of meaning. For example, one video clip on Youtube.com is one web element. Observed together, elements make a specific syntactic structure that is based on semantic, formal and physically performative interrelations (Brügger, 2009). Semantic relations are achieved by
textual cohesion and coherence, lexical construction of coherent „world“, isomorphism between semantic units and global structure of menu. Formal relationships are those that are manifested at the plan of markings and they are implemented by various graphical and textual references (arrow keys, menus, etc.). By physical-performative relationships, we imply the possibilities of performative activities and movements, mostly between the elements that are visible and those that are not visible. It is about different continuous (vertical or horizontal scroll) or discontinuous movements (clicking dragging etc).

Web design can be observed as a process and as a product. As a product, web design represents a specific implementation of individual web sites, with many related pages that have their aesthetic and functional dimension. Web design as a process represents a series of steps that lead to the implementation of specific web design.

Web design as a process and web design as a product are very rarely finite categories because, as world wide web (www), the individual site is also fluid and relatively variable. However, this variability primarily concerns the individual elements, for e.g. news or pdf files, while informational and functional structure still shows a high degree of stability.

Typically, web design as a process includes three groups of participants (Chevalier and Ivory, 2002) – individual web designers, clients, purchasers of the site and future users of the site, i.e. users of what the purchasers are offering (products, services, information etc.). Cases where designers make their own sites are possible, so they are found in double role of designer and purchasers. In addition, it is possible to organize the creation of web site in such a way that programmers and graphic designers take part in it, as two different groups of participants.

In developing web design Katamraju (2004) identifies three periods. The first period, from 1993 to 1996, the author calls the „fusion of art and code“ period. That is the time when Internet technologies haven’t yet become widespread and when the experts in this field are very rare, clustered in specialized scientific institutions or organizations. Web design wasn’t a based field of knowledge, but those who are even remotely familiar with the programming, they have experimented with black text on grey background and with inclusion of several photographs or other graphical elements.

The second period, Katamraju relates to the proliferation of Internet, from 1997 to 1999 and calls it „bifurcation of art and code“ period. At this time, process of creating web sites is divided into two segments, first one that concerns graphical design and the second one that concerns programmer’s task of creating information structure, bases, codes, scripts etc. Designer’s part is seen as art, and designers are responsible for aesthetic dimensions of sites, while programmers deal with technical-technological basis of sites functioning.

In the third phase, which begins in 2000, graphical design becomes less important and this is „domination of code over art“ period. Programming tasks are paid significantly more, while companies for graphical design are organized in such a way that they offer all types of designer services, in addition to website design. This course of events can partially be explained by the expansion of finished models of web pages and whole sites that become available with the expansion of Internet.

As it can be seen from this brief historical review, expertise associated with web sites creation have: 1) elements of technical-technological competences, knowledge and skills in the field of programming that can be acquired through formal or informal education, and 2) the artistic gift that also implies certain competences in the field of graphical design (which can also be acquired by formal or informal education), but which are far from being something that can simply be „learned“.

In modern web design, especially if we do not observe rather expensive undertakings but the needs for the web sites of individuals, small or medium companies, non-governmental organization, educational institutions etc., two aspects of creating web sites are not sharply separated. One person usually deals both with aesthetics and code. Elements of code domination still can be monitored because persons with programmer’s competences are winning the field of design rather easily and perform both segments of the job, while reverse practice is much rarer to encounter.

Inclusion of clients in design process begins with proliferation of the Internet and its spreading out of the specialized scientific centres, i.e. in the „bifurcation of art and code“ period. Simultaneously, that is also the time of intensive development of „Internet economy“, which equally draws both big international companies and small local manufacturers and service providers into itself.

3. CONTACT OF AMATEUR AND PROFESSIONAL IN WEB DESIGN

Discussion that follows is mostly of theoretical character. At the level of illustrations, empirical material obtained from a series of interviews with web designers, which have been conducted during June and July 2011 within a wider study regarding the ways in which web designers and purchaser negotiate about aesthetic and functional elements of web site, was used.

Relationships that are established between web designers and clients, purchasers of web sites are similar to the relationships that appear in other fields, particularly those
in architecture and spatial planning, which also include (at least) two groups of actors. Nicolas Negroponte, architect by his primary vocation, and today commonly known as a theoretician of „digital being“, observes this similarity (Negroponte, 1998). In one of his early works, Negroponte presents the idea of a software programme that should help the architects to achieve higher participation of clients. Unlike previously prevailing approach, according to which the only thing that was required of users were additional information about their needs and habits, Negroponte argues for „removing the architect and his previous experience as intermediaries of my [user] needs and my [users] house“ (Negroponte, 2003: 357). Main reason for that is answer to a question whether architects can, based on previous experience, predict the needs of users or, as Negroponte summarizes it, „Can an expert have expertise in goals and values, or is expertise per se limited to means?“ (Negroponte, 2003: 359).

Parallels with architecture appears to be relevant because it is about a contact between professional knowledge that is highly sophisticated (of course, more in architecture than in web design, among other things, because the responsibility of professionals is by far greater) with the knowledge that comes from clients’ experience and their ideas that have occurred on the basis of that experience.

Experience of purchaser, client, is double – firstly, it is about indirect, personal experience that the users has with previous architectural/design solution, and then there is also indirect experience from life. Rather simplified, we have the experience of everyday being in one house and we know what we would like to change and preserve from that experience, but at the same time we know about the houses of other people and their experiences. Therefore, purchasers of website do not need to have previous website to know how to articulate their requirements, it is enough that they are web users and that they already have more or less built attitudes and preferences of the aesthetic and functional elements.

Therefore, it is important to point out that there is even particular professional knowledge behind the design (in real or in virtual space), it is to such an extent available to amateurs that they lose technical-technological complexity from their sight, due to which they are placed in the role of experts.

In response to Negroponte’s question, amateur knowledge in web design is very important because it involves:

- Knowledge of the purpose of web site
- Knowledge of end-users of the web site
- Knowledge and understanding of own (corporative or individual) identity that involves mission, vision, goals, values (sometimes formulated in a form of a brand).

Whether this knowledge is acquired and supported by studies or it is more intuitive, based on them clients set certain restrictions to web designers. This knowledge is the source of authority of purchasers when formulating certain requirements, that are the fields which purchaser has mastered and from which he derives his demands.

In visual terms, knowledge (and attitudes) regarding the organization for which the site is created are most frequently summarized in a logo. Logo is already existing identification of an enterprise or institution, recognizable among target audiences (consumers, partners, professional communicators etc.). Logo is also the element that is already realized, so designers are expected to incorporate it into web site and to base the entire aesthetics on it. As interviewed designers confirm, they are expected to monitor previously given design of logo in the choice of colours and specially designed graphical elements.

Knowing the purpose of web site represents implicit knowledge of clients. In particular cases, it can be narrowly focused – when it comes to portals for e-learning or e-banking, web sites of media organizations etc. Knowing the purpose, unlike previous type of knowledge, mostly refers to functional elements of web site, by which we usually mean the way of navigation and interactive options (such as on-line purchase, access to databases, entering comments etc.), but also various options of personalization and additional settings (eng. customization).

The manner of implementing (or non-implementing) these options has equally important role in positioning the users of web site, as well as aesthetic elements, and in that sense it is related to familiarity with end-users of web site as well. For example, media portals still have a series of characteristics that put the users into a function of recipient. Although the possibilities of giving feedback (by comments and likes) are, of course, incomparable in relation to traditional media, these elements are functionally separated from the contents that are placed by media organization itself. In contrast, for example Youtube.com portal provides approximately equal „rights“ to individual and corporative users, by which everybody is set in equal position of the creators of audio-visual messages.

In addition, by functional elements we determine the level of including end-users, and thus their attitude towards the content of the web site (and directly towards the purchaser). At the functional level, web sites can be rather complex and require high degree of user engagement or, on the other hand, they can represent mere presentations. This question further leads up to the issue of the literacy of users, i.e. to knowledge and skills that the users should own in order to handle specific contents and options.
Unlike the knowledge about own identity, knowledge about the purpose is rarely explicit in encounter of purchasers and designers. From the interview, we can conclude that web designers mostly see websites through their presentation or promotional function, at the expense of all others. Since others rarely get explicit, precisely this segment of client knowledge represents a possible battlefield for knowledge of designers and purchasers.

In the end, knowledge of the end-users of web sites can have two forms. First, there is knowledge acquired by systematic study of the existing and potential users. These studies represent usual part of marketing process. However, smaller enterprises, as well as greatest number of institutions, do not own detailed data about the users, so they rely on the second form of knowledge, the one that is implicit and intuitive. It basically represents a way in which clients construct their users.

Regardless of the type of knowledge of the end-users that the clients have, that knowledge is rarely transmitted to web designers. On the other hand, designers themselves rarely think about the end-users. In interviews that have been carried out in June and July 2011, designers themselves have not articulated their own or offered (from the part of clients) knowledge of users. Only if the question would be directly formulated, the respondents could reflect on the users, but predominantly referring to their experience in designing web sites for a very narrow user group, such as, for example, one portal for e-learning was.

In addition to these three key fields, purchaser can have the experience and knowledge of similar organizations (with similar users and/or similar identity), which already have their web sites that serve for the same or similar purpose. Precisely this knowledge serves as a basis from which requirements in the first encounter with web designer are articulated. Interviewed designers confirm that clients address them with the request of having a web site that is similar to some other.

However, this field is included in domain of designer knowledge, doubly. Firstly, designers might have at some point of their careers designed similar web sites and thus acquired some knowledge– even professional routines, but they often make a particular type of website – regarding aesthetic and functional characteristics. Secondly, designers might have been users of a similar website and they are able to draw certain knowledge from that experience. First knowledge can be classified in the category of situational knowledge as knowledge within a particular situation that typically appears within a certain domain. It represents one of the key elements of design knowledge primarily because of the manner in which knowledge in the field of web design is generated (this will be discussed in fifth part of this paper).

Precisely this area where two types of knowledge meet – situational knowledge of designers and client knowledge of the purpose, end-users and own identity – represents a possible field of negotiation, conflict (if their knowledge is not the same) or compliance (if there is a correspondence in conclusions adopted).

4. MODEL OF WEB SITE PRODUCTION

Depending on the characteristics of relations that are established between two types of knowledge in design process, we can observe four models. Those are paternalistic, paternalistic-educational, participatively educational and inclusive relationship of web designers with clients.

4.1. Paternalistic relationship

In paternalistic relationship, web designers are set into a position of authority in relation to clients. Dominance of professional web design knowledge exceeds the area of familiarity with the code and aesthetics of web sites to that knowledge which should be dominant in domain of purchasers, i.e. knowledge of the purpose of web site, end-users and own identity.

This relationship appears in situations when basic corpus of design knowledge is being supplemented by the acquired experience of designers. Experience acquired, i.e. situational knowledge, works as a catalyst for the authority with which designers appears before the client. In such relationship, client is entitled to a limited series of requests that have default character for designer, while everything beyond that is a possible point of contention.

For understanding the way in which situational knowledge affects the creation of paternalistic relationship, concept of a genre can serve us. By genres in socio-semiotic sense, we do not only refer to structural characteristics of text, but also to wider understanding of this traditional concept. Simultaneously, genres are cognitive frames that manage manufacturing, interpretation and use, and specific texts in which certain types of manufacturers, users, themes, media, manners and purpose of communication cross. „The social semiotic approach to genre has focused on the function of texts in social interactions, on what people do to or for or with each other by means of texts“ (Van Leeuwen, 2005: 123), they are „semiotic resources, ‘templates’ for doing communicative things“ (Van Leeuwen, 2005: 128).

In Riddel’s opinion, this way of observing genres stresses „the significance of media-audience encounters is not restricted to textual and representational aspects only, but also the routinised activities of using and receiving the media and their texts are saturated with significance. Hence, these routines are in themselves constitutive of the social and cultural dynamics of audiences’ meaning-making“ (Riddel, 1998: 130). In this way, communication
and discursive (textual) dimensions are included in the concept of a genre.

Such an approach to genre is significant because it provides for the concept to be equally relevantly used in the analysis of manufacturing and use. „Media and genre routines are intimately interrelated with the ways media industry operates in organizing its output” (Riddel, 1998: 129). In mass communications, genre can be seen as a relation between user and producer, allowing the user to find more of the same, and the producer to create more of the same (Agre, 1998).

Having in mind socio-semiotic approach, situational knowledge of designers can be seen as experience of designing certain web genres. In Lundberg’s opinion, genre can be a powerful way of framing a design, since the producer by relying on genre can be assured that the user in some sense already has experienced the product, so the design process is often related to „genre repertoires“ which designer has at his disposal (Lundberg, 2004).

When establishing paternalistic relationship, designers do not only copy aesthetic and functional elements from their previous experience, but the entire genre repertoires, which include knowledge of the purpose and users. It seems logical to assume that with years of service in the field, designers acquire more experience, so their knowledge becomes more consolidated. Additionally, in establishing paternalistic relationship, consolidated knowledge „performs“ with additional authority.

The way to limit paternalistic relationship is through contests formulated in details or tenders for development of web sites in which special attention is given to precisely defined purpose and users. In domestic designer practice, contests are rarely detailed and include very widely defined aesthetic and functional categories. For example, in the contest for creating web site for Radio-television Vojvodina from 2006, there are data on the technology of development, then there are two sentences about visual identity of the site („Essence of the required visual solution for RTV website, looking up to the best solutions of similar services, is dominantly processed information architecture in such a way that it obtains legibility of a great number of information, with an attractive appearance of the pages. Information that are not in the form of news.“), as well as a few more things about content of the web site. There is only one sentence on the function of the website („The aim of creating Radio-television Vojvodina is to provide timely current news through new media, information on programmes of the Broadcasting Service of Vojvodina, work plans and communication with the audience“) and not a single one on planned users. This opens a space for designers themselves to incorporate their understanding of users into final solution.

Observing paternalistic relationship from the aspect of a client, we can conclude that it occurs when clients do not have clearly formulated requirements or when they lack knowledge to formulate them clearly. Paternalistic relationship is established when this gap is supplemented by additional professional knowledge of designers.

4.2. Paternalistic-educational relationship

Although purchasers of web site are also the users of Network, so they are familiar with „web sphere“, it is possible that they are not aware of their graphical or programming solutions that can be incorporated into their web site. In this situation, web designers operate from the position of educator because, in addition to performing their specific task, they also educate their clients.

Experiences of designers interviewed confirm the existence of such situations. Designer I. S. (37), for example, explains that very often clients mention the colour of web site as the first information, and many people who did not have web site so far expect him to develop information structure that is a basis for further negotiation.

In this way, educational relationship is established, which still can have dimensions of paternalism, due to which we suggest it to be called paternalistic-educational relationship. Paternalism is reflected in the fact that designer’s knowledge and experience is still a dominant component of final product, web site. Additionally, solutions that are offered by designers in the process of educating clients are rarely alternative and they are presented as final. Designer, I.S. (37) claims: „I never do a several versions of title page. I do one, and if the client does not like it, I go all over again“. Paternalistic-educational relationship can perhaps be best understood through a title of one of the popular lectures from the field of design: „Educating clients to say YES“ (see: http://boagworld.com/talks/educating-clients-to-say-yes/)

4.3. Participatory educational relationship

More liberal relationship can be established if designer in the process of consulting about web site presents options that the client has at his disposal, so informed purchaser can make a decision. This relationship can be characterized as participatory educational relationship.

Particular challenge for establishing this type of relationships appears in the field of technical-technological knowledge (familiarity with the code), because this is a field in which there is the biggest gap between professional and amateur knowledge. In order to relatively equally discuss functional elements of the website with his clients, designer primarily needs to adjust his discourse to amateur language or to make an extra effort to explain professional terminology to the purchaser. Only then designers can explain the options
that the clients have at their disposal and their justification for a specific web site.

Designers who establish this type of relations often have their own sites that are particularly meant for educating the clients. For example, such is the blog of Brian Hoff, „Design Cubicle“, whose aim, as it is stated, „is not only to teach, inspire or help other designers, but to focus on educating the clients and raising the awareness of design.“

Participatory educational relationship can be related to the culture of exchange and sharing, which is widespread in web sphere, particularly in „open source“ ideology and practice. In addition, the way in which global WWW network appeared points to an early existence of this relationship, since the network quality itself comes from a multitude of web pages that are publicly available.

In participatory educational relationship, web designers do not get involved in issues that are in domain of clients’ knowledge and that refer to knowledge of organization, users and purpose of web site. Their role is limited to the means – functional and aesthetic elements of web site – through which clients can meet their communication goals.

However, this does not mean that in final product, particular web site, there are not designer’s impact such as authorship, regardless of the model of relationship that is established, is always divided between clients and web designers. Nature of the process of creating web site in which two parties participate is such that the only question asked is to what extent and in which domains particular types of knowledge take part in final solution.

### 4.4. Inclusive relationship

Following the line of increasing participation of clients, the next level represents participatory design within which the task of a client is not to set particular requirements, but to provide designers the contact with end-users and to participate in design process with them. Participatory design originates from Scandinavian countries and it is based on three premises:

1. „The goal of PD is to improve the quality of life, rather than demonstrate capability of technology;"
2. The orientation of PD is collaborative and cooperative, rather than patriarchal;
3. PD values interactive participation and integrate feedback from intended users, thereby promoting design iteration“ (Ellis and Kurniawan, 2000: 264).

This type of relationship is based on assumption that amateur knowledge is equally relevant as expert and, therefore, requirements and needs of amateurs need to be integrated in aesthetic and functional dimensions of the final product. In this model of relationship, sovereign area of website creators – functional and aesthetic elements – goes into domain which clients and future users of website deal with. The way in which users access semantic and physical-performative relationships is separately tested.

Since amateurs find it relatively difficult to articulate their knowledge, the task of designers is to facilitate the participation by preparing as many as necessary functional prototypes to reach the solution that satisfies the users. Within this relationship, two realizations are possible. Within the first one, designer is not present during the interaction of users with prototype, but he receives feedback from the clients. Within the second one, particular attention is paid to the presence of designers during the interaction of users with prototype, since it is considered that interaction of users with designer is an integral part of design process (according to de Souza, 2005: 7).

Appearance of participatory design is situated in a wider paradigm of creating the user-centred interface. As De Souza claims: „the gist of user-centeredness is a radical commitment to understanding the users and asking them what they want and need. Their answers set the goals that professional HCI design practices must meet for interactive computer-based artifacts to be usable, useful, and widely adopted“ (de Souza, 2005: 8).

Participatory design and inclusive relationship are still mostly reserved for those social groups that are considered non-typical users of Internet and who are believed to have specific needs in relation to standard. These are often older persons, children and people with disabilities.

In addition to these target groups, inclusive relationship is also realized in the creation of commercial websites for on-line purchase. „Designing a successful website is not only about the process of shopping and the efficiency of moving from one web page to another. It's all about understanding those people who enter the site, why they're there, what they like, and what bothers them. Helping customers move from one domain to another is meaningless if they can't relate to the overall environment“, say the authors who advocate inclusive relationship and intensive contact with end-users (Chandler and Hyatt, 2003: 122).

One of the reasons for which participatory design rarely used is that process of creating web sites that implies participation of both the purchaser and his end-users takes a long time, and with additional engagement of designers in developing functional prototypes (nearly final version of the website) the total costs are also increasing.
5. SOURCES OF DESIGN KNOWLEDGE

In the end, we need to mention that established relationship will depend on the level of professionalism of designer himself. As we have already mentioned, design knowledge can be acquired in formal or informal way, so the level of „professionalism“ is a very ductile category. The task of creating websites is obviously far from profession, but it might be said that it is a profession (in sociological determination of the two terms).

The issue of the way in which creators of websites acquire their knowledge is important. It is necessary to observe that highly sophisticated knowledge regarding the code (programming) and art (graphical design) are most frequently formally separated in higher education. For that reason, teams for the development of websites are either created or the ones that deal with one field are trained for another. On the other hand, both dimensions of developing websites can be learnt in courses of informal education. Although there are great differences between them, both types of knowledge can be classified as general knowledge. It becomes supplemented by situational knowledge that is acquired during a series of performed tasks.

For example, results of one of the rare studies among designers (Chevalier and Ivory, 2002) shows that designers at the beginning of career work good within previously set client restrictions, but it is more difficult for them to foresee the needs of clients if they are not clearly articulated. On the other hand, professional designers that had previous experience with previously set clients’ requirements, they can make conclusions about the needs that are not clearly articulated in design process, since they own contextual knowledge acquired through experience (Chevalier and Ivory, 2002: 60).

Interviewed designers are a good example of the fact that manner of knowledge acquisition affects design practice. The ones who have acquired knowledge in non-formal way frequently use ready-made CMS models that can usually be downloaded from Internet, free of charge. Within these models, it is possible to perform numerous changes (change of font, adding pictures, etc.), but structure of the relationship of semantic wholes is given by the model that is downloaded. Those models are created having in mind the specific organizations that perform certain functions for websites and address specific users. For example, often used site Joomla offers models for restaurants, e-shops for computer games, travel agencies, portals for e-learning etc. (www.joomla24.com). As it is expected, by using these models, designers narrow legitimate space of client knowledge about the purpose for which they need the site.

On the other hand, those designers who have acquired general knowledge formally, they protest because of using the models and particularly point out that they create all components of website by themselves. In that way, their knowledge is primarily anchored in experience acquired through practice. However, it does not mean that it is more open for greater participation of amateur knowledge because precisely by building its professional quality in relation to „hastily trained designers“, as interviewed B.M. (30) calls them, they put their knowledge before the client’s. One of the designers interviewed testifies that clients „say that he is a dictator“ (I.S., 37).

6. CONCLUSION

Relationship between the expert knowledge of web designer and amateur knowledge of clients and users of websites can be conceptualized as a scale between the dominance of expert knowledge over amateur (paternalistic relationship) until the equalization of the status of two types of knowledge (inclusive relationship), while paternalistic-educational and participatory educational relationship are somewhere in between. These four types shouldn’t be observed as absolute categories because they can change during the process of designing, or constant relationship may have particular characteristics of several theoretical types.

In addition to discussion on professionalism of web design, we should finally add that softwares that significantly facilitate the creation of websites have emerged with the development of technology. Those are, for example, the ones that do not use complex programme languages but function by the principle WYSIWYG (What you see is what you get).

For that reason, there appears a question whether web design in the future will move towards the consolidation of professions and possible professionalization or web design will entirely go to the hands of amateurs, following other trends of information society. In that way, not only that equal relationship between two types of knowledge would be achieved, but it would come to their identification.

References:


THE ROLE OF INTERNET IN YOUTHS EVERYDAY ACTIVITIES

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Abstract: It is an extremely exciting time to be in the Internet field. It is becoming more and more frequent that, of lately, one encounter words it the prefix e- in daily press, periodicals and professional literature, like e-mail, e-banking, e-commerce, e-learning, etc. The advent of the World Wide Web and rapid advancements in Web-authoring software have related the possibility of delivering compelling electronic-learning to new groups of learners, and for new classes of applications. At the same time, rapid technical innovation is surmounting the bandwidth barrier of the Web and enabling the delivery of online content that is truly interactive and media-rich. There is a big influence of technique on our daily life. Electronic devices, multimedia and computers are things we have to deal with everyday. Especially the Internet is becoming more and more important for nearly everybody as it is one of the newest and most forward-looking media and surely “the” medium of the future. Therefore we thought that it would be necessary to think about some good and bad aspects of how this medium influences us, what impacts it has on our social behaviour and what the future will look like. The Internet changed our life enormously; there is no doubt about that. There are many advantages of the Internet that show you the importance of this new medium. The authors had theoretical and methodological approach to Internet usage in daily life.

Keywords: Internet, social behavior, social network, media impact

1. THEORETICAL APPROACH

During June 2010, a study was conducted to determine the frequency of Internet usage in youth everyday activities and also to establish youth behavior patterns on the Internet. The sample included of 60 subjects, ages between 15 and 25 years old. Subjects filled in a questionnaire, which was made to establish the relation between youths behavior with Internet usage. After processing and analyzing the questionnaires, the conclusion was related to what extent the Internet is represented in youths everyday activities and in what way.

This topic is especially interesting from psychological perspective, for various reasons such as: a clear awareness of the manipulation of the Internet and its content, how the Internet affects the level of moral consciousness, how to change the everyday life of young people regarding to increase usage of the Internet.

Internet should be considered in both perspectives. As well as search for new information, new knowledge can certainly contribute to the enrichment of our knowledge - where Internet plays a leading role, as well as the down sizes - the abuse of Internet content, invasion of privacy, the creation of dependence often in young and adults. Regarding to the tremendous development of Internet, now days the subject of learning o-line could not be categorizes as an unknown.

E-learning comprises all forms of electronically supported learning and teaching. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process. The term will still most likely be utilized to reference out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum.

E-learning is essentially the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.

Abbreviations like CBT (Computer-Based Training), IBT (Internet-Based Training) or WBT (Web-Based Training) have been used as synonyms to e-learning. Today one can still find these terms being used, along with variations of e-learning such as E-learning, E-learning, and eLearning. The terms will be utilized throughout this article to indicate their validity under the broader terminology of E-learning.

The convergence of the Internet and learning, or Internet-enabled learning.

The use of network technologies to create fosters, deliver, and facilitate learning, anytime and anywhere.
The delivery of individualized, comprehensive, dynamic learning content in real time, aiding the development of communities of knowledge, linking learners and practitioners with experts.

A phenomenon delivering accountability, accessibility, and opportunity to allow people and organizations to keep up with the rapid changes that define the Internet world.

A force that gives people and organizations the competitive edge to allow them to keep ahead of the rapidly changing global economy.

With good design and delivery, e-learning does all these things. But, at its heart, it is, simply, learning. Too bad most interpretations focus on the technology (the "e") and not on the learning.

E-Learning has to keep the people it's designed for in mind. How do we learn? How do we acquire and retain skills and information to help us develop? Only when we address individual learning styles can the "e" in e-learning factor in. Then the technical side—the electronic delivery—can be adapted to the learner.

Maybe the "e" should actually follow the word "learning."

"The effectiveness of an E-learners experience is greatly enhanced through student-centered (usability) design. For example, students remember more information from a text book that is well organized, with extensive visuals, reflection/interaction points, clear headings, etc. The same concepts exist for online courses—learners learn better through use of clear headings, limited distracters, visuals, screen-friendly fonts, appropriate white space, web safe colors, etc. Basically, usability is the process of testing (through observation) how students behave with a course—what works, what doesn't, what confuses."

**What is internet?**

The Internet is a global system of interconnected computer networks, which use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies. The Internet carries a vast range of information resources and services, such as the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail.

It is always mistaken said that the internet and the World Wide Web are both the same terms, or are synonymous. The comparation is given in the table below.

<table>
<thead>
<tr>
<th>Internet</th>
<th>World Wide Web</th>
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<tr>
<td>The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet. Information that travels over the Internet does so via a variety of languages known as protocols.</td>
<td>The World Wide Web, or simply Web, is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. The Web uses the HTTP protocol, only one of the languages spoken over the Internet, to transmit data. Web services, which use HTTP to allow applications to communicate in order to exchange business logic, use the Web to share information. The Web also utilizes browsers, such as Internet Explorer or Firefox, Opera, to access Web documents called web pages that are linked to each other via hyperlinks. Web documents also contain graphics, sounds, text and video.</td>
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What is internet offering?

The modern era has been now extremely advanced and well-developed and the basic reason for this development is actually the launch of the internet and its applications which have provided the individuals with the easiest routine in their daily lives.

The modern era of the internet has made even the most tiring and physically demanding works on the finger tips. For example the shopping which is indeed a very complicated affair, can be easily done on the internet in the modern times, via e-commerce. This technology has emerged as one of the breakthrough uses of the internet.

The internet has changed the face of the lives of people, turning them completely into the modern and latest lifestyle with its developments. Today, instead of the newspapers, the people use the internet to access the e-news which provides with not only the news papers completely but also various different news channels from all over the world. Even the live video news from the news channels can be accessed through the net, overpowering the other media, even including the television.

The modern developments through the internet have also widened the opportunities for business and professional developments. The need to advertise the products of any business companies are no more a major problem, as the
companies can develop their own website and information regarding the products to convince the customers with their works.

There are also several open opportunities of making money through the internet, with the most common profession being the web site development with the increasing demand of web-development personals used to develop the websites to promote their business and companies.

Internet is indeed the major advancement in the modern era, enabling the common people to sit at home and rule the world.

Education these days has been the top priority for any family or individual person, and no doubt amongst the latest technologies to promote and maintain the education standards the internet comes first.

Internet is not only an access to websites, these days there is knowledge and information on every aspect of the educational world over the internet. The resources provided on various web pages are indeed very informative and useful for professionals and students related to every field of work. The only pre-requisite is the research over the internet for a specific educational topic, and then this information just needs to be filtered to gain the basic knowledge of what you are looking for. Therefore, these are true internet resources which deal with every individual's educational needs.

Internet has also provided the opportunity to study online. There are virtual universities set up, in which the students can take classes sitting on the computer seat opening the university's website video section according the topic, and then study at home.

The most amazing thing about internet education is that the international education is no more a chance for only the wealthy and high profile family students because now via internet no matter if one can afford to study in top most universities, people can easily benefit from the international quality education and gain a respectable university degree sitting at home through the online educational courses provided by the world universities.

Internet education thus also provides the individuals to balance their time according to their own needs, as there is no fixed time to attend the lectures. This also allows the poor class of people to work and study at the same time through internet education.

The Internet is a positive tool for student learning as well as youth empowerment and well being. There is evidence that computer and Internet use improves test scores, history chronology learning, and motivation to learn. Although promising, the benefits are not without limits. Older students seem to benefit more from online aids than younger students, and the very youngest of students actually do worse in technological formats compared with traditional paper and pencil formats.

A recent review concluded that adolescents are primarily using the Internet to reinforce offline relationships; adolescents also seem to use online forums such as homepages and blogs to gain positive feelings of mastery and competence. In addition to this, youth is allowed to use the Internet and other technologies (photography and video cameras, music production software) to document their lives and create awareness for health and community issues such as drug-use, violence, discrimination, and homelessness.

The Internet's growing popularity as a health resource for youth makes it an appealing vehicle for delivering interventions and it may be an economical and effective means for health promotion and prevention. As behaviors such as smoking, unhealthy eating habits, and risky sexual behavior often start in adolescence, early intervention delivered through the Internet may serve as a preventive measure. The Internet has been used to provide free counseling, smoking prevention, obesity and eating-disorder prevention, anger management and violence prevention, and substance abuse prevention. Researchers have also explored online gaming formats as a means to carry out psychotherapeutic treatment.

Today the Internet offers almost everything. Access to large number of libraries, newspapers, magazines, archives, international non-governmental organizations, ministries, embassies, universities, institutes, and so on. It maybe sounds a bit unbelievable, but almost entire planetary knowledge is placed in a computer network - Internet.

During the connection to the Internet, one gets the possibility of exchanging electronic mail with some of the tens of millions of people who are connected to the Internet, from anywhere in the globe. There is an almost unlimited ability to use Internet resources. Theoretically it is possible to transmit computer to our millions of pages of text on topics that interest us and interact with thousands of people who have similar interests as me.

**Internet usage**

Information technologies increasingly pervade daily life. The primary purpose of the Internet is communication, and communication, as one of the fundamental psychological and sociological phenomenon deserves a

comprehensive study, reflecting all its aspects and their effects, and unbiased scientific evaluation.

The Internet, however, grew a mere framework of communication media and, thanks to the development of computer technology and increase the number of its users, has become the social space in which individuals interact, which has considerable intervention into the very personality of the user. Lessons learned on the Internet are increasingly, in order of importance, approaching the experience gained in the real world. Cyberspace (cyberspace), a term which usually means it is also a psychological space. Regardless of the technological development of some innovations, the Internet can not provide its users perceptive of every day fullness in the physical world. The main mode of communication is through text or language, although there are also ways to enhance communication, audio-visual means of communication, but their usage is not nearly as much as the usage of textual forms of communication.

It is necessary to point out the dangers of excessive Internet use, including all the services that this technology enables. It is not limited to web and email. There are a number of other activities that lead to substance abuse. The most striking in the period behind us, and chat rooms are "messenger" (IRC, MSN, Yahoo, ICQ), social networks (MySpace, Facebook).

The consequences of any addiction, be it a dependency on alcohol, drugs, food or the Internet, leading to distortion of personality, mental and physical condition and social life of the individual. Use anything in excessive measure is dangerous for the consumer. Therefore we should aim at self-control and understanding their mistakes.

**Internet abuse**

When someone tries to explain how the Internet works, often emphasizes that it is an informal and open medium. And information flow freely available to everyone, which means that any of its information can reach the world. In fact, more and more people the freedom that the Internet gives every misinterpreted. They use the internet services in a way that harm to other users and systems, Internet service providers.

In the jargon it is called spamming and can be basically divided into three categories: those who use their freedom to have fun at someone else's account, those who want to capitalize again on another's account, and a third, perhaps the largest category, which are common Internet users who unwittingly do things that harm others. Understandably, only the first two categories of people classify the pests because by virtue of being engaged in such activities, they show their recklessness and dishonesty.

All attempts to convert any of them in the normal end users are totally without success. They are usually very imaginative in finding ways to harass as many people and they do not fear of anything.

The global Internet, in addition to allowing easy and quick way flow and a large number of different content, is also a source of abuse and a challenge to the legal system. Thanks to him happen to some of the most flagrant violations of human rights and dignity, such as child pornography, and most often misused intellectual property. "Myspace" and "Facebook" networks are the most obvious reflection of loss of social control over the individual. They explain it as a place for fun, and many of them as the sources of systematic deviations.

**Todays youth – every day activities**

It has been said that the pace of change in today's youth culture is quickening. Yesterday's cultural icons are on the ash heap today and what's "in" today will be "out" tomorrow. It is wise for parents to be students of youth culture, but practically speaking, how does one find time to keep up with all of the trends and changes that take place? The realistic answer is, you won't find the time.

The characteristics of traditional age (18-to-22-year-old) college students—a group sometimes called the Millennials—have been described by Howe and Strauss as individuals who:

- Gravitate toward group activity
- Identify with parents’ values and feel close to their parents
- Believe it’s cool to be smart
- Are fascinated by new technologies
- Are racially and ethnically diverse; one in five has at least one immigrant parent
- Are focused on grades and performance
- Are busy with extracurricular activities

**When asked about the biggest problem**

Less and less young people are engaged in any recreational sport or active. The most common reason for this problem is time or lack of money. A small number of young people have a hobby, and given to him. Most young people use computers daily at home. Computer is often used for listening to music, playing games, surfing the internet and chatting. What is worrying is that the computer is used mainly for entertainment. Mobile phones are an integral part of life for youth. Cultural events are less and less visited. Television, as the main

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3 Amanda Lenhart and Mary Madden, “Teens, Privacy & Online Social Networks: Managing Online Identities and Personal Information in the Age of MySpace,” Pew Internet & American Life Project
source of information, it is present in young people. The young are the most fun going out to bars and discos. Bars and discos are the place of entertainment on weekends and sometimes during the week.

Young people often gather in the open - favorite places as parks, school yards and an area near the building, the house in which they live.

The situation is more than evident and alarming. Negligence of parents and teachers observed a degree of commitment to children is expressed through socio-educational structure of the young. Technology development and the presence of different content in the media had a favorable outcome in younger generations.

The notion of a Net-generation is consistent with a deterministic view of the effect of technology on society. Technological determinism views technology as an independent force that drives social change. Technology itself exercises causal influence on social practices, and technological change induces changes in social organization and culture regardless of the social desirability of the change.

2. METODOLOGY OF RESEARCHING

Problems of researching

The prevalence of Internet usage in the everyday life of young people and how it influences their behavior

Case studies

To determine the representation of the Internet among young people, it is necessary to carry out empirical research and get to empirical data on time spent on the Internet as young people and their behavior.

Purpose and character of research

The aim is to get a closer view that shows the extent to which young people are occupied with Internet, its contents and accompanying behaviors that are related to this action.

This research is empirical and should serve for the diagnosis of possible options in improving the quality of young people time spending and aspect in which it can be changed.

Tasks of researching:

From the set goal there are following tasks:

1. To determine whether young people use the Internet every day
2. To determine whether young people use the Internet to obtain new information
3. To determine whether young people know most of their friends over the Internet
4. To determine whether young people spend more time online than they should
5. To determine whether young people would rather spend their time online than with their friends
6. To determine whether the young people argued with a loved one due to the use of the Internet
7. To determine whether young people use one of public programs (fb, myspace ..) on every day base
8. To determine whether young people often practice to chat with strangers
9. To determine whether will young people agree to meet someone they know only over the Internet
10. To determine whether the young people find it easier to communicate with people online rather than live
11. To determine whether young people sometimes experience sexual arousal while on the Internet
12. To determine whether young people use the Internet to escape from bad moods and problems
13. To determine whether the young people had an unpleasant experience with a stranger
14. To determine whether the young people have ever been in a relationship with someone they met online
15. To determine whether the young people have ever experienced some kind of torture over the internet
16. To determine whether young people often talk about sex over the Internet

Hypothesis of research

Based on the research goals and objectives set the following general hypothesis:

Young people use the Internet every day more than necessary, and communicate over public networks

Based on the goals and objectives of research, it is necessary to set the following hypotheses:

We consider that young people use the Internet every day
We consider that young people use the Internet for gaining new information
We consider that young people do not know their friends mostly from the Internet
We consider that young people spend their time more that they should
We consider that young people spent free time with friends rather than on the Internet
We consider that young people have been argued with beloved person because of the Internet usage
We consider that young people use daily one of social network program on the Internet

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We consider that young people often speak on the Internet with strangers.
We consider that young people will not meet strangers.
We consider that young people easier communicate on the Internet rather than alive.
We consider that young people sometimes have sexual excitement on Internet.
We consider that young people use the Internet to escape from daily problems.
We consider that young people did not have unpleasant experience on the Internet.
We consider that young people chat about sex on the Internet.

Variables in research

The dependent variables include a list of questions we asked in the questionnaire. No independent variables.

Technique and instruments used for research

The research used interviews as a research technique. In this technique as a research tool or instrument the questionnaire was used. This technique consists in written form and subject are expected to respond in written form too. With answers we have information about Internet usage in youths daily life, which is also subject of this research. In questionnaire are 5 possible answers: completely inaccurate, mostly inaccurate, indecisive, mostly accurate and completely accurate.

Population and sample of research

Basic static set, the population from which we received a sample unit for research, are young people aged between 15 and 25. The subjects were mostly students or students from the city of Novi Sad and its surroundings. The study included sixty young subjects.

The course of study

The research was conducted in June 2010. year. The Faculty of Management in Novi Sad, Svetozar Markovic Gymnasium in Novi Sad and the University of Novi Sad. The study lasted four days. There was no interference in the research and respondents are finding interesting questions. Interpretation of results and report writing was also conducted in June 2010 in Novi Sad.

The procedures for data processing

The data were analyzed with a statistical method using histograms display the results. Each question is discussed individually, where he provided comment on the result.

Results of research

<table>
<thead>
<tr>
<th>question:</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>1. Do you use the Internet every day?</td>
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<td>1</td>
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</tr>
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<td>2. Do you use the Internet for gaining new information?</td>
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<tr>
<td>3. Do you know most of your friend via the Internet?</td>
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<td>1</td>
<td>3</td>
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<tr>
<td>4. Do you spent more time on the Internet than you should?</td>
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<td>11</td>
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<tr>
<td>5. Would you gladly spent more time on the Internet, rather than with your friends?</td>
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<td>9</td>
<td>3</td>
<td>/</td>
<td>1</td>
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<tr>
<td>6. Did you have a confrontation with a beloved person for using the Internet?</td>
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<td>6</td>
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<td>10</td>
</tr>
<tr>
<td>7. Do you use one of the social sites (Facebook, MySpace, etc.) on a daily basis?</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>13</td>
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<tr>
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<td>4</td>
<td>2</td>
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<tr>
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<tr>
<td>10. Is it easier to you to communicate to people rather that in person?</td>
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<td>/</td>
</tr>
<tr>
<td>11. Do you sometimes experience a sexual thrill on the Internet?</td>
<td>37</td>
<td>3</td>
<td>6</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>12. Do you use the Internet to escape from problems and moody behavior?</td>
<td>17</td>
<td>9</td>
<td>14</td>
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<td>10</td>
</tr>
<tr>
<td>13. Have you ever had an unpleasant experience with a stranger on the Internet?</td>
<td>35</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>14. Were you ever in a relationship with a person you’ve met on the Internet?</td>
<td>40</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>15. Have you ever experienced a form of molestation on the Internet?</td>
<td>51</td>
<td>3</td>
<td>/</td>
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<td>6</td>
</tr>
<tr>
<td>16. Do you oftenly talk about sex on the Internet?</td>
<td>28</td>
<td>9</td>
<td>11</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

Question 1:
Do you use the Internet every day?
Regarding to research, we can see that mostly examinees use the Internet daily, which agrees with the hypothesis. The hypothesis is confirmed, we see that 88% of respondents use the internet every day.

Question 2:
Do you use the Internet for gaining new information?

Regarding to results, we can see that 94% of examinees use the Internet as the source for new information, which agrees with our hypotheses. The hypothesis is confirmed.

Question 3:
Do you know most of your friend via the Internet?

Completely and partially inaccurate are the predominant answers to this question and they make up for 86% of the examinees. The youth are still attaining their friends via the Internet, therefore confirming our hypothesis.

Question 4:
Do you spent more time on the Internet than you should?

To this question the examinees have given a very variegated answer, which doesn’t c lain the presumed hypothesis’ full confirmation. 38% of the examinees admit using the Internet more than they should, while 39% declares that they don’t use the Internet as they should. Hypothesis not confirmed.

Question 5:
Would you gladly spent more time on the Internet, rather than with your friends?

Up to 93% of the examinees would gladly spend time on the Internet, rather than with their friends. Hypothesis is fully confirmed.

Question 6:
Did you have a confrontation with a beloved person for using the Internet?

Form the presented data, we can see that 68% didn’t have a confrontation with a beloved person, which makes up for more than half of the examinees. Only up to 22% have had a confrontation with a beloved person for using the Internet. Hypothesis not confirmed.

Question 7:
Do you use one of the social sites (Facebook, MySpace, etc.) on a daily basis?
Most of the examinees, 85%, use Facebook on a daily basis. Only up to 10% don’t use either one of the social-public services. Hypothesis not confirmed.

Question 8:
Do you often practice communicating with strangers?

From the presented data we can see that up to 70% of the examinees acknowledge that they don’t communicate with an unknown person via the Internet, while only 10% will initiate a conversation with strangers. Still, a quite noticeable 20% is indecisive. Hypothesis is refuted.

Question 9:
Would you set up a date with someone you know only via the Internet?

Under the assumption that the youth doesn’t approach strangers via the Internet, we’ve come up to some interesting results. 28% of the examinees would set up a “blind date”. 12% of the examinees declare themselves as indecisive. 60% wouldn’t set up a meeting with a person they don’t know via the Internet. Hypothesis not confirmed.

Question 10:
Is it easier to you to communicate to people rather that in person?

From the presented data, it’s clear that the youth would easily and comfortably communicate “face to face”, rather via the Internet. Hypothesis confirmed.

Question 11:
Do you sometimes experience a sexual thrill on the Internet?
Aside from a known fact that the youth visits pornographic sites, 66% reports that they don’t experience a sexual thrill while using the Internet. On the other hand, 24% of the examinees admit that they sometimes experience a sexual thrill. Hypothesis is refuted.

Question 12:  
Do you use the Internet to escape from problems and moody behavior?

![Question 12 Graph]

To this question the examinees have given a very variegated answer. 24% agrees that they use the Internet to escape from their problems, 23% are indecisive, while 43% states that they don’t use the Internet in stressful situations.

Question 13:  
Have you ever had an unpleasant experience with a stranger on the Internet?

![Question 13 Graph]

Out of the total number of examinees, 68% of them never had any unpleasant experiences with strangers whilst using the Internet. Nonetheless, 20% did in fact have an unpleasant experience. Hypothesis confirmed

Question 14:  
Were you ever in a relationship with a person you’ve met on the Internet?

From the presented data we can see that a large amount of examinees, 71%, didn’t have a relationship with a person they met on the Internet. However, 29% declares that they have, in fact, been in some sort of a relationship with a person they know on the Internet. Hypothesis confirmed.

Question 15:  
Have you ever experienced a form of molestation on the Internet?

Most of the examinees, 90%, weren’t molested on the Internet, while 10% did experience molestation which they would grade with a “10 out of 10”. From the presented data it is noticeable that molestation is present, although in a small number. Hypothesis confirmed.

Question 16:  
Do you oftenly talk about sex on the Internet?

![Question 16 Graph]

More than half of the examinees don’t talk about sex on the Internet, 63%. 20% of them still does talk about sex, while 18% is indecisive, which means they do talk, but not so often. Hypothesis not confirmed.

**Discussion:**

Out of the 16 presumed hypotheses, 9 are confirmed. However, there were some contradictory answers by the youth from which we can bring their honesty during examination to question. Questions such as: “Does the youth communicate with strangers?” has only 10% of positive answers. “Would you set up a date with a stranger?” has 28% of affirmative declaration. This fact alone is statistically impossible, regarding that you can
set up a “blind date” whilst not communicating with a stranger in the first place. Aside from using Facebook on a daily basis and other social networks, the youth are still using the Internet as a source of additional knowledge and information. Most of the examinees use the Internet daily which clearly indicates the growth of Internet usage compared to previous years. The youth are still practicing their personal friendship relations, although the degradation of youth’s social life is apparently noticeable. Many questions demand a completely honest approach by the examinees, and even if some are more intimate than the others, despite the anonymity, honest answering is itself brought to question. Pornography is present to minors and adults alike, but the target groups that were questioned declare that they barely use sites with pornographic content. Topics on sex overcome being taboo and the youth are more and more prone to open and free conversations on this subject. Starting from this fact, a hypothesis is set which confirms this, however it has been refuted. Examinees haven’t experienced frequent conflicts with beloved persons, but we can see that in a quite noticeable number that conflict is considered to be even more present than presumed. Molestation, or other unpleasant situations aren’t perceived by the youth in a large number.

I consider that the Internet is the number one threat for the youth’s social life and that attempts should be made in every way to resist manipulation. Facebook and other forms of public networks take up too much time and restrain the youth from fulfilling their obligations and commitments. In spite of this, the examinees still know how to balance their time between obligations and the Internet.

3. CONCLUSION

To study the internet as a culture means to regard it as a social space in its own right, exploring the forms of consumption and content production, and the patterns of online communication and social interaction, expression, and identity formation that are produced within this digital social space, as well as how they are sustained by the resources available within the online setting. In this sense, online activity is conceived as different and even separate from one’s offline activity, having a life of its own, usually separated from real life as a parallel reality of the participating individual.

Youth operating within an online community may be geographically dispersed, experiencing different hours of the day in different locales, but they share an identical interest, virtual space and rules, shared activities, and a common sense of belonging. Being online not only detaches individuals from the constraints imposed by location, but also frees them from the constraints associated with their offline personalities and social roles. Youth have an opportunity to express online their “real” or inner selves, using the relative anonymity of the internet to be the person they want to be and experimenting with their identity and self. The Internet plays an important role in adolescent life as a cultural artifact and a culture in itself.

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PROJECTOID - SOFTWARE APPLICATION FOR SUPPORTING PROJECTS AS EDUCATION TOOLS

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Abstract: To be able to apply all four types of knowledge conversion (socialization, internalization, externalization and combination) during formal education, for the purpose of developing appropriate attitudes, skills, knowledge and skills, it is necessary to have the work of students on real projects. Real projects, however, are never limited by boundaries of a single case. They often cover body of knowledge in various subjects, from different years of study, including study programs. The real work is also very team, where each team member performs tasks in their domain of expertise. This implies that students supply projects to include more students and teaching staff, with different subjects, years of study and study programs. To facilitate the coordination of such projects, special software was developed – called projectoid as Web2.0 applications. Application itself provides a classic project management, and collaboration and cooperation of a number of teachers and students that can be spatially distant, as well as basic educational components-monitoring student achievement, their evaluation and self-evaluation, assistance in teamwork, and learning through trial and error method, analysis of the literature, brain-storming and team participation. In this paper, the possibilities of application are presented, a description of its use is given, and the importance and usefulness of the usage of such applications is discussed.

Key words: Managing educational projects, web 2.0, knowledge management, teamwork

1. INTRODUCTION

Modern system of study involves learning through work on real projects. By using the concept of Nonaka and Takeuchi on the spiral of creation of new knowledge through socialization, internalization, externalization and combination, it becomes obvious that without the participation of unreal projects there is no creation of new usable knowledge, and no corresponding development of attitudes, skills and abilities, as well as the development of creativity and intuitiveness are now imperatively required of university graduates, professionals.

The problem is that real projects are never bordered by with just one school subject, but almost always cover the necessary knowledge, skills and attitudes in the area of a number of subjects, from different schools and different years of study. This would mean giving up the self-sufficiency in the case of professors, and turning to real teamwork and a number of professors and students on a particular project. Included would be professors and students from different subjects, years of study and study program, according to the requirements of the project. Each professor would be within its subject a carrier of sub-projects, and students to work in teams, and each of them received the grade in their field work on the project, that is the subject of which was co-opted to the project. To facilitate the management of these, complex unreal projects that consist of multiple sub-projects, a software application was developed called "Projectoid".

2. BRIEF DESCRIPTION AND PURPOSE OF THE APPLICATION:

The application is named Projectoid, primarily because of its purpose, which is reflected in its functionality in organizing various types of projects involving more people. In this case, the Projectoid allows professors and students at the university to keep records of their work and progress in development and organization of projects and project tasks.

3. A MORE DETAILED DESCRIPTION OF THE APPLICATION, AND ITS GENERAL USE:

The interface consists of several segments which together form a compact and visually appealing whole. At the very start, allows the user to login (Option to enter the application itself), which categorizes the user and it opens up certain parts of the program and provides some opportunities for work. After the login form, main page is presented to the user that is used for data entry projects and consists of two forms of entry to enter projects and subprojects. The next page is a page in the menu to see the object, which serves as a categorization of the user in selecting students for the project. The next page is related to the review of projects, which is the user's choice, lists information about the desired project in the table on the page. It is followed by sub-page review in the same way that the election lists data from the database for the desired sub-project and sorts them in the table on the...
page. The next page contains the interface to upload the data and on it the user can set through form on the server the document up to 2MB in size (which of course may change depending on need). At the end there is a page from the input of the teachers (users), and it is up to date, students can be assessed by numerical and descriptive rating.

4. PROFILE OF USERS WHO WOULD USE THIS APPLICATION:

User profile of this application is divided into three groups, namely:

- Professors, who are ultimately the bearers of projects
- Students, who represent the group of users that access is just review part of the Projectoid.

According to the division to these categories, the user has access to certain parts of the application. So:

- Teachers can perform listing of projects and determine their parameters. Then, enter data on personnel working on the project and primary information about their connection with the project.
- Students can view the projects on which they work and thus have access to their progress in the work and research.

5. TECHNOLOGY AND APPLICATION ARCHITECTURE:

For making the application, for the most part php is used, which provides the functionality of this application. In many lines of php, it has many functions that allow the operation of this application. On each page a session is started:

```php
<?php
session_start();
if (!($_SESSION['user']) || ($_SESSION['user']=='gost')) {
    header("Location: index.php");
}?
```

Here we check whether someone is logged in order to prevent the user directly typing the address file can access the page without login, or, if registered as a guest, you can not login to access a site intended for teachers.

```
if(isset($_POST['student'])){
    $_SESSION['user']='gost';
    header("Location: studenti/PregledProjekata.php");
}
```

This code is checking whether someone is registered as a guest, and then it is automatically sent to a page intended for guests (students).

On the page of projects entry, we have a number of text inputs for which it is checked if all fields are filled, and then if so, the data is forwarded to the base, and if not, the user will remain with empty fields until they are full, and when pressed the button again, then it will only be able to write data into the database.

If on a page there were more buttons, each variable that we would need for later use or on another button, we keep in the session, e.g.:

```php
$stud=$_POST['broj_stud'];
    $stud = (int)$stud;
    $_SESSION['stud']=$stud;
```

On the page subject of the review, projects and subprojects, we used select boxes and radio buttons, which are selected using the data, and on the basis of selected the table provides information requested by the user, and they are printed from the database. At each picking, the selected data are stored, so users do not need to choose all the same for every subject or project.

Example code for the select box:

```php
$con=mysql_connect("localhost","root","");
if (!$con) {
    die ("Ne mogu da se konektujem na server");
}
$db=mysql_select_db("projectoid",$con);
$query="SELECT smer.Naziv FROM smer";
$sql=mysql_query($query,$con);

<select name="stud_prog" size="1">
<?php
    while ($red=mysql_fetch_array($sql)){
        ?><option value="<?php echo $red['Naziv'];?>" selected="selected"> <?php echo $red['Naziv'];?> </option>
<?php
    }
</select>
```

Example of radio button:

```php
<?php
    $post = '';<br />
    if (isset($_POST['godina']) && 'prva' == $_POST['godina']) {
        $post = ' checked="checked"';
    }
</label>
```

Example code for the select box:
PROCEEDINGS OF SCIENTIFIC-RESEARCH INTERDISCIPLINARY PROJECT DIGITAL MEDIA TECHNOLOGIES AND SOCIAL-EDUCATIONAL CHANGES THAT IS FINANCED BY THE MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF SERBIA

Example of prints to the table:

```php
<?php
if(isset($_POST['prikazi'])){ $pred=$_POST['predmet'];
$con=mysql_connect("localhost","root","");
if (!$con) 
    die ("Ne mogu da se konektujem na server");
$db=mysql_select_db("projectoid",$con);
$predm=mysql_fetch_array($query); while
($red=mysql_fetch_array($sql)){
```

There is also a page for uploading data. Here registered users are allowed to hang the required documents after or during the project, other users can read detailed information about the project, and after it is done, they can read about how it went, and who did what. Code looks like this:

```php
<?php
if(isset($_POST['submit'])){ if ($_FILES['file']['size'] < 2000000) {
    if ($_FILES['file']['error'] > 0)
        {
            echo "Greska: " . $_FILES['file']['error'] . "\n";
        }
    else
        {
            echo "Upload-ovano: " . $_FILES['file']['name'] . "\n";
            echo "Tip: " . $_FILES['file']['type'] . "\n";
            echo "Velicina: " . ($_FILES['file']['size'] / 1024) . " Kb\n";
            echo "Privremeni fajl: " . $_FILES['file']['tmp_name'] . "\n";  
            if (file_exists("upload/" . $_FILES['file']['name']))
                {
                    echo $_FILES['file']['name'] . " already exists. \n";
                }
            else
                {
                    move_uploaded_file($_FILES['file']['tmp_name'], "upload/" . $_FILES['file']['name']);
                    echo "Smesteno u: " . "upload/" . $_FILES['file']['name'] . "\n";
                }
        }
    else
        {
            echo "Invalid file\n";
        }
    }
```
Limitation during uploading is of file size in the form, which must not exceed 2 Mb, which is enough for the documents. If necessary, for some users, this number can be increased. In case of uploading a file which already exists on the server, the upload will not be executed, because of security measures to prevent a user from intentional or accidental copying an existing document. The file names must be called only by the name of the project, the connection to the database, and prints in the table for viewing projects. When Professor uploads file on the screen, he can see the name of the file that is uploaded, type, size, temporary name, and where the file is located.

Finally, teachers are able to enter course grades, when the sub-projects and projects are completed, so that students could see have what they did, because with a numerical score, there is also a descriptive rating which will explained why and for what reason the student received the grade he received.

The code is organized as follows:

```php
<?php
if(isset($_POST['studenti'])){ $projekat=$_SESSION['proj'];
$pot_proj=$_POST['potprojekti'];
$_SESSION['pot_proj']=$pot_proj;
$con=mysql_connect("localhost","root","");
if (!$con) {
die ("Ne mogu da se konektujem na server");
}
$db=mysql_select_db("projectoid","con");
$projekat=DB_NAME['projekat'];
$db->query("UPDATE studenti NA Projektu SET Opisna_ocena=$Opisna_ocena, Numericka_ocena=$Num WHERE BrIndexa=$BrIndexa AND NazivProjekta=$projekat");
header("Location: uspesno3.php");
} else {
    echo "Niste uneli sve potrebne podatke.";
}
?>
```

Professor selects first project to which its sub-project is related, and then, based on that, he can fill in the appropriate grade for the listed students. So, due to security measures, teachers are prevented from enrolling, by any chance, for projects where ratings are not carriers, therefore, each user can only enroll grades to students with their projects, which is quite logical, because it is always better to prevent than cure.

6. APPLICATION STRUCTURE:

Projectoid structure consists of the previously mentioned php, html, css and mysql. For each submit button, select box, radio button, text input, ie. for each part of the html form php script is written, to allow manipulation of these fields. After PHP, the most important role also has mysql, which is made from a database which stored data are read.
The database consists of nine interconnected table primary (outer key).

Table student with data and name, number Index, which is also the primary key in this table and unique for each student. Table student merge with the table department by inserting in the table student the primary key table department (department code) because it is one to many connection, because student can be registered only in one department and in one department there may be more students enrolled.

Table student has its department name and code. Our database has seven different departments. Every department has certain courses which are intended to be attended in the course of that department. Courses can be repeated in several departments, so this connection more to more is connected to the table which will with its outer keys define that the tables that are connected over primary key table department (department code) and primary key table course (course code).

Table course with data course name, description (short description which means that the student who attends that course is capable of performing and that the student in that course must know), year of attendance, and its primary key which is course code.

Table professor with information regarding the name, last name of professor, title, username and password that is unique to each teacher and that teachers use to access and be able to log in and work on projects. Course code as the primary key table.

Table projects with the project name as the data which is in this table the primary key because the projects can not assign identical names, a description of the project (brief description of what this project means that it is and knows), the date of commencement and completion of the project which is envisaged, the means needed for implementation, and the name and surname of the holder and this is one of the professors.

In table students on the project table, there is the index number of students, the project name and the name of the action in which Student work, and then their numerical and descriptive ratings that were given to subprojects.

In the table sub-project, there are the sub-project name field, name holder, a work plan and code of professor because this table that was associated with a table of teachers to be able to make requests to list of professor who hold these sub-projects.

Table kon_tacke, we have fields for the number of control points, description, date and name checks for which the action is related to the control point. These points are required for teachers to define when to check the activities on their subprojects.

Subjects were divided by year of listening and directions, but can be repeated in multiple directions.

So, it was allowed to choose the department and years of listening and the database and items that are intended for listening will be selected.

As for HTML, it is used for making application forms and their parts (pages), while creating, the attention was paid to form the first input and selection legible and clear. Each page is made in a table because this solution proved to be compact and does not generate much loading at startup and the use of applications.

CSS is implemented directly in HTML pages and calls over <style> tags, in places where it is needed, and sometimes it calls over <div> tag. The colors are adapted to modern design and leave a pleasant impression on users who work with the application. Java Script is used to ensure the dynamic narrowing of the page when resizing the window.

7. APPLICATION USAGE:

While loading the very application, the user can use a login form, which depending on your user profile meets and starts an application in a particular environment. As the home page there appears page for data entry on the projects (Figure 1).

On this page, the user is able to manipulate information on the project in one form and another form of subprojects. For the project, he can enter the project name, name of teacher who he is implementing the project and anticipated start and completion of the project, specified funds set aside for the project, and describe it in brief or more extensive thesis. By pressing the button <Make project>, all unite information from the forms are forwarded to the base project and there placed in the table for him. In the second form the user is able to manipulate information for sub-projects, such as: project name for which he is attached, the name of the action, name of the developer, the number of students who work on the project and their data, the number of control points and work plan. By pressing the buttons in...
the form, the data is sent directly to the base, the table-related sub-projects.

When choosing a site for review of cases (Figure 2), the user has the ability to inspect the base and, through a selection of certain items from it, pull out a list of students who study a particular year and the program, listen to some subjects, in order to have access to the preferences of students whom he wants to employ on a desired project.

On the very page, the user selects from the drop-down menu program of study, year of study, and by the choice narrows down the list and, in the end, he may be obtain a review of students categorized according to the desired criteria. Then, on the next page, the user has the ability to examine all desired projects that were entered into the database, and also the students that are responsible for them. (Figure 3).

Optional sub-projects from the database, the user can get full access to them and examine students and personnel responsible for desired subproject. It is necessary that the drop-down list select the desired sub-project from the database and table data will be listed on it. The list in the second row, may request a display of students in charge of the work on the selected subproject. On the next page, data upload up to 2MB is provided, which is very tolerant and satisfactory for text documents (Figure 5) and if necessary, this limit may change.

Upload form is very simple to use and consists of a button to select the desired file to upload, and buttons for forwarding to the server. The name of the file which is uploaded must be identical to the name of the project, to be able to connect to the database, and later to review the documentation related to a specific project.

On the last page of the application, the user can enter numeric or descriptive marks to students for a specific project, for which students are categorized. (Figure 6)
After choosing the desired project from the drop-down list, the user has access to students and their numbers in the table on the project, and if desired, and by matching search criteria, he can enter grades for students, descriptive and numeric types, and by pressing the button below the table, information about evaluation are stored in the database.

8. LOGICAL DATA STRUCTURE


The first page that loads at startup is a Projectoid index.php. Here the user enters his username and password, or if it is not a professor, then click on the Login as guest, and he opens the page from a folder PregledProjekata.php student, while the only page he can open beside this is PregledPotprojekata.php, also from the folder student. If it is a teacher, when he enters the necessary information, he opens the page for UnosProjekata.php. When you fill out the required fields and click on the button to enter data into the database, if all is successful, then it opens the page uspesno.php, and there is a link to return to the previous page. In case that sub-project is entered into the base, when inserting data into the database page, there will appear uspesno2.php. Then we can choose between the sides PregledPredmeta, PregledProjekata, PregledPotprojekata, Upload and UnosOcena. On the UnosOcena when entering all necessary data and clicking the button to enter them, uspesno3.php page is opened.

In the subfolder Upload, there are stored documents that are uploaded and users can read them later, to view details about the project, how was your work, etc.

9. RELATIONAL DIAGRAM

10. CONCLUSION

During the very login option, applications seamlessly classify user profiles and for each one organizes an interface intended to work in the application. Selection menu is fully functional and provides the user with a clear and quick selection of desired parts of the application and quick interaction between the sites, which is satisfactory and better than the main menu or in the form of drop-down list. Data entry in all forms is functional and accurate. Connection between the base and the script is flawless, as every route and flow of data from the base to the application has been repeatedly tested. Data is protected with profiled user choice and advantage of this is safety that is at a high level. Working with the application choice for consumers is made easier because of the additional explanations of each field and buttons that provides safe operation to the user with no errors and each step can be restored to its previous state, so data corruption is thus avoided. Print lists and tables are legible and organized to provide a clear view of desired data. During the development of the application, all members of the creation team have improved their knowledge of HTML, PHP, CSS, SQL area. By using JavaScript to the PHP code to an application might look more dynamic, because it allows the creation and completion of certain text inputs, select boxes, etc. without clicking a button. Projectoid is designed and implemented for the purpose, it serves perfectly and its use is very comfortable and easy to master. It is functional in every aspect that makes and provides comfort when working with it. Technology used in making the application provides maximum compatibility and flawless operation. The main application code has been carefully designed and built so as not to burden the system when running certain functions and operations.

Modern system of study involves learning through work on real projects. By using the concept of Nonaka and Takeuchi about the spiral of creation of new knowledge through socialization, internalization, externalization and combination, it becomes obvious that without the participation of unreal world projects there is no creation of new usable knowledge, and no corresponding development of attitudes, skills and abilities, as well as the development of creativity and intuitiveness of are now imperatively required of university graduates, professionals. The problem is that real projects are never bodered, with just one school subject, but almost always cover the necessary knowledge, skills and attitudes in the area of a number of subjects, from different schools and different years of study. This means giving up self-sufficiency to case of professor, and turning to real teamwork and a number of professor and students to a particular project. Included are professors and students from different subjects, years of study and study program, according to the requirements of the project. Each teacher within their subject is sub-carrier, and students work in teams, each of which receives
evaluation from their domain of work on the project or the subject from which to project is co-opted. Without applications like Projectoid, you can not manage these, complex real-world projects that consist of multiple sub-projects, and thus no proper education in the era of knowledge.
EFFICIENT IDENTIFICATION OF INFORMATION OBJECTS IN DTVS

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Abstract: Digital TV system (DTVS) is wide distributed with functionality of multimedia server. In DTVS context recognition processes are making under the circumstances of uncertainty issue—particularly when a deficiency of information, shortage or restricted data, is involved. Response rate is one of the biggest operational problems of the most part of DTVS internal and external processes, with information object efficiency identification assumption. In the light of information science, DTVS information object is data sequence. DTVS contains immense information objects described by numbered attribute concretizations. Short response time is general operating demand of internal management system as well as client subsystem of DTVS—user of DTVS services. Candidate contribution of response rate is information object efficiency identification.

This study is aimed at defining object efficiency identification attribute structure by LFA (Logical Filter of Attributes). The design of the LFA model is based upon the mathematical analysis of the entropy function, using the analogy between recognition processes and the theory of experiment. The LFA model essence lies in the recognition algorithm of the optimal model in the form of the Optimal Sequence of Attributes (OSA) of the reliable recognition. The LFA model primitives are presented in the narrative form, suitable for manual application. Additionally, this study also presents some LFA methodology trials, i.e. practical application of this research results.

Keywords: Information object, efficiency identification, entropy function, reliable recognition, optimal sequence of attributes

INTRODUCTION

Digital TV System (hereinafter – DTVS) is a very complex information system (DTVS–IS) that is characterized by distributive TV network with dispersive (broadcast) classical TV transmission (broadcasting) with numerous services with individual multimedia communication. Of course, complex and vast are data warehouses that need to provide efficient answers to diverse information requirements. As main precondition for efficient processes of answering information requirements, there are optimal structures of data warehouses (systems of databases) and interfaces with processes that provide information services. Optimal structuring of data warehouse (system of data carriers databases) implies rapid and easy manipulation of information, i.e. rapid and easy claiming and updating the data on information objects. Key problem that needs to be solved is optimal recognition of structures of information objects, which implies efficiency of the process of recognizing information and optimization of data warehouse (data carriers database system).

Processes of recognizing the information and optimization of data warehousing (data carriers) have a common area that is represented by models of key attributes, i.e. sequences (series) of data, based on which information models are recognized. One of the solutions for that common area is the result of this research that can in short be described as the shortest sequence of attributes for efficient and sufficiently reliable recognition.

Practical application of results of this research is possible in two very important fields for DTVS:

1. Structuring data warehouse – optimization of sequences of key attributes, which will provide the fastest access to desired information objects and
2. Designing graphical user interfaces (GUI – graphical user interface) – structuring the form which the users fill in for obtaining interactive services DTVS.

APPLIED SCIENTIFIC-RESEARCH METHOD

Problem of recognizing the structures of information objects is a universal problem of every information system. In spite of that, no universal solution to the problem of recognizing was found, moreover majority of applicative solutions were heuristic – based on subjective attitudes of individuals who mostly do not have exact foundation. Justification is a complexity of a problems for which it is difficult to find research starting point-each unique standing point could be disputed. This research...
has determined multidisciplinary approach as one of the possible starting points that are difficult to be disputed. Choice of scientific disciplines that should be used with a rather uncertain outcome and it is always easy to dispute it. For that reason, this research lasts for decades and it is still current, and it requires the systematization of relevant and key general terms from a few border sciences, based on which only proven attitudes can be used.

Main actor of each recognition is a man – involved directly or indirectly through some slot. That points to the need of using the attitudes (proven truths) from psychology and theory of experiments, primarily for observing how is it subjectively recognized and what are the limitations in that case. Very important terms and fact are related to knowledge and truth, related to which there are numerous disjunctive interpretations and terms. The term of experience is also important, from the knower as expert to ignorant as layman.

Very important and complex problem is pragmatic communication. For each form of communication it is very important to know, in general and particular cases, how many facts can a man use simultaneously and in a synchronized way. This question is often interpreted within intellectual capacities or potentials of a man. Within this research, this problem arose very big attention. Answer is looked for coincidentally – in literature, and coherently – through adequate statistical survey experiments.

Models of efficient recognition are one of the key issues – they are constantly studies in all the fields of human activity. Many specific models of efficient recognition were found – they serve for recognition in narrower domains of problem fields. By this research, particular attention was caused by methods of theory of experiments, which are used through analogy – semantics is systematized and general structure of recognition is formalized.

In general case, each recognition represents a special case of decision-making – in the end of each recognition we have to decide whether the „right object of interest“ is recognized, due to which it was necessary to investigate the problems of modelling and uncertainties of recognition.

Principal objective of this research in relation to DTVS is the application of research results that can be automated. When we are familiar with the form (model) of the procedure that leads to the solution – then the automation of that procedure is possible through the computer. When this procedure is comprehensive to such an extent that it is comparable with human thinking, i.e. „when it is at the level of human intelligence“, then we come into the field of Artificial Intelligence by automation. If by automated solution we imitate average specific concluding, based on knowledge of one limited group of experts (professionals, experts in that particular field) then the farthest reach are expert systems.

For this paper, it is exceptionally important that the research results in domain of limiting human intelligence in the function of recognition.

Using proven attitudes from theory of experiments (entropy of complex experiments with uncertain outcomes), as already adopted and proven truths, with mathematic expressions about entropy of complex and incomplete experiments, their coherence with basic assumption of this research is confirmed and proven – model of forming optimal series of characteristics for optimal recognition of information objects exists.

Usually, by experience we imply the part of knowledge of an individual acquired according to the following procedure:

- Reception of information by receptors (sensors) regarding a fact or event, and
- Processing by subjective statistics of the observed object or outcome of event,
- Recognition of objects or events and their outcome, during the process of:
  - Identifying „familiar“ object or structure of event, or
  - Exploring the „unknown“ object or „new“ structure of events.

Having in mind the processing of the received information by subjective statistics, based on experience, we cannot exactly say why is something as it is (why are outcomes of an experiment as they are) but we can say that it is most probably like that (the most probable outcome can be expressed by experience).

Experience is one of the significant methods of recognition. For experience we often use the expression: knowledge acquired on the basis of subjective statistics of errors. Reason is that processing by subjective statistics is usually performed after the reception of information about wrong interpretation of some fact or wrongly recognized event, when the object, fact or structure of events is „better and more permanently“ remembered.

Literature offers numerous results of experiments regarding the capacity and characteristics of human recognition: scale, scope and limitations. Within this research, results of many studies were used. Important conclusion and interpretation of those results is: reliability of recognizing a man is maximal with 8 data (facts), while with more than 14 facts there is a complete confusion of the outcome of recognition – reliability then equals zero.
That was an encouragement for the research is analytical direction – studying the characteristics of the system and entropy of complex experiments with incomplete familiarity with the outcome. The reason is that information objects are observed as systems, in order to optimally recognize multimedia contents. These recognitions of information objects can be observed as complex experiments.

Special attention of this research was risen by the literature from the field of theory of experiments and theory of information, with aiming the attention to the works that explain entropy. Results of these analysis are systematized in LFA methodology, which has emerged as a conclusion based on characteristics of entropy, presented in the form of methodology with systemic approach.

1. **Optimal structure of information object – model of efficient recognition**

For modelling information object, one of the key assumptions is the structure of identifier based on which it will be recognized. In general case, information object is multimedia and represents a complex system. Recognizing the complex system of information object and formation of alternative decisions on the structure of its components is analogous to the recognition of the outcome of complex experiment. Procedure of recognizing information object is analogous to complex experiment with uncertain outcome. Main goal is reducing that uncertainty to optimal level using the appropriate sequence of attributes. For obtaining appropriate sequence of attributes we can use LFA, which will leak appropriate attributes in appropriate sequence. For that reason, real reliability of recognizing information objects needs to be sacrificed, i.e. it is necessary to give up the respecting too. It is easy to observe that series of data x(i), as vectors (chains) of concretization of attributes, for two or more information objects, can partially or completely map. Probability of distinguishing series of data is as bigger as length of series (n) increases, i.e. if it is disposed with more relevant data. Complete distinguishing of series of data, i≠j ⇒ a_i ≠ a_j corresponds with complete reliability of recognizing information objects of a complex system (R=1), which it can approach only asymptotically.

Having in mind basic orientation of this research, that the process of recognizing information objects of the system is treated realistically and rationally, certain scope of reliability of recognizing information objects needs to be sacrificed, i.e. it is necessary to give up the respecting too big number of attributes (n→r). For that reason, real choice of attributes is exceptionally important, i.e. filter for selection of r attributes is necessary (r characteristics), which will also provide sufficient – optimal reliability of recognizing information objects of the system.

For this filter we will use the abbreviation LFA (Logical Filter of Attributes). Precondition for optimal reliability of recognizing information objects of the system is a choice of Optimal Concave Sequence Attributes (short: OCSA)), which is a cornerstone for optimization of each process of recognition, as well as recognition of information objects of DTV system.

The aim of this research is one of the solutions of so-called „fundamental theorem of the recognition theory”, which points to methodologically based procedure of choosing the easiest series of attributes that provides optimal recognition of information objects of DTV system.

### 1.1 Components of recognition objects

For the sake of a clearer and more concise expression of the results of this study, it is necessary to unambiguously define initial terms that will be used in this report. Main terms relevant for this paper are:

- Attributes are characteristics inherent to each of the those information objects, \( a_j \Rightarrow X^j, j=1,2,...,n \).
- Information object is a system that is directly described by concretizations of finite set of \( n \) attributes, \( a \Rightarrow \{ x_1, x_2, ..., x_n \} \), data that carry information about characteristics of the system.
- If we dispose with \( j \) data for \( i \) information object, \( x_1 \Rightarrow \{ x_1, x_2, ..., x_n \} \) relevant data can be marked as element of the vector of information objects \( x_1 \Rightarrow \{ x_1, x_2, ..., x_n \} \), which corresponds with a data vector \( x(i) = \{ x(1), x(2), ..., x(n) \} \), made of a series-chain of attributes concretizations
- \( X = \{ X^1, X^2, ..., X^n \} \).

For any kind of manipulation (recognition, memorizing, learning, comparing, changing, controlling,...) of information objects those two steps of mapping, in both directions, \( a_i \Rightarrow x_i \Rightarrow x(i) \).

#### Data on complex system \( a_i \) are seen as information object, which consist of a finite set of interrelated inherent data \( a_i \Rightarrow \{ a_1, a_2, ..., a_n \} \)

- Structure of one class of information objects can be described through finite set of \( n \) attributes, i.e. characteristics inherent to all the characteristics of the observed class of information objects, \( X^1, X^2, ..., X^n \), where for each characteristic there is an appropriate attribute.

- Information is treated realistically and rationally, certain scope of reliability of recognizing information objects needs to be sacrificed, i.e. it is necessary to give up the respecting too big number of attributes (n→r). For that reason, real choice of attributes is exceptionally important, i.e. filter for selection of r attributes is necessary (r characteristics), which will also provide sufficient – optimal reliability of recognizing information objects of the system.

#### For this filter we will use the abbreviation LFA (Logical Filter of Attributes). Precondition for optimal reliability of recognizing information objects of the system is a choice of Optimal Concave Sequence Attributes (short: OCSA)), which is a cornerstone for optimization of each process of recognition, as well as recognition of information objects of DTV system.

The aim of this research is one of the solutions of so-called „fundamental theorem of the recognition theory”, which points to methodologically based procedure of choosing the easiest series of attributes that provides optimal recognition of information objects of DTV system.
1.2 Optimal sequence of attributes

Every automation of the process if as efficient as the set of necessary and sufficient attributes is smaller, i.e. as the number of data necessary is smaller. For decision-making, limiting factor for reducing the number of attributes is reliability of recognition (R). Precisely for this reason, for defining a specific system for recognizing information objects of DTVS, one of the key objectives is finding OCSA (Optimal Convex Sequence of Attributes), as minimal sequence of attributes (for appropriate characteristics of information objects of DTVS) which will satisfy given reliability of recognizing information objects (R).

On the way of solving this problem, there is a main problem of recognition: how to choose a smaller number or combination of r attributes (r≤n), such that neither of the two combinations of r attributes can provide more reliable recognition in comparison to the chosen combination? Unreliability of recognizing information objects is analogous to the term of uncertainty of outcome of some experiment – as objective characteristic of experiment. Experiments with multiple outcomes are random experiments, and realization of some of the possible outcomes is a random event. Information object of a complex DTV system is characterized by one-time appearance of several events. In that sense, complex experiments correspond to complex systems. Precisely, characteristics of entropy of complex experiments are used for constructing LFA based on conditions for the formation of OCSA1.

For this paper, method and procedure of reaching OCSA, by using LFA, is very important, which defines algorithm of methodology of forming a series of attributes that provides optimal recognition.

2. Structure of Ifa methodology

For the formation of LFA methodology, the following assumptions were adopted:

- Object of recognition is information object DTVS-which obliges on the application of systemic approach to recognition objects, which is explained in 1.
- OCSA can be formed – by using facts and conclusions related to the characteristics of entropy of complex experiments, mentioned in [16, chapter 7.3.1].

2.1 Facts and conclusions related to entropy

Characteristics of entropy of a complex experiment point to useful facts, based on which we can draw the following conclusions:

- In general case, uniformly – maximally reliable recognition is practically impossible. In special cases, it is theoretically possible to uniformly recognize when all the objects of the observed DTV system are known.
- In a special case, uniformly – maximally reliable recognition is theoretically possible only when all the attributes of the observed class are known, X={X1, X2,..., Xn}, i.e. when there is mutually uniform correspondence between the elements of recognition set – characteristics of objects, information on characteristics and available data of information carrier about characteristics, ai↔xi↔x(i), i.e. when: {a1, a2,..., an} ↔ {x1, x2,..., xn} ↔ {x(i,1),x(i,2),...,x(i,n)}.
- If the number of attributes (objects, components, arguments,...) of recognition increases, then the reliability of recognition also increases, i.e. the uncertainty of question is reduced – which recognition object is in question. This increase of recognition reliability asymptotically approaches border value Rmax→1.
- The biggest amount of information about recognition objects is provided by r attribute (of objects) from OCSAr. This amount of information cannot be exceeded by the amount of information provided by any other combination of the series of objects of the class r.
- For reliability R, required in advance, OCSAr guarantees the smallest number of (r) necessary objects. If OCSAr does not provide R, other combinations of length r shouldn’t even be examined, but we need to take into account the attribute next in sequence A' from OCSAr.
- Greater uncertainty is when there is a set of recognition elements with a greater number of elements whose distribution of probability is more even. The biggest – maximum entropy is in case of completely even distribution of possible outcomes of events.
- Optimal recognition provides the shortest series of attributes for given reliability of recognition, it provides it in sequence from the beginning of OCSAr.

2.2 Structure of LFA

Defined conclusions and attitudes in relation to entropy of complex experiment2 are the foundation (basic structures), based on which methodology of LFA – logical filter of attributes for OCSA was formed. For this

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In order to have a clearer expression of LFA methodology, in this part of the paper the structure of LFA was mentioned in relation to the choice of OCSA as a series of attributes (objects) that provide optimal recognition of information objects of complex systems. Of course, in each variant of change, systemic approach2 is implied, both towards the recognition objects and the structuring of filter.

Synthesized, formation of OCSA, by using LFA, can be expressed through the following three attitudes (in the form of criteria), which are the basic model of LFA structure:

1. **Attitude: IDENTIFICATION (identification criterion)** – Let’s assume that OCSA is either an empty set or that there is a set formed from the first r-1 attributes of OCSA. Attribute is chosen only from the set of teh rest attributes that are independent from previously (r-1) selected attributes. 

   Priority when choosing k attribute has the attribute that is characterized by the biggest absolute entropy. 

   Practically, domain of selected attribute is the one with the highest cardinal number, i.e. domain is with the highest number of possible different concretizations (data).

   Among the attributes with approximate cardinal number of the set of possible data, the attribute with as even as possible distribution of their probability is chosen (more even chance of data appearance).

2. **Attitude: ACCUMULATION (accumulation criterion)** – selected based on 1. attitude. Attribute is classified in k position in OCSA. 

   If the selected k attributes provide sufficient reliability of recognition, R(k)≥R, 

   Then an optimal series of k attributes is identified, i.e. OCSA is formed.

3. **Attitude: SCHEDULING (criterion of meeting the reliability)** – When OCSA does not provide sufficient reliability of recognition, R(k)<R, then we choose the next object with teh application of 1.) Attitude and 2.) Attitude, until OCSA provides required – necessary value of reliability of recognizing the objects of a relevant class, R(k)≥R, with k attributes, strictly selected according to the 1.) Attitude and 2.) Attitude. If we choose r (1≤r≤m) attributes, strictly according to the first two criteria, (attitudes 1.) and 2.), then there is not a single other combination of attributes of the class r that carries bigger amount of information about teh objects of recognition and they represent the first r attributes in OCSA ⊆ OCSA.

### 3. FORMALIZATION AND AUTOMATION OF LFA

Research results have proven that LFA processes can be formalized2 – which points to the fact that LFA can also be automated. Objects of observation are „covering DTV system“, whose models are logical structures of characteristics that are arranged in OCSA, based on LFA. Target process of LFA is optimal recognition „information objects of covering DTV system“, based on sufficient number of data – concretization of attributes from the initial part of OCSA series.

For the set of recognizing a, one class of possible information objects of some covering, based on available attributes, when OCSA is previously already determined, we can perform teh automation of recognition.

Let’s say that a={a_1, a_2, ..., a_m} is a set of objects, which represent m already known and possible information objects of DTV system, for covering within which recognition is performed. Let’s say that X={X^{(1)}, X^{(2)}, ..., X^{(n)}} is a reliable set of attributes of objects a_i ∈ a from the set of recognizing- class of possible and known information objects of the observed covering. Finally, for a particular class of information objects, let’s say that a series of attributes X can optimally be arranged in OCSA={X^1, X^2, ..., X^n}.

Then, concept of automated DTV system of recognition (basis for the realization of artificial intelligence) can be presented in a formalized way through the following algorithms.

### 3.1 Algorithm LFA

Let’s suppose that m class of information objects as covering objects is known. We observe the following "new m+1 class", marked as a_{m+1}. Based on j characteristic, we define the attribute X^i, in the following series of algorithm steps:

1. **New object**: a_{m+1} ∈ a; 
   \[ j=1; \]
   \[ X^1 := X^{new}; \]
   \[ OCSA := \{ X^1 \}; \]

2. **First attribute**: 
   \[ H(X^i) = \max \{ H(X^{(1)}, ..., X^{(i)}) \}, i=1,2,...,n; \]

3. **New attribute**: 
   \[ j := j+1; \]
   \[ X^j := X^{new}; \]
   \[ X := \{ X^{(1)}, X^{(j)}, ..., X^{(i)} \}; \]
   \[ /* \text{arranging OCSA} – \text{sorting} X \text{according to the criteria of declining entropy} */ \]
   \[ H(X^i) \geq H(X^j) \]

   \[ j \leq i \leq n; \]
3.2 Algorithm of recognition with the application of LFA

LFA algorithm covers a dialogue between mediator and machine. It is supposed that mediator has an ability to tell the machine: which is the necessary (minimal) reliability of recognizing \( R_{\min} \), and data \( x^i_m \), which are concretizations of attribute \( X^j \). In addition, mediator should be able to make a decision about the selection of one of the possible objects (information objects) from the set of possibly alternative ones. Mediators can be:

- **Operators** – personal mediators who communicate with the machine;
- **Adaptors** – transform the signals (original analog characteristics) into digital data readable for the machine;
- **Agents** – protocol mediators that automatedly map data (information carriers) regarding the objects at the request of the machine.

When those conditions are met, recognition with the application of LFA can be represented by the following algorithm:

**Required reliability:** mediator (operator) tells the machine his desire for recognition, \( k=0 \), with minimal reliability of recognizing \( R^* = R_{\min} \);

**The next data:** machine prepares a query for the next data – by marking the next attribute, \( k=k+1 \);

**The next attribute:** whether there is next \( (k, k \leq n) \) attribute in OCSA, \( X^k \in X^k \{X^1, X^2, \ldots, X^n\} \);

If \( k \leq n \) then, go to **Claiming the data**;

**Otherwise:** go to **Learning**; /* the following attribute or object is new information object */

**Claiming the data:** machine claims from mediator the following concretization \( x^k \) for the following attribute \( X^k \) from OCSA:

**Coverage of data:** mediator (operator) tells the claimed data \( x^k \) to the machine;

**Reliability of data:** machine responds by list of possible objects with appropriate reliability of recognizing in the form:

\[
R^*_x \left( \{X^1, \ldots, x^k\} \right) \Rightarrow a_i,
\]

\( a_i \in a' = \{a'_1, a'_2, \ldots, a'_m\} \);

**Verification of reliability:** \( R^*_k \leq R_{\min} \). If reliability is insufficient, then, go to **Coverage of data**;

**Otherwise:** go to **Choice of object**;

**Choice of object:** decision on choosing the most probable object, \( a_i \in a' \);

**End.**

3.2.1 Algorithm of learning with the application of LFA

**Learning:** /* expansion or formation of a new OCSA for the object observed */

**Precognition:** /* familiarity with an initial set of attributes, arranged in OCSA */

\[
X^i = \left\{X^i \right\}_{i=1, \ldots, k}.
\]

**Beginning of learning:**

\[
OCSA^a = OCSA_1 = \{X^1\} = X^1;
\]

**I := 1; */ first attribute is in OCSA */

**n := 1; */ in OCSA is only one attribute */

**Addition to knowledge:** \( i := i+1; \quad n := n+1; \quad j \in \{\text{known attributes about the object} \}/

**The following attribute:** \( X^i = OCSA_{i-1} + X^i' \), /* set of attributes that should be arranged in OCSA */

**Arrangement of precognition:** /* setting the attribute \( X^i \), which is observed, in OCSA */

\[
H(X^i) \geq H(X^i'), \quad j \leq i \leq k;
\]

\[
H(X^i \left| X^1, \ldots, X^{i-1}\right) \geq \max \{H(X^i \left| X^1, \ldots, X^{i-1}\right)\},
\]

\( j = 1, \ldots, k-1, \quad j \leq i \leq k \).

**OCSA_{i-1} \cup X^i \Rightarrow \{X^1, X^2, \ldots, X^{i-1}, X^i\} \Rightarrow OCSA^i.**

**Calculation of reliability:**

\[
R^*_x = f \left( H \left( X_n^{n+1} \left| X^1, \ldots, X^n \right) \right) \right)
\]

If \( R^*_x \leq R^*_i \) then, go to **New object**;

/* formation of a new object in Knowledge Base */

**Otherwise:** if \( R^*_x > R_{\min} \),

Then, go to **Addition to knowledge**;

**Otherwise:** go to **End of learning**.
End of learning: updating the Knowledge Base with new attributes and their corresponding reliabilities of recognizing information objects,
/* structure of object is expanded */
Presentation: expressing, showing and using the knowledge.

4. POSSIBILITIES OF USING LFA

Application of LFA within procedures of recognizing information objects of complex systems is possible in three ways:

1. Manually – as conceptual assistance to experts when determining OCSA, in the form of recommended methodological procedure for the formation of OCSA, with the instructions regarding the required number and type of data (concretization of attributes) in the function of reliability of recognizing certain class of information objects. Mentioned criteria can be used as methodology for manual (expert) choice of objects in order to achieve optimal recognition.

2. Dialogically – where mediator (operator) tells the machine (LFA) his desire for recognition and data $x^1$ concretization of attribute $X^1$, and the machine (LFA) as an answer provides a set of the most probable objects $a$ and appropriate reliability of recognition $R(x^1 \Rightarrow a_i)$. If the reliability is insufficient, the concretization of the following attribute is told to the machine (LFA), let’s say $k$ – th in the order, to which the machine (LFA) provides an answer in the following form $R(x^1, x^2, ..., x^{k-1} \Rightarrow a_i)$, etc.

3. Automatically – based on the initiated procedure of recognition, machine (LFA) requires from the automated mediator a series of data that are concretizations of a chain of attributes $X=\{X^1, X^2, ..., X^n\}$. After the mediators tells the machine (LFA) appropriate series of data $x^1, x^2, ..., x^n$, machine (LFA) tells the mediator a set of the most probable objects $a=\{a_1, a_2, ..., a_m\}$ and their corresponding reliabilities of recognition $\{R(a_1), R(a_2), ..., R(a_m)\}$, based on which mediator decides about the most probable information object.

Regardless of the way in which it is used, in relation to intuitive choice of attributes of recognition, method of LFA provides advantages and the optimization of recognition, because it either defines the procedure of forming OCSA or it dialogically supports the formation of OCSA or it determines OCSA.

Manually, application of LFA method has an advantage over intuitive manner of choosing attributes, because although expert chooses based on his personal statistics, by LFA method we introduce systematism in that process of selection. By LFA methodology, we have defined structure – procedure based on which we can manually efficiently form OCSA as a series of attributes that points to optimal recognition.

Many experiments by which borders of human intelligence were examined (for instance: Dambel) have pointed out that, when recognizing, a man can take into account 6-8 attributes at most. Dialogically and automatically, machine, on the basis of LFA concept, has higher intellectual range and it is much faster than an expert (intellectual subject). In addition, Turing’s experiment of dialogue would certainly be positive in recognition domain – which means that the application of LFA is an introduction into artificial intelligence.

Procedure of LFA methodology consists of the two basic dialogical processes, formation of OCSA and it coverage of data (concretization of attributes) for reaching optimal recognition – based on the initial part of OCSA series.

5. APPLICATION OF LFA

Based on the mentioned characteristics of entropy of a complex experiment, generally, we can point to two classes of OCSA interpretations that point to possible applications of LFA in problem areas of optimal classification and optimal selection. In classification domain, LFA provides optimal criteria for determining classification ("belonging" of objects to classes) and relation structure (model of relations – interfaces).

For problem area of selection, using LFA, methodologically based, OCSA is formed. Process of forming OCSA is arrangement of attributes in optimal order, which guarantees the fastest possible reduction of alternatives – provides a minimal number of necessary elements of a subset of potential candidates in the set of selection (choice, recognition, identification, diagnosis).

5.1 Examples of practical application of LFA

There is a big number of examples of the application of LFA model. In order to illustrate, there are a few examples mentioned that can serve as illustration of LFA possibilities and as imagination stimulus for other application.

5.1.1 Plan of weakening PTN

Objects were four-poles for regulating the weakening of all physical relations (physical lines). Attributes: weakening (data known a priori), deviation of weakening (a priori known limits of reliability – discriminatory
function), four-pole model (scheme structure), characteristics of available elements of four-poles (resistance, price of resistors and possible deviations of resistance).

From LFA, for alternative four-poles, there was an order of four-pole attributes formed

$$OCSA = \{X^1, X^2, X^3, X^4\} \Rightarrow \{weakening, deviation, elements, prices\}$$

Based on such OCSA, knowledge base was formed about weakenings that has provided very efficient decisions based on which 26,214 physical mediums of transferring PTN (public telecommunication networks) were regulated.\(^2\).

5.1.2 Plans of measuring VF relations

Within ZJPTT, there was a great number of measurements on intercity routes on daily basis.\(^3\) There were three problems: organization of measurement, administration of plans and use of measurement results, and control and decision-making regarding collective interventions (repairs and/or regulations).\(^4\)

By the application of LFA, automated system is realized that has enabled the accuracy and elimination of redundant programming and administration of measurements (based on measurement plan, we have automatically obtained the following: measurement programmes, without „typing errors” that have introduced enormous intensity of disorganization, optimal alternatives for efficient decision-making regarding the interventions – based on measured size, alternatives of decisions were formed.\(^5\)

Physical structure of the observed system is characterized by the class of objects Relation:

$$(A \rightarrow B \iff B \rightarrow A) = \{\text{mark of the relation } (A,B), \text{class of the relation, measurement type, periodicity, expected measurement results, measured size}\}.$$  

Dynamic structure of the flow of measurement process in the following:

Measurement programme $+$ Perpetual calendar $\Rightarrow$ Measurement plan (relation, type and time of measurement) $\Rightarrow$ Performing the measurement $\Rightarrow$ recording the results of measurement $\Rightarrow$ recognition of information objects of relation $\Rightarrow$ decision-making and performance of corrective intervention (repair and/or regulating).

5.1.3 Applications designing

Within the jobs of developing the designing of subsystem PTN, based on LFA, processes of designing are significantly improved. In the first phase, the application of systemic approach is introduced. Process of designing is systematized\(^6\), and the course of designing is defined:

- Analysis of dynamic structure of the observed DTV system-characteristics of functioning;
- Recognition of classification structure of the observed DTV system-description of objects;
- Recognition of relation structure of the observed DTV system-prototypes of interfaces;
- Recognition of the objective of functioning of the observed DTV system-descriptions of IR (Information Requirements) based on the structure of the observed DTV system;
- Defining classification structure of designed DTV system-recognizing classes and subclasses;
- Defining characteristic coverings of designed DTV system-determination of responsibilities for each of classes (based on functions of classes);
- Defining relation structure of designed DTV system-determining the cooperation between different classes (structure of communication between classes);
- Defining static structure of designed DTV system-formation of a general model that describes structure;
- Making a model of prototype of designed DTV system –simplification of simulation model, which enables iterative procedure of realization – modelling, testing, correction, modelling, testing, correction,...).

Standardized formalization of project – expression of project model is execution form, such as codification by programme language or some other standardized form for project.


\(^{3}\) Popović M.: "Godišnji, mesečni (dnevni) planovi merenja i ispitivanja VF sistema i međumesnih telefonskih vodova (govornih kola)", paper at the conference „Computer in telecommunications“, Novi Sad, 5.6. 1975.


\(^{5}\) Popović M.: "Godišnji, mesečni (dnevni) planovi merenja i ispitivanja VF sistema i međumesnih telefonskih vodova (govornih kola)", paper at the conference „Computer in telecommunications“, Novi Sad, 5.6. 1975.

Strictly according to this model, with the application of LFA, the first original applications were done (of the subsystem IS PTT Novi Sad): measurement of VF relations; automation of maintenance of local networks, optimization of designing local networks, fixed assets accounting and prototype of automated designing of PTN reorganization.

The last example, prototype of automated designing PTN reorganization, is the most interesting example of LFA application for this class of problems. For the field of telecommunication network of Novi Sad, for all elements of static structure, relevant OCSA were formed for objects that describe: telecommunication needs, urban structure, structure of the existing network and structure of elements that can be installed. Alternative solutions for given coverage of network were obtained automatically.

5.1.4 Application of LFA for AUTEM

During the functioning of PTN (Public Telecommunication Network)\(^8\), when at a random place there comes to a cancellation (failure or malfunction), the mediator determines and forms concretizations \(X_{1}, X_{2}, ..., X_{r}\) of attributes \(X_{(j,1)}, X_{(j,2)}, ..., X_{(j,r)}\). Concretizations chain (data record) is send to the system for recognitions, where based on the formed OCSA=

\[
\{X_1, X_2, ..., X^n\}, \quad r \leq n,
\]

based on condition

\[
\text{Hr}(X_{(j,1)}, X_{(j,2)}, ..., X_{(j,r)}) \leq \text{Hr}(X_1, X_2, ..., X'),
\]

optimal sequence of \(r\) attributes is formed, LFA:

\[
(X_{(j,1)}, X_{(j,2)}, ..., X_{(j,r)}) \Rightarrow (X_1, X_2, ..., X');
\]

\[
(X_{j,1}, X_{j,2}, ..., X_{j,r}) \Rightarrow X_j = (x_{1}, x_{2}, ..., x_{r}).
\]

Based on a series of concretizations \(x_{i}\), in OS (Operating System), the most probable type of cancellation is diagnosed. As in this way we obtain optimal alternatives of diagnosis, we form a decision (automatically or manually by dispatcher) on the organization of cancellation elimination. After every intervention, statistical samples are updated, based on which Knowledge Base in OS is verified, which was initially formed in heuristic way (expert group has formed initial Knowledge Base).

Prior to the introduction of AUTEM, transition variant in which OS are the people in Dispatcher Centre who diagnose the cancellation and organize its elimination.

5.1.5 Preparation of handball judges

For the needs of Commission for Development of FFHB (French Handball Federation), at the request of a member of that Commission whose portfolio is development of handball trial, LFA is applied for determination of optimal sequence of the classes of handball situations. The aim was improvement of preparations and trainings of handball judges.

Objects (situation models) were formed for each attitude in Regulations on handball trial. Object is a class of situations that corresponds to individual attitude in Regulations. These objects as attributes, are not identical with attitudes in Regulations, but they are mutually uniformly defined based on them.

For appearances of each of these objects in handball matches a qualified statistical sample was formed. Based on such statistical experiment, with the application of LFA, OCSA was formed where every attribute represents an objects, i.e. one attitude in Regulations on handball trial. Recognized set of objects was classified and average frequency of appearance for each class of objects was determined. Based on those frequencies, object’s field of expectation was defined – as probabilities of appropriate attribute.

Based on Bayes formula, the biggest entropy for objects that represent class of situations of contact players (attack and defence players) is determined. At seminars of handball judges (current and candidates), the advantage isn’t given to this class of situations, but it is almost neglected, although all analytical subjective reports of trial controllers have pointed out that the biggest problems in trial refer to that class of situations. Decision suggestion is to give advantage to situations of contact between players at these seminars.

These results are not published because they represent a part of document that is currently processed by FFHB administration.

6. CONCLUSIONS AND DIRECTIONS OF FURTHER STUDIES

This study was dedicated to solving the problems of recognizing information objects of DTVS complex system, in order to improve procedures of development of complex subsystems of DTVS (designing and exploitation), through optimization of formalization and then automation of recognition. Study was multidisciplinary and it required systematization of concepts from the field of the theory of system, information and experiments. Special attention was paid to phenomena of uncertainty, with systematization of terms and conclusions in relation to entropy.

Possibilities of subjective recognition and the existing classes of methodologies of practical implementation of automated systems of recognition were critically observed. In both cases of recognition, subjective and automated, there was a lack of answers to fundamental issue of recognition: how to choose attributes of recognition object?

6.1 Conclusions

By presented study, a set of possible answers to this rather general and complex question was given - what is fundamental for optimal recognition?! For solving this „general problem of recognition”, one of the most difficult ways was chosen – inductive-deductive procedure.

Inductive procedure was initiated by studying the limitations of recognition. In case of subjective way of recognition, in addition to the lacks of methodology in the way of observing the recognition objects, limitations of subjects (people) to 8 simultaneously and synchronizingly observed. In case of operatives who decide in relation to used facts for reliable recognition (decision-making) were difficult ways was chosen – inductive-deductive “general problem of recognition”, one of the most fundamental for optimal recognition?! For solving this difficult ways was chosen – inductive-deductive procedure.

The last phase of this pragmatic research was aimed at applications of LFA within DTVS, especially in fields of telecommunications. LFA methodology was applied in designing AUTEM – system of automated management of national public telecommunication networks. LFA methodology is applied in designing AUTEM – system of automated management of national public telecommunication networks. Project was a success and it was exceptionally competently reviewed and verified. However, due to restructuring of state systems, it was not realized.

Specific class of objects observed, focused by this research, are information objects of complex systems. As practical implementation of recognition was one of the important goals of this research, the existing classes of automatedly applied methodologies with heuristic approach were studied (recognition of forms and expert systems) and with exact approach (discriminatory functions and neo-Bayesian approach). In presentations of methodologies and their applications, a lack of answers to basic question of their applications was observed: how to choose the attributes of recognition? All the existing methods of automated recognition start from previously – a priori chosen series or set of attributes.

Having in mind that the objects observed (information object that is recognized) are complex dynamic systems, category of uncertainty is their very important characteristic. Using the established analogy of experiments and recognition of information objects, terms of entropy (measures of uncertainty) and data of information object were systematized.

Foundation of LFA model consists of conclusions related to entropy of complex experiments. Based on those conclusions, the term of optimal series of attributes (OCSA) was systematized and structure and algorithm of LFA were defined, applicable for both manual and automated application. In that way, LFA methodology is completed, whose structure consists of systemic approach and LFA model.

This research has lasted about 30 years. Although it began long time ago, it is still valid. Research results are verified at a big number of examples in different fields. First applications of LFA methodology have resulted in first original projects of automation in PTT Serbia. In that way, there were first original applications: automated management of measurement organization and maintenance of VF system and voice circles, subsystem of fixed assets accounting, automation of regulating the system of weakening physical lines and automated designing and documentation of subscriber’s telecommunication networks. LFA methodology is applied in designing AUTEM – system of automated management of national public telecommunication network. Project was a success and it was exceptionally competently reviewed and verified. However, due to restructuring of state systems, it was not realized.

In the last couple of years, LFA methodology was verified in sport subsystem – handball in France. The first results are encouraging, because the possibility of applying LFA methodology within handball trial, technical training of players, tactical preparation of teams and handball „coaching“ (tactical leading of a team in a game) was accepted.

The last phase of this pragmatic research was aimed at applications of LFA within DTVS, especially in fields of GUI structures – graphical user interfaces, and
particularly for the processes of optimal keys of information objects warehouse.

Width of the area of successful applications of LFA methodology points to expedience of this research.

6.2 Directions for further research

In the end of this research and after long application of LFA, many open questions were imposed and possible directions of further research, of triple nature: theoretical, practical and social.

In the field of theory and applications of recognition, there are many questions with a series of open scientific problems from the field:

- Theory of dependence – particularly characteristics of complex dependencies, because issues related to simple functional dependencies are almost solved by the followers of the ideas of Boys-Code nominal forms;
- Theory of classification – due to extreme mass application of software tools for implementation of information systems based on OÖ (Object Oriented approach);
- Connecting recognitions within coverage (subidentifications for the class of objects) into the system of general recognition (identification within the system);
- Formalization of objects and attributes for particular scientific-technical fields...

Directions of further research and looking for answers to the questions of practical character, primarily refer to solving problems of creating general model of automated system of recognition. We can mention a few, currently interesting ones:

- Calculation of expectations of information object’s appearance on the basis of reduced statistical sample;
- Transformation of characteristics into attributes;
- Formation of a general model for exact and automated determination of OCSA;
- Development of specific systems of automated recognition for more significant activities.

Mentioned problems and directions of further research exceed the framework of individual research – such as it is the case with this paper. For that reason, mentioned problems and possible directions of further research can be used as motivation for other researchers, even coordinated teams, to develop recognition models and reach Artificial Intelligence.

Research in this field, in all developed countries, is classified as strategic research. It means that both economic and social conditions were created for team research. Our problems of social character are much wider and more complex. Some of our problems are the following:

- How to organize the cooperation (in the country and abroad) in domains of recognizing, decision-making and, generally, Artificial Intelligence;
- Is it worth to pay significant attention to the technologies that are to come?

As the answer to the last question is too difficult, it may cause research pessimism. We should be motivated by theoretical possibility that only with individual enthusiasm we can reach useful research results in fields that require big investments and numerous research (multidisciplinary) teams.

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INFORMING PEOPLE ABOUT THE TELEVISION DIGITISATION PROCESS IN SERBIA

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Abstract: Public interest in TV program innovations is connected with very frequent statements of experts and politicians that Serbia, in accordance with Conversion from Analog to Digital Broadcasting Strategy, is obliged to start broadcasting digital television signal by April 2012. The aim of this paper is to show how media report on this topic, but also, based on the results and using media discourse critical analysis, to offer the best model for informing people about the necessary process of television signal digitisation. Texts on this subject taken from different media show similar, almost uniform way of informing people about the digitisation.

Key words: digitalisation, television, signal, informing, public

1. INTRODUCTION

“Daily life has become programmed. It is programmed by television.” (Henry Lefebvre, Critique of Everyday Life, 1947).

Although since the statement of this French sociologist and philosopher there has been almost seven decades, and in spite of increasing spreading of Internet, television is still “the most powerful and influential medium of mass communication” (Djuric 2003:398). Television that we know today will soon become the past, while in some countries, it is already part of the past for the last couple of years.

In most developed countries, digital switchover has already been finished or is in its final phase. In those countries, there are two types of free-to-air TV channels: public and commercial services. Digital public services in Europe are still mainly funded through subscription, and in the USA there are public donations, as well as revenue from commercials, while commercial digital channels are exclusively financed through revenue from commercials (Adda, Ottaviani 2005: 164-165). Independent regulator and competition authority for the UK communications industries (Ofcom) issues reports on digital switchover processes around the world. In 2008, Finland had the highest rate of households which can receive the digital signal (88%), followed by the UK (86%), the USA (70%), France (66%), etc. The USA finished the digital switchover on their territory by the 12th June 2009. As for the UK, the switchover has been completed in the western parts of the country (Scotland and Wales), while the process is still going on in England and Northern Ireland.

Similar to these countries, the switchover process has been finished in Croatia. The analogue TV signal was off on the 5th October, 2010. Prior to that, all TV subscribers received a coupon which ensured them a certain discount for purchasing the digital media receiver. In Montenegro, the process of digital switchover is still taking place, but has been followed by numerous problems, although there is an official state strategy (cf. Džafić 2008: 95-104). Though thirteen companies applied for the digital switchover contest, the state committee thought that none of the offers was satisfactory, thus cancelling the contest, and then chose the companies they wanted to cooperate with in a non-transparent way.

(Obligatory) digitalisation of media in Serbia will also provide the citizens with a better quality and reception of radio and television programmes. After the digitalisation, state will be able to much efficiently use media spectrum that will be enriched by new technical possibilities. Those are only some of the advantages of the forthcoming process of one of the biggest innovations of television

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1 Great Britain, Germany, United States of America, and since recently Croatia and Slovenia, etc.
2 http://stakeholders.ofcom.org.uk/market-data/research/market-data/communications-market-reports/icmr08/ (on 14th September, 2011).
since the transition from black and white to colour programme in the 70’s of the previous century.3

2. Digitalisation – NECESSITY

Regional Conference on radio communications for planning digital terrestrial broadcasting service in region parts 1 and 3, in frequency range 174-230 MHz and 470-230 MHz, held in Geneva in June 2006, has decided that today’s analog technology will have to be replaced by digital radio and television until 2015. (according to Isakov 2006: 38-39). Obligatory transition to digital broadcasting for all the countries of European Union is 17. June 2012, and three years later for all other countries that signed the plan Geneva 06. Serbia has signed the agreement GE06 (Geneva 06) and thus it has obliged itself to entirely transfer to digital broadcasting of radio and television signal until 17. June 2015. According to the Conversion from Analog to Digital Broadcasting Strategy, Serbia should transfer to digital terrestrial broadcasting of television contents until the 4. April 2012. It is interesting that “according to this document it is not predicted that dual system exists for some time”6 (Valic Nedeljkovic 2011: 9). In accordance with digital plan of frequencies adopted in Geneva, in Serbia, once the digitalisation period is ended, it will be possible to have from 32 to 48 national television and from 12 to 16 national radio programmes, which is by far more than in 2011. Observed from the aspect of the existing technology, new digital technology allows the formation of a multiplex of four to six programmes of the same quality on one existing channel (Prlica 2011: 33). After digitalisation, the state will be able to use radio-television spectrum in a much more efficient way and to use “released part of the spectrum for new services” (according to Surculija 2009: 19-20). This particularly means that due to much more successful form of transfer and compression, part of TV spectrum meant for broadcasting analog signal will be free, so it will be possible to use it, in example, for wireless broadband Internet.

3. DEFINING THE SUBJECT OF RESEARCH

The aim of the paper is to indicate the way in which the media report about the forthcoming digitalisation of television, but also to offer the best model of informing the public about the necessary process of digitalisation of television signal through the analysis of media discourse.

I see Discourse as a unit bigger than a sentence (of a voice or text message), which is realized between interlocutors in some context (Savic 1993: 29-33). Discourse also includes written communication, even written interaction, having in mind that recipient (audience) and the author are not in interaction face-to-face (Van Dijk 1998: 2-3). Media discourse is a broad term that may refer to overall reality that is represented through printed and electronic media (O’Keeffe 2005: 1).

The term public is, in the broadest sense, defined as the audience, i.e. consumers of information (readers, viewers, listeners). “The willingness of citizens to take part in social activities” is of huge importance to journalists and media, as well as that citizens-public “have all public sources of information open and all the facts that require active attitude of people towards political activity available” (Djuric 2003: 167). Role of the public in this phenomenon (digitalisation) is very important since there is a real danger that due to technical problems, it will no longer be able to watch television programme.

The term digital television7 defines as a “hybrid platform that combines elements of forms of classical analog television and Internet, as well as providing contemporary multimedia services” (Lugmayr, Niiranen, Kalli 2004: VII). Digital television is a kind of a window to the world of interactive digital media, and it offers to its consumers a much higher level of choice in relation to the remote control of analog television.

Digital television will bring about a significant increase in the number of channels and programmes available to the end users, which will then “have much more problems in finding interesting programmes among numerous irrelevant contents” that will be offered (Blanco-Fernandez; Pazos-Arias, Gil-Sola, Ramos-Cabrera Lopez-Nores 2008: 33).

Figure 1. A summary of differences between classical analog and modern digital television

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5 More about the process of digitization of public service television in five countries of Southeast Europe (Slovenia, Bulgaria, Croatia, Serbia and Bosnia and Herzegovina) in: Sükösd, Isanović 2008: 39-239).
6 In the meantime, in July 2011, relevant minister Predrag Markovic has announced that „there will be left some time for parallel use of both signals, until all households are adapted to new conditions of digitalisation“ (available at: http://www.b92.net/biz/vesti/srbija.php?yyyy=2011&mm =06&dd=14&nav_id=518958 ; visited 15.8.2011)
7 More details on technical aspects of the term television digitalisation Ibrahim 2001:1-34)
4. METHOD, CORPUS OF RESEARCH AND UNIT OF ANALYSIS

When analyzing media texts on the subject of television digitalisation in Serbia, the method of qualitative analysis of media discourse was used. Analysis of discourse has appeared to be the most appropriate one for this type of research because as interdisciplinary science it critically reexamines the society and culture in which actual interlocutors exchange messages. A special coding sheet was created for the needs of this research and it included several categories, among which in this paper will be presented only those in which relevant data were obtained (subject, type of title, attitude of the subject towards the topic).

Research corpus represents 17 media texts that are issued/printed in different media, electronic: Radio and television of Serbia, Radio and television of Vojvodina, Radio and television B92, Radio 021, Internet magazine Personal magazine; daily papers: 24 sata, Danas, Politika, Vecernje novosti, Bllic and Glas javnosti, newspaper agencies: Tanjug, Beta and FoNet and site of (former) Ministry of Telecommunications in the period from 2009-2011. Texts are excerped using media portal www.naslovi.net that owns big electronic archive of all the information that media houses have placed in their Internet issues.

Unit of analysis is informative newspaper article, including the title, as well as data on the broadcaster, i.e. media or author, if it is known.

5. ANALYSIS AND RESULTS

Analysis has firstly shown that the number of texts about television digitalisation was increased in relation to the first observed year (2009) from three texts, through the second year observed (2010) to ten texts, which is recorded until the end of August 2011. (Table 1). Therefore, as the deadline for digitalisation was approaching, in the same way the interest of media was increasing. This information shouldn’t be a surprise, having in mind that the televisions, which do not perform digitalisation until the predicted deadline, will not be on air, since digital signal of domestic televisions8, as well as those from the region9, will override analog signal and disable watching such programmes.

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8 Which complete digitalisation proces on time.
9 Croatia, Hungary, Romania, Bulgaria, Bosania and Herzegovina, Montenegro, Macedonia and Albania.
When it comes to persons who have spoken about digitalisation, in the corpus observed there were 17 interlocutors recorded, of which, as the most prominent ones, appear the minister and Secretary of State for Telecommunications Jasna Matic (six times), editor-in-chief of RTS Digital Tatjana Citic (four times), Assistant Minister of Telecommunications Irina Reljin (three times), provincial secretary for informing Ana Tomanova Makanova and director of public enterprise Broadcasting equipment and communications Vladimir Homan (two times). Others’ were recorded only one time. These data can be commented in a way that in Serbia there is either a very small number of competent interlocutors regarding the subject of digitalization, or the journalists, i.e. media, have decided to talk about it only with a few of them who are responsible for that field and who were the most available to them (government representatives, editor of one digital TV channel, as well as a director of the company that is responsible for implementing the digitalisation of television signal in Serbia). It is interesting to mention that except for certain Radisa Petrovic, who works in Broadcasting Equipment, media haven’t interviewed not a single expert as relevant interlocutor (university professor, telecommunication engineer etc.).

Titles are one of the most important segments of newspaper texts since that by them, to a significant extent, the audience decides whether to read the text or not. In this research, I have observed three types of titles: informative, educational and metaphorical-critical. The majority were informative titles (65%), and there was an equal number of educational and metaphorical-critical (17.5% each). (Figure 1):

![Figure 1. Type of a title in thematic texts](image)

Educational type of titles:
- What does television digitalisation mean
- On digital television you choose the term of your favorite shows
- Digitalisation for free watching of television channels

Metaphoric-critical type of a title:
- Analog-digital headache
- TV picture will be more expensive for villages

- Implementation of a digital TV channel will cost millions of euros.

Through informative titles and texts the public could find out where seminars and round tables on digitalisation are held, how will the trial and actual digital networks work, as well as about the plans to initiate this process firstly as a pilot-project in Vojvodina. Through educational texts, public could discover what does the term digital television actually mean and why is Serbia obliged to converge its analog signal to digital. The most interesting were the texts whose titles were metaphorical-critical. I would particularly like to mention Analog-digital headache, practically the only newspaper critical text about insufficiently clear digitalisation process, irresponsibility of authorities towards the public that, as the final instance in order to watch digital television, will have to set aside a certain amount of money to buy signal converter or to buy a new television. Author of the text is a columnist on the web site of Radio 021 and speaks about the meaning of digitalisation to ordinary citizens. Even before the authorities have announced that the deadlines of digitalisation will be broken, the author has criticized the attitude of authorities towards this process and (obvious) delay in relation to the countries from the region. Although that text has appeared in February 2011, not before June was it announced that digitalisation will probably be prolonged for 2013.

6. INSTEAD OF A CONCLUSION

Analysis of media texts about television digitalisation in Serbia has shown that media report about this phenomenon in a similar way – informatively, while critical or research journalism is almost reduced to zero regarding this theme. Although in Serbia there is a big number of experts for the problems of digitalisation and technique, media didn’t recognize that and, for that reason, most frequent interlocutors were politicians.

In order for the public to be informed and educated in relation to media digialisation, especially if the journalists pay much more attention to this phenomenon that is to come to Serbia. Although the process will be late a year, that can be a good opportunity to inform the public about the way in which they will in near future watch TV programmes, as well as about the price at which they will watch them, and also to obtain new contents that in era of analog television, to which we are accustomed, could not even be imagined.

10 Only except the programmes are watched through cable systems or satellite, i.e. if they possess plasma or LCD television set.
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SPATIO-TEMPORAL DATABASES - CHALLENGES, PROBLEMS AND SOLUTIONS

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Abstract: Spatio-temporal databases represent the databases that integrate the concepts of spatial, temporal and spatio-temporal databases. This field is in the focus of research papers in the past years. Various models of spatio-temporal data types have been developed, along with the associated algebra and query languages that provide support to the entire data streams and related spatio-temporal changes. This provides continuous flow of information about the current positions of objects as well as the queries about the past and future positions of objects and their trajectories. Design of these databases faces numerous challenges in the view of frequent and continual updates of the query results in order to obtain accurate, current information; the problems of dynamic query conditions; time and space limitations, redundancy in processing and evaluation of queries, etc. This review paper attempts to briefly explain the challenges of research in the field of spatio-temporal databases, focusing on the modeling of typical spatio-temporal queries opposed to the traditional database. It also brings solutions proposed by prominent authors in this area of expertise.

Key words: spatio-temporal databases, data streams, continuous queries

1. INTRODUCTION

Spatio-temporal database1 is a type of database managing spatial and temporal objects. Time and space represent important aspects of real systems.

Over the last years relational databases have been used widely due to the simplicity and the possibility to support data and queries satisfying the requirements of most of business applications. However, for the requirements of managing data changing in time and space, the systems for managing relational databases have been proven insufficient. Over the past years, data bases that support the data of spatial and temporal type represent the area of intensive research. The researches tend to define spatio-temporal data types and the appropriate algebra that could satisfy the demands for managing these types of data.

Managing spatially and temporally referenced data gains great significance, considering the continual progress in development of wireless communications, sensors technology and of information technologies in general. Spatio-temporal databases and applications have the possibility to store and support the changeable temporal and spatial values of the system they are modeling. In conventional databases, manipulating the attributes containing spatial or temporal information are only applicable programs with a little help of the system for managing databases. In contrast to it, the spatio-temporal databases support both aspects of data: through models and query language. Applications relying on spatio-temporal databases can most often be found in geographical information systems (geographical information systems, GIS), autonomous navigation and medica.

Spatio-temporal databases store and manage data which change the position and/or value over time. The examples for this are data collected in following traffic, climate changes, demographical changes or multimedia applications. A large amount of data changing over time induces these bases being of large capacity, thus it is highly significant to create efficient schemes of indexing, approach and review and processing of these data.

The field of spatio-temporal databases explores the trends of a more flexible setting up of queries and information processing related to spatial and temporal parameters in the databases. Over the past few years this field is increasingly in the focus of researches, although there are still relatively few complete prototypes of real systems, few products that provide efficient support for the applications following changes in spatial and non-spatial data over time. As the reason to it, the experts specify the focus on individual segments of the problems in the area of spatio-temporal databases, prejudicially to holistic approach to the databases design and development. (Paton, Fernandes & Griffiths, 2000).

In the paper which is of reviewing type, we will present the most frequent problems in modeling spatio-temporal databases, analyze the challenges and barriers in setting, processing and evaluation of queries over the spatio-temporal databases, and give a review of solutions
Spatial Databases, Symposium on Spatial Data Handling) conferences and researchers' gatherings (Symposium on Journal of Geographic Information Systems, international
Numerous journals, such as Cartographica, International systems. Lately, the research in this field lasting more
advance in the area of information technologies,
databases it is necessary to reconstruct the previous states
1.2 Temporal Databases
Temporal databases include the concept of time in order
to provide a high level of abstraction needed for efficient
functioning of the applications over the databases.
Intensive research in this field in the last years has given
great contributions. In the form of International educational seminars on the temporal databases2 infrastructure, as the special section in the magazine IEEE Transactions on Knowledge and Data engineering on temporal and real time databases, etc.
In the context of temporal databases two dimensions are
mainly spoken about– valid, valid time and transaction
time. Valid time implies the time for which the fact/phenomenon/event is valid in reality, the time when
the fact occurred in reality, independent from the time
when it was evidenced in some database. This time can
be in the present, past or future. Although all the facts
that have happened have to have the valid time, they do
not necessarily have to be recorded in the database, for
any reasons.
Transaction time implies the time when the fact is present
in database as a saved data. The transaction time actually
represents the period of transaction at which the fact is
written as a data in database or transaction time at which
the fact is erased as a data from the database. Besides,
valid time records time of different states of real system
whereas transaction time records the time of various
states of databases. (Kline, 1993)
2. SPATIO-TEMPORAL DATABASES
Spatio-temporal databases deal with geometrical changes
time. (R. H. Güting, 1998). In essence, objects’
geometry cannot be changed in discrete, intermittent
moments of time, but continuously over the time and then
we speak about moving objects. Databases containing
such data follow not only the object’s current position but
also the complete history of the object trajectory.
If for the object only important is the current location in
the space, the basic aspect of the object represents the
moving point; if, otherwise we speak about certain space
the object describes during the motion, the "moving
region" is the concept that records both the motion but
also the narrowing down that is spreading of the object’s
moving region.
It can be said that, in distinction from traditional
databases, spatio-temporal databases have the following
characteristics: 1) most of spatio-temporal queries are by
the nature continuous, unlike the conventional queries

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2 ARPA/NSF sponsored International Workshop on Temporal Database Infrastructure, 1993
that go through the process of evaluation only once; meaning that the queries over the spatio-temporal databases require continuous evaluation because along with the change of databases’ states the query result becomes invalid (Terry, Goldberg, Nichols, & Oki, 1992). 2). Spatio-temporal databases contain a great number of moving and static objects and, consequently, a large number of continuous queries over the moving and static objects (Brinkhoff, 2002). Any kind of delay in the response to a query can result in outdated answer; for example, a query on the object moving within a certain region – if the response to the query is late and the object constantly changes the position, the result will be outdated, invalid response to the query.

The mentioned characteristics could also point out to the first barriers in working with spatio-temporal databases. Namely, these kinds of databases’ models speak on the need for frequent updating of the object’s position in the database, variations in the view of the amount of data stored in the base, as well as on the need to respond in the real time on the appropriate queries related to spatio-temporal aspects of the base. Unlike the traditional techniques of processing data and queries responding mainly to static conditions and predictable environment, the systems for managing such databases would have to enable continuous adjustment and modifying of the queries and processing of a large amount of queries over a variable data streams. The problems in modeling the spatio-temporal data the values of which are changing over time are explained in the next chapter.

2.1 Modeling the spatio-temporal data

Owing to a continuous and very often fast change of spatio-temporal data geometry (GPS technologies, following the movements in traffic, etc), but also due to the fact that it is not always possible to measure the value of these data with the greatest precision, the spatio-temporal data are often uncertain (Tossebro & Nygård, 2002)

Even though we often speak about the continual aspect of an object’s change of geometry, there is also a whole class of applications where the object’s geometry changes only in discrete steps (Erwig, Güting, Schneider, & Vazirgiannis, 1998), for example, the changes in border areas between the states or changes in the size of parcels in the cadastral register. Accordingly, Erwig and the associates in their research speak about two levels of modeling of spatio-temporal data, an abstract and discrete model. The discrete model of spatio-temporal data can be directly implemented and is based on a discrete representation of objects such as raster of vector model of data. The discrete models are mainly represented by linear approximations of different geometrical forms such as polygonal surfaces, curves and similar.

Whereas the algorithms in computer geometry are mainly using precisely these linear forms, the discrete models are suitable for mathematical operations, and thus simple for implementation.

On the other hand, the abstract models are, according to Erwig and the associates, on a higher level of abstraction and enable designing of appropriate queries that are not possible in the discrete models of data. The abstract model, in essence, observes movements of objects as a function of time depending on the position where the object is situated in an individual point of time; analogously, the region of movements of the object is represented by a function of time depending on the region the object’s moving takes up in the given point of time. According to Erwig, the abstract models are conceptually simpler and their semantics can be defined relatively easy.

In the referenced papers also mentioned are the other examples of modeling spatio-temporal databases from the aspect of their uncertainty. Egg-yolk-model

3 (Cohn & Gotts, 1995), models based on fuzzy sets they describe (Lagacherie, Andrieux, & Bouzigue, 1996), (Schneider, Gotts, 1995), models based on precisely these linear forms, the discrete forms and enable designing of appropriate queries that are not possible in the discrete models of data. The abstract model, in essence, observes movements of objects as a function of time depending on the position where the object is situated in an individual point of time; analogously, the region of movements of the object is represented by a function of time depending on the region the object’s moving takes up in the given point of time. According to Erwig, the abstract models are conceptually simpler and their semantics can be defined relatively easy.

In the referenced papers also mentioned are the other examples of modeling spatio-temporal databases from the aspect of their uncertainty. Egg-yolk-model (Cohn & Gotts, 1995), models based on fuzzy sets they describe (Lagacherie, Andrieux, & Bouzigue, 1996), (Schneider, Gotts, 1995), or rough sets (Worboys, 1998), (Beaubouef & Petry, 2001), and other.

2.2 Data streams management systems

When speaking about databases that support data of spatial and temporal type, basic requirements that need to be fulfilled are managing information on the history of objects’ movements in the system observed, determination of an object’s position in determined temporal instances in the present, but also in the past and in the future, that is, predicting the position of an object in certain point of time in the future and thus the way of the objects’ movements over time. Setting up queries over these data requires primarily determining the exact position of the object moving and updating the position in the database, so that the data would be valid in any moment. The need for frequent updates of the objects’ position, large amounts of data stored in the base as well as the request to answer to the set spatio-temporal queries in the real time, have pointed on certain flaws of traditional systems for spatio-temporal databases management (DBMS). In order to overcome the problem, new approaches have been developed which observe the objects’ trajectories as continuous, temporally changing and unlimited data streams. The systems for managing data streams have been developed (Data Stream Management System, DSMS) that enable managing data streams and setting continuous queries over the data streams with support to the standard, individual, current queries (Eng. snapshot, instant queries). New DSMS

3 Eng. Egg-yolk model

4 Eng. Rough in the meaning of rugged, of the exactly determined limits
support the techniques of queries' processing that enable a continuous modification and evaluation of the queries, handle large number of continuous (instead of individual) queries over the time, set over variable data streams.

DSMS systems obtain the input information in the form of streams of data on updated locations of the moving objects. Usually a high rate of data streams input effects the creation of large amount of data that cannot be stores in the data base but are processed during the input and respond to the queries that are directed to the DSMS. In other words, instead of execution of the query over the set of data that is stored in the database in advance, the queries are executed over the data streams which are incoming into the DSMS "online" and remain in the memory for a short period of time. (Babcock, Babu, Datar, Motwani, & Widom, 2002). Consequently, DSMS has to process the data before they leave the memory, whereat the system itself cannot control the order at which the data are coming in. Once the data is processed, it cannot be taken over again if it is not explicitly stored previously. Since the data streams coming into the DSMS are highly great or even unlimited, the continuous queries are processed intermittently during the arrival of new information.

In spatio-temporal databases, thus, DSMS responds to two types of queries over the data: 1) individual, instant queries 2) continuous queries. The instant queries are processed only once, in the moment when they are directed, and the response to the queries depends on the data that have been stored in the database up to that time. The continuous queries are processed several times successively and the responses to them are updated with the change of location, that is, with the change of the data related to the moving object.

Several prototypes of DSMS systems can be found in the reference papers: TelegraphCO5 is one of the prototypes of these systems, developed as the result of the research projects at UC Berkeley, implemented on the architecture PostgreSQL in order to support the distributed processing of continuous queries (Chandrasekaran, et al., 2003); STREAM prototype of DSMS-a, developed at the University of Stanford, uses the associated language similar to SQL, CQL (Continuous Query Language) enabling setting up of continuous queries over the data streams (Arasu, Babu, & Widom, 2006); Aurora DSMS that describe (Abadi, et al., 2003); NiagaraCQ (Chen, Dewitt, Tian, & Wang, 2000), and other.

2.3 The queries in spatio-temporal databases

Specific problems of setting, processing and evaluation of queries over spatio-temporal types of data, mentioned in the introductory segment of the paper, are a special area of research in the past years in the domain of spatio-temporal databases. Owing to the accelerated spreading of applications’ domains requiring work with spatio-temporal data types, a need occurs for creating new techniques of processing the queries over the databases of both spatial and temporal type.

Numerous researches can be found in the reference related to the evaluation of spatio-temporal queries, with existing algorithms for continuous evaluation of single queries over the spatially and temporally changeable data. The paper by (Papadias, Zhang, Mamoulis, & Tao, 2003) suggests an approach for queries' processing on the basis of architecture recording the location and relation of the moving objects in a certain region. Further, these authors present several new algorithms which in an intuitive way process spatial limitations, and are based on the nearest neighbour algorithm which is limited to Euclid’s spaces6.

Benetis and associates in the paper (R. Benetis, 2002) suggest an approach based on the algorithm k of the nearest neighbours and algorithm of inverse k nearest neighbours, for the queries on instantaneous and predicted locations of an object moving intermittently in a plane. The first algorithm returns k number of objects that are the closest to the observed object at any point in time in a determined time interval. The second algorithm returns as the result the position of object marked as k nearest neighbour to the object on which the query is performed, again, for each point in time in a specific time interval. The algorithms are based on indexing objects’ positions and are represented as linear functions of time.

The approach suggesting the algorithm for different models of queries k nearest neighbour over multiple data streams is explained in the paper by (Xiaoya & Ferhatosmanoğlu, 2003). For presenting data streams the authors use scalar quantification and index structure that enable dynamic review of database and efficient processing of similar queries.

The mentioned algorithms as well as a great number of the other can be found in the referenced papers that observe the continuous queries over spatio-temporal data as a series of instantaneous (snapshot) queries. In these approaches the problem of processing queries redundancy can occur. Namely, the snapshot queries are looking for the answer from the server, that is, database in certain time spans – if the time span between two consecutively executed queries is sufficiently short, the answers to two successive queries can be the same or with negligible minor differences. In order to avoid the redundancy problem, certain authors offer approaches in which the time interval between two consecutive spatio-temporal queries is relatively long. For example, (Zhang, Zhu, Papadias, Tao, & Lee, 2003), suggest an approach that

5 TelegraphCQ Project: available at http://telegraph.cs.berkeley.edu/telegraphcqv2.1

6 Euclid’s space, the area in which the distance between objects is defined by their relative position in the space.
enables persons moving to check the accuracy of previous queries on the basis of their current position. So that this would be made possible, with the query result the server also returns the region around the location at which the client is found within which the returned result is correct (validity region).

Also in several other examples of the research of continuous queries over spatio-temporal data, offered are algorithms for continuous queries over the moving objects at which the time interval of setting two consecutive queries is limited (Gedik & Liu, 2004) and (Zhang & Lee, Semantic Caching in Location-Dependent Query Processing, 2001).

In all the mentioned papers, the aspect of validity of the results the executed query is returning is pointed out, whether it is about valid time or region. Once when the valid time expires or the client setting the query is found on the next set query. In the paper (Song & set query in order to narrow down the search for the result temporary storing the queries' results in their researches. The mentioned papers are dealing with the problem of outside the validity region, the continuous query is returning to the re-evaluation. Further, the authors of mentioned papers are dealing with the problem of temporary storing the queries' results in their researches. The idea is to store temporarily the previous result on the set query in order to narrow down the search for the result on the next set query. In the paper (Song & Roussopoulos, 2001) suggested are four different progressive methods that potentially solve the problem of finding k nearest neighbour for the moving object, whereat the range of the search for the result of every subsequent query is decreased due to usage of information obtained from the previous query. Similar approach is explained in the paper (Lazaridis, Porkaew, & Mehrotra, 2002).

When the trajectories of moving objects are known in advance, the methods of computer geometry are used, at the static objects or information on the velocity of moving objects, at the moving objects, on the basis of which the algorithms of continuous queries return the nearest object or the corresponding region. If the data on the trajectories change, the query has to be subjected to re-evaluation (Lazaridis, Porkaew, & Mehrotra, 2002), (Saltenis, Jensen, Leutenegger, & Lopez, 2000).

The paper of the authors (Xiong, Mokbel, & Aref, Scalable Processing of Continuous K-Nearest Neighbor Queries in Spatio-temporal Databases, 2005), investigates the problem of continuous query k nearest neighbour by suggested SEA-CNN algorithm (Shared Execution Algorithm) executed over the set of continuous k nearest neighbour queries. The authors have designed the suggested algorithm so that it: 1) limits the query processing on the basis of previous results of the queries (only the queries the results of which are under the influence of moving objects over which the query is executed are re-valORIZED), 2) enables scalability in relation to the number of objects found moving and over which queries are performed and the number of continuous k nearest neighbour queries. The novelty, in relation to the previously mentioned papers, the authors introduce in their concept is the shared execution of several queries. The novelty implies that all simultaneous continuous queries along with the associated regions of search are grouped in a table of similar queries. In this way the problem of evaluation of a large number of continuous queries is narrowed down to a problem of spatial association of operations between the table of queries and the set of moving objects (table of objects). By combining limitation of the search during the queries' execution and shared execution of the queries, the authors claim that both efficacy and scalability of the proposed algorithm are achieved.

2.4 The queries with multiple predicates

Judging by the references and the mentioned approaches and algorithms, most of the researches in the domain of spatio-temporal databases dedicated to continuous queries’ processing, are mainly focused on solving the problem of processing single spatio-temporal queries or problem of shared execution of several continuous queries. In both cases it is about the continuous queries that contain one predicate (Eng. single predicate). The predicate can relate to a certain range that is region, k nearest neighbour, or any other predicate of spatio-temporal type. The area to which somewhat less attention has been paid regarding the continuous spatio-temporal queries is the domain of queries that can have several predicates (multi-predicate spatio-temporal queries).

We will give two examples of the queries with multiple predicates.

a) The query set up by a driver of a car moving along a highway, in which the nearest hotel to the current position of the driver is searched for. Naturally, the driver does not want to go back, but he/she is looking for a hotel on the road ahead. In this case, a continuous query is needed which is the nearest hotel (predicate k nearest neighbour) in the region on the road ahead of the driver’s current position (accurate region predicate).

b) The police surveillance of a city – searching through all the areas of the city in any time interval in order to ascertain in which region of the city in a specific moment of time there is a greater number of suspects than the number of orderly policemen. This query would require the review of the policemen and suspects in every region (two predicates and valid region), computation of number of both groups according to the city’s sections and then determination of the region in which greater number of suspects than of the policemen is found. Thereat, one should have in mind that both the policemen and the suspects can be found in intermittent moving.
The author (Elmongui, 2009) in the paper is trying to answer the problem of optimization of multi-predicate spatio-temporal queries. The contribution given from the aspect of overcoming the barriers related to the influence of time, space and combination of the two parameters on the optimization of queries executed under various conditions, as well as from the aspect of distribution of the objects moving over time.

Relying on the paper (Güting, et al., 2000), and on the suggested model of complex spatio-temporal queries, the authors (Hadjieleftheriou, Kollios, Bakalov, & Tsotras, 2005) suggest an introduction of a new type of spatio-temporal queries called Spatio-temporal Pattern Queries (STPQ), representing a sequence of various spatial queries depending on temporal predicate. Such presented queries can contain any spatial predicate (k nearest neighbour, valid region and other) where each such predicate is related to precisely determined time constant (time interval or specific point in time).

According to the mentioned references, the challenges which with the researchers in the field of spatio-temporal queries are facing relate to the optimization of multi-predicate continuous spatio-temporal queries. Several authors indicate the problem of lack of appropriate operators of queries that would give satisfactory answers to the queries with optimum time of the query processing. Multi-predicate queries require special handling since they cannot be efficiently answered by simple accordance of the existing operators (such as are the operators of determining differences and similarities among data) one above the other in order to create a sequence of the operators.

2.5 Temporal parameterization in spatio-temporal queries

Another challenge accentuated in the papers is distribution of moving objects changing over time. For example, in the period from 7 am to 2 pm the number of cars increases in central parts of the city areas. During the night, this number drastically decreases, that is, a great number of cars- the objects moving in the time span from 7 am to 2 pm are now parked, meaning that the number of the objects satisfying DSMS queries is significantly minor.

The distribution problem, in general, can be observed as a continuous multi-predicate query searching through a set of data changing in spatial and/or temporal aspect, in relation to the focused information that also changes in relation to time/space. We will illustrate it: Let’s say that a continuous query is directed from the moving police car for three nearest police cars in certain areas of the city through which the car is moving. Depending on the current position of the police car from which the request is directed (the focused object), the response to the continuous query will be changing. Even though the focused object is static, other police cars change positions during the query execution and thereby automatically the responses to the query are changing.

A system for managing the distribution streams of data for moving objects, PLACE*, suggested by (Xiong, Elmongui, Chai, & Aref, 2007) supports continuous spatio-temporal queries through a newly created model of queries QTP – Query-Track-Participate. More precisely, the authors suggest an algorithm for processing of continuous queries over mutually connected data streams that are changing dynamically.

The requests for constant updating and evaluation of queries and responses to the continuous queries have thus been caused by the dynamic environment and periodic or constant changes under the query conditions or the database contents. These requests are especially expressed in the field of the Internet technologies, mobile communications and weather forecasts. The authors (Tao & Papadias, 2002) suggest a new concept of temporally determined queries. TP queries (time-parameterized) as the authors named them, as the result return 1) the actual result in the moment of time when the query is set, 2) the period of validity of the queries’ results period depending on the dynamic environment and 3) the change caused by the results’ obsolescence.

Although the new concept of temporally determined query and technique of transformation of the most frequent spatial queries into their TP match, the issues of implementations of these temporally determined queries on other types of queries remain opened.

3. CONCLUSION

Major subjects the paper is dealing with relate to studying of the problems in the area of spatio-temporal databases. In the paper we have tried to briefly deal with:

- The structure and presentation of spatial, temporal and spatio-temporal aspects of databases as well as the types of data managed by the databases.
- The aspects of modeling of spatio-temporal databases.
- The designing and processing of the queries caracteristical for the spatio-temporal databases.
- The problems of modeling different one-predicate and multi-predicate continuous spatio-temporal queries.

The review of the research papers offered in this paper has not comprised numerous researches related to studying the modeling of spatio-temporal relations, an architecture of the system for managing spatio-temporal databases, methods for storing data streams, techniques of indexing, GUI of the spatio-temporal databases, etc. In certain mentioned fields in the past few years an extraordinary drift has been made, whereas certain
aspects, according to the references, have remained insufficiently explored.

References:


1. INTRODUCTION

In today’s world of job seeking one of the most important criteria that employers have is the person’s ability to work in a team, i.e. to be a team player. Although it sounds like an easy thing, not many people are able to function in teams, share knowledge and collaborate with other members of the team without some previous training. As it turns out, the educational system in Serbia has not devoted much attention to the development of this particular skill and has not found many ways to foster it among students. Yet, one of the regularly used methods of grading students nowadays is through their pair work or group work on a variety of projects. The question that springs to mind is how students are to learn the way to function in a team, how to share their knowledge, how to share information, etc. The answer lies within the educational system itself – if collaboration is cultivated among students and guided by the teacher, it does have a strong chance of developing into a life-long skill that they will be able to use once they start working.

The advancement and the widespread use of the internet have led to the flourishing of collaboration through a number of different online tools and platforms. Although these tools and platforms have been primarily exploited by the staff for the purposes of sharing resources, they can be just as easily applied in student-teacher collaboration. This is useful on two levels: first, it improves the work on a certain subject because the teacher and students work together in different media with the aim of improving the students’ knowledge in the given subject; second, this enables the students themselves to learn how to collaborate, i.e. share knowledge, resources, and plans. In the field of teaching and learning significant advantages and opportunities can result from a sense of belonging, which in turn is the foundation of any kind of collaboration. It promotes and improves learning and is an important factor in academic achievement, personal development and student satisfaction. This paper focuses on some general principles necessary for the development of e-collaboration among students, attempting to set a practical and applicable framework for future research. It also presents the results of a research conducted with a group of fourth-year students at the Department of English, Faculty of Philosophy in Novi Sad, concerning their collaboration via a Google group set up for the subject Varieties of English.

2. THEORETICAL BACKGROUND

A sense of community, so important in daily life, bears a certain significance in the educational setting as well. Namely, it is associated with “a feeling of belonging to a group (membership), a feeling of influence within the group, fulfillment of needs and a shared emotional connection with other members” (Oliver et al. 2007: 3). In other words, in the field of teaching and learning significant advantages and opportunities can result from this sense of belonging, which in turn is the foundation of any kind of collaboration. It promotes and improves learning, and is an important factor in academic
achievesment, personal development and student satisfaction.

Edwards et al. (2007: 27) define a collaborative setting as a place “where learners can validate their perspectives through social negotiation and interaction with an authentic task.” In addition, Hara (2003: 953) summarizes collaboration as “working together for a common goal and sharing of knowledge”, whereas Weiseth et al. (2006: 40) propose that “collaboration takes place when two or more people communicate and interact to reach a goal”. What all these definitions have in common is a certain sense of purpose which is embodied in the goal or task that learners are to perform, as well as the social side of the collaboration, which by default includes more than one person. There are also authors who stress the inquisitive side of collaboration, whereby it promotes, stimulates and motivates learning due to the fact that interpersonal relationships are built, strengthened and deepened.

Johnson and Johnson (1996) assert that in a face-to-face environment collaborative learning encompasses several different types of behaviour:

- seeking and receiving help, advice and feedback
- exchanging resources and information
- sharing knowledge
- challenging others’ contributions
- monitoring the efforts and contributions of others
- and engaging in small group interaction.

All of these types of behaviour can also be observed in online settings, where collaboration has found a natural way to get extended and enhanced. Hence, learning collaborations between students tend to move online, where they use discussion forums, perform online group assignments and work on virtual team projects, as part of the modern academic study environment (Oliver et al. 2007).

Just like offline, communication is a critical component of online collaboration, according to Garrison (2006: 25), and must include discourse that is purposeful, threaded and reflective. More precisely, each act of communication happens with a purpose and is usually linked to a previous communicative act, whether it has just taken place or did some time in the past. Furthermore, in order for this communicative act to make sense, it must be thought through by the communicator, i.e. he/she must reflect on the consequences of their words.

On the other hand, online learning has advantages when compared to face-to-face settings in terms of supporting collaboration and creating a sense of community. Firstly, it provides more opportunities for reflection and dialogue compared to a fast and free-flowing face-to-face environment, simply because of the differences in the synchronicity of communication (synchronous face-to-face communication which requires an immediate response as opposed to the asynchronous online communication which allows for a certain degree of planning and structuring of a response). Secondly, online interactions are “group centred”, not “authority centred”, because they build on previous contributions which are readily available on the platform used for e-collaboration, while face-to-face interactions are usually structured in turns (Garrison 2006).

Technology here functions as an enabler of collaboration since students and their teachers heavily rely on IT resources. Wang (2007: 282-283) claims that the internet has strong potential for promoting collaboration and that the World Wide Web can “be a place for faculty to invite students to collaborate and innovate.” Kock (2007: 5-6) lists six crucial elements of e-collaboration:

- the collaborative task that the students are supposed to tackle;
- the e-collaboration technology that is used in the task;
- the individuals involved in the collaborative task (just students or students and teachers);
- the mental schemas possessed by the individuals, which refers to their previous knowledge and experience, cultural background, etc.;
- the physical environment surrounding the individuals, i.e. the possibilities of engaging in e-collaboration in terms of equipment that is made available to them;
- the social environment surrounding the individuals.

The primary aim of e-collaborations is the promotion of higher-level learning outcomes through student knowledge construction, and the improvement of the quality of student learning experiences. However, open-ended ongoing collaborations are also valid goals, with knowledge sharing, community building and socialization of new members into the culture and work ethics of a particular community. In other words, it is not only important for students to perform a task collaborating with their peers online, but also to learn how to do it, to feel at home with it and to turn it into their daily practice.

3. TYPES OF E-COLLABORATION

There are several taxonomies which classify e-collaborations. The first one offered by Rich et al. (2000) and Bos and Zimmerman (2007) relies on the types of participants, so there can be found five broad categories: interactions between students, interactions between staff, collaborative development of teaching resources, databases and information centres, and joint delivery of courses and programmes. Of all of these, we are here primarily interested in the third category, collaborative...
development of teaching resources, because it improves the exchange of knowledge regarding certain academic subjects. Another taxonomy of e-collaborations based on types of participants is found in Thagard (1997: 245-246), where the following categories are named: employer/employee, teacher/apprentice, peer-similar and peer-different collaborations. Again, we are interested only in some of these, since other obviously take into account work settings as well.

E-collaborations are also categorized in terms of the location of participants and institutional structures. Akkerman (2006: 27) suggests five levels of collaborative activity: the core group level (the focus of this paper), department level, faculty level, national level and international level. It is clear that as the level of the activity rises, it becomes more complex to organize and coordinate it.

Furthermore, there can be direct or indirect e-collaborations (Borgman 2006: 359): the former occur when participants work together on research projects, whereas the latter occur when the members of the teaching staff contribute to teaching resources, concepts and relationships, or even research data. Finally, e-collaborative groups can be distinguished on the basis of duration and purpose (Johnson et al. 1991). There can be formal learning groups that last from one class to several weeks and are set up to complete a task or assignment, with the purpose to accomplish a goal together and explore talents of different students thus maximizing the learning process and experience for every member of the group. There can also be informal learning groups which last for only one class, with the purpose of ensuring active learning of all members of the group. Especially beneficial is the first category because it includes long-term groups with stable memberships, which resemble learning communities. “Their purpose is to provide support and encouragement and to help students feel connected to a community of learners” (Barkley et al. 2005: 8).

4. FACTORS THAT INFLUENCE THE SUCCESS OF E-COLLABORATION

E-collaborations can be implemented in the educational practice of different systems with varying success. While some are more open to such types of cooperation, others may exhibit a certain degree of technophobia and mistrust towards online resources. This suggests that the success of e-collaboration in great part depends on the cultural and sociohistorical background in which it is to take place.

For collaborative learning to happen, the following conditions have to be met: students have a common goal, share responsibilities, are mutually dependent and need to reach agreement through open interaction (Oliver et al. 2007: 2). Simple as they may seem, these conditions require a lot of effort on the side of the students because they imply a clear awareness of the common good, interdependency and the need for cooperation, which in individualistic cultures may sometimes pose a problem.

In addition, other factors influence the success of e-collaboration. Olson (2008: 1-3) lists the following components: the nature of the work, the amount of common ground among participants, their readiness to collaborate, their management style and leadership, and technology readiness. It is again obvious that a certain degree of awareness of the benefits of online resources is necessary for e-collaboration to succeed and this is something that can be built among students gradually and over time.

Finally, Olson and Olson (2000) and Walsh and Maloney (2007) claim that distance can also be a factor that inhibits e-collaboration. The implication is that students involved in the process of e-collaboration must have a certain number of face-to-face meetings where they can establish a common ground and perhaps solve some misunderstandings, as well as build relationships that are missing in the pure online communication. The obvious lack of non-verbal communication may hinder the efficient exchange of ideas and that is often solved through several face-to-face encounters. The lack of non-verbal cues, as well as a degree of technophobia, are possible sources of stress, which also poses a problem for e-collaboration (Allan and Lawless 2003). The teacher’s role in this case is crucial as he/she may guide the students through periods of anxiety and stress with advice, instructions, a helping hand and a sympathetic ear. When students are engaged in the process of e-collaboration, the presence of the teacher the form of course design, facilitation of discourse and direct instruction is critical for ensuring the success of this whole process (Garrison 2006).

It is important to stress that collaborative approach is not necessarily an optimal approach to all academic work because not all types of e-collaboration are appropriate for all learning contexts. Toomela (2007: 202) distinguishes between unidirectional or dialogical collaborations:

- unidirectional collaborations imply that the goals, questions and the selection of relevant information is done by one person, who benefits from the knowledge provided by others, so the product of collaboration depends on one person;
- in dialogical collaborations, team members work together, they make choices as a team and as a team share a common understanding about the task, so the product of such collaboration is collective creation.

5. RESEARCH: RESULTS AND DISCUSSION

In order to see how well prepared and willing part of the student population is in terms of e-collaboration, a
Research was conducted among fourth-year students at the Department of English, Faculty of Philosophy in Novi Sad, concerning their collaboration via a Google group set up specially for the subject Varieties of English. The research included 35 students who were using this Google group for the duration of four months. A formal questionnaire with eight questions was used in order to investigate how and why the students exploited the potentials of the Google group, with the aim of establishing to what extent they were ready for e-collaboration and how they viewed their contribution to this kind of a learning environment.

The first question was primarily diagnostic and aimed to ascertain the percentage of students who became members of the group, as it was an optional thing for them. The results indicate that all students who did the questionnaire were members of the Google group. This may indicate a large potential for e-collaboration since the number of students involved in this kind of knowledge exchange is fairly large (N=35), but the remaining questions will reveal if this presupposition is correct.

The second question intended to discover the frequency of the Google group viewing and the options were: once a day, several times a week, once a week, rarely, and never. The students’ answers to this question can be seen in Image 1 below:

![Image 1](image1.png)

Image 1. The frequency of viewing the Google group (1 – once a day, 2 – several times a week, 3 – once a week, 4 – rarely, 5 – never)

The third question that was posed to students inquired if they followed discussions that were started on the Google group (Image 2). The majority of students replied that they did (answer 1), whereas one fifth of students replied they did not follow group discussions (answer 2).

![Image 2](image2.png)

Image 2. Percentage of students who followed group discussions (1 – yes, 2 – no)

The fourth question was tightly connected with the previous one as it investigated if students started any discussions on their own (Image 3). On the basis of the answers, it might be possible to conclude that students felt very uncollaborative (no – 100%), but when responding to this question, they did not take into consideration the fact that even asking a question may be considered group participation and a start of a discussion. It is, therefore, not entirely true that students did not participate in the work of the Google group.

![Image 3](image3.png)

Image 3. Percentage of students who started group discussions (1 – yes, 2 – no)

The fifth question was concerned with the very practical side of the Google group – the downloading of class material. A vast majority of students responded affirmatively to this question, whereas almost 6% said they did not download any material from the Google group (Image 4). This is a surprising fact, because one of the primary reasons for setting up this kind of a platform was to accelerate material dissemination on the side of the teacher and enable easier material sharing among students.

![Image 4](image4.png)
The sixth question inquired on the type of the downloaded material and primarily served to the teacher as an indicator of the most useful and most wanted types of material (Image 5). It can be seen from the chart that the most popular materials were the ones tightly connected with the course (lectures and exercises), but many students showed interest in additional materials as well.

Image 5. Types of material downloaded from the Google group (1 – lectures, 2 – class presentations, 3 – exercise handouts, 4 – additional material).

Question 7 aimed to establish if students found this kind of communication helpful, which the majority did (Image 6). The minority of students who did not think this was a good way of collaborating and communicating wrote additional comments saying that the same thing would be accomplished with a blog, although that was essentially not true (blogs do not offer the option of file sharing and direct download). This is actually indicative of the fact that these students belonged to that small percentage who rarely or never viewed the Google group (see Image 1).

Image 6. Percentage of students who found this kind of communication helpful (1 – yes, 2 – no)

The last question in the questionnaire intended to discover the perceived correlation between group participation and collaboration on the one hand and students’ success in the subject Varieties of English (Image 7). Again, the majority of students thought that the use of the Google group helped them in taking the mentioned course, while a small percentage did not have this opinion for the reasons already mentioned.

Image 7. Percentage of students who thought that the use of the Google group helped them in taking the course in Varieties of English (1 – yes, 2 – no)

The overall results of the questionnaire are fairly predictable – they show a high degree of passive participation, which is seen in material download and relatively high viewing percentages, but there is very little active participation and collaboration. This seems to be an expected result largely stemming from the educational system in Serbia, where knowledge sharing is in no way encouraged. On the other hand, many future employers will ask these students to show a certain competence in team work and collaboration, so it is high time they learned how to work together and how to recognize the potentials at hand.

6. CONCLUSION

We primarily have to bear in mind that e-collaboration is not always more efficient than individual work and “sometimes it may even be less productive” (Toomela
There have been studies that show that brainstorming in a group is less productive for creating new ideas than working alone, probably because some individuals do not feel the amount of freedom necessary for self-expression. Furthermore, some students tend to contribute less when working in a group, either because they do not feel comfortable sharing their ideas with others or simply because, due to the lack of monitoring, take advantage of the work of others. Finally, cultural differences may result in inefficient group work because some students’ cultural background will disallow them to participate equally.

With regards to technology, Wang (2007: 286) lists problems like extra time required to facilitate chat discussion, difficulties some academic staff and students may have with technology and the lack of available time to practice using the technology.

As for the positive sides, it is worth noting that e-collaboration among students promotes higher-level learning outcomes, through the development of argumentation skills, which are crucial in the academic life. Learning collaborations are usually more process focused because they help create learning communities, improve the quality of learning, and provide opportunities for deep learning. All in all, the development of virtual learning communities is considered to be a worthwhile long-term goal of educational collaborations as that prepares students for team work in their future professional life.

References:


COPYRIGHT PROTECTION OF DIGITAL CONTENTS

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Abstract: Digital revolution, which has enabled the users to use digital content in a completely new way, as well as the very nature of digital content, which enables their copying and distribution in a simple and cheap way, have contributed that controlling the distribution of those contents is rather difficult, and copyright protection of publisher, producer and other carriers of those rights has become a special problem.

A special form of copyright infringement is software piracy, about which there are diametrically opposite attitudes in professional circles, as well as in legal interpretation and practical behaviour of some institutions and states.

In this paper, we have given current definitions of digital rights management system, as well as a brief historical overview of the systems used in different fields of distribution of digital contents (music, film, computer software etc.).

Some legal solutions which regulate this field, both in the world and in Serbia, are described, and also, in that context, the attitudes of opponents to the application of these systems.

Analysis of the existing state points to the need of creating such a concept of the digital rights management system, which could protect economic interests of their carriers, and which could simultaneously be simple for use and it wouldn’t impair consumer rights of users of those contents. In that sense, possible approaches are presented in defining the architecture of such systems are presented in the paper.

Keywords: copyright, intellectual property, digital content, digital rights management

1. INTRODUCTION

Digital rights management (DRM) is a term that is used to describe technologies of access control, which are used by the companies such as Sony, Amazon, Apple Inc., Microsoft, AOL and BBC, as well as other producers, publishers, carriers of copyright and individuals, in order to limit the unauthorized in a way and to control the allowed use of digital content. DRM implies all the methods of controlling the access to protected digital content, by using modern technologies. Basically, control of using that content is, instead of the hands of its owner, author or publisher, entrusted to particular software. Various methods are used, depending on whether it is about video or music content, text documents, plain messages of electronic mail, or any other sensitive digital contents, which should be protected against unauthorized use.

Although many believe that DRM methods, particularly those that are applicable in film and music industry, Iako mnogi korisnici DRM metode, are too restrictive, it is actually attempted to solve one legal problem through them – copyright protection, which is significantly impaired lately by unauthorized distribution of digital contents via Internet. Any download of MP3 music of film, from one of so-called P2P (peer-to-peer) networks, implies the loss for their authors and distributors. Some estimations point out that, in film industry only, it brings a loss of almost 5 billion dollars per a year.

Due to the nature of Internet, it is not practical to take legal action against everyone who breaks the law in that way, even the authors and distributors can only attempt to prevent unauthorized copying of their work in digital format, through particular technological solutions.

According to that, a special problem is the requirement to enable the legal users (or buyers) of those digital contents to make copies for their own needs, which is the essence of doctrine of „fair use“, specific for regulations on copyright protection. However, this doctrine is difficult to implement by DRM methods, because computer programme can hardly determine what „fair use“ is.

It is relatively simple to make a system that will be able to control user rights such as „2 copies are allowed“, because computer can understand what is number 2, but it cannot understand statements such as “I have copied the content to my laptop and MP3 player, and now I have a new computer to which I should copy it again”. Conditions of “fair use” cannot be digitalized easily. In
order to protect their rights, many companies have eliminated any possibility for the user to decide on rights of delivered content.

DRM technologies attempt to control the use of digital media content by preventing the end users from unauthorized use, copy or converting those contents in other format. In a way, it is copyright protection, known even before the appearance of digital media, which gains in importance by development of technology, because the ways of impairing these rights become simpler (from copier machine, tape recorder, cassette player, VCRs to PCRs). Arrival of digital media and technologies of analog-digital conversion, with mass use of PCs, has made real panic in film and music industry, whose incomes were the most jeopardized. Namely, while the contents on analog media as a rule lose in the quality by copying, that is not the case with contents on digital media. Possibilities of personal computers, with the appearance of Internet and tools for exchanging the data on Internet, have significantly facilitated unauthorized distribution by copyright protected digital contents – which many people refer to as digital piracy.

DRM technologies have precisely appeared with the attempt to prevent digital piracy, but also they have prevented the normal use (fair use) of the protected, or even non-protected digital content.

The aim of this paper is to provide a broader insight into current situation in this field, as well as to point to possible directions of further development of DRM system.

2. LEGISLATION

The application of DRM system has encountered opposite reactions from the beginning. On one hand, there are companies, producers and distributors, they protect intellectual property and, finally, their incomes. Digital protection is, according to them, necessary for preventing the theft of intellectual property, such as physical protection (locks) necessary to protect individual property. On the other hand, the opponents of DRM-(Free Software Foundation, Electronic Frontier Foundation) claim that innovativeness and free competition are thus eliminated and that digital protections, which are used in DRM, can limit the users and when it comes to quite legal activities, such as copying CD or DVD for your own needs, renting the material in libraries, or using that material in scientific research and education. According to them, carriers of copyright limit the use of digital content in a way that is not in accordance with copyright law in other fields. They claim that the user is the one that should be protected by law because, prepared in this way, DRM is not an acronym for digital rights management, but for digital restrictions management [1].

DRM systems have obtained a certain legal support in a several international acts. The first one was WIPO Copyright Treaty (WCT) from 1996, which was accepted by majority of countries, members of international organization for intellectual property World Intellectual Property Organization, whose Article 11 requires from all national organizations to bring laws against the attempts to circumvent DRM system [2].

In the USA, it is done through Digital Millennium Copyright Act (DMCA), while in Europe this agreement is embedded in European directive on copyright, from 2001, which requires from member countries of EU to introduce legal protection of preventive technical protection measures (i.e. DRM).

DMCA is a supplement to U.S. Copyright Law, according to which production and spreading the technologies that enable the users to avoid technical measures for limiting the copying, with main goal of impairing copyright of their legitimate carriers are considered illegal. In addition, the emphasis is put on intentions, i.e. goals of possible offender. This has opened many discussions, since, for example, any reverse engineering (decryption of DRM system), has been done in order to achieve interoperability between commercial and so-called open operative systems, allowed by this act, but further distribution of that software for decryption that could enable the others to violate copyright is not allowed [3].

DMCA has appeared to be rather inefficient, when it comes to the protection of DRM system [4], but it had negative impact on development of cryptography, for the fear of researcher so that some of its provisions could be violated in particular cryptoanalysis. For example, based on this act, one Russian programmer was arrested in USA in 2001 and he has spent a few months in prison, after the presentation of one programme for decryption of electronic books, on the conference DEFCON in Las Vegas. The application of this act has particularly encountered the resistance of students who have dealt with cryptoanalysis, as well as consultants in the field of computer security. Dutch expert, Niels Ferguson, has refused to publish the information on vulnerability of one Intel system, fearing that, based on DMCA, he could be arrested when he travels to USA.

In April 2007, European Parliament has supported EU directive from 2001 [5], in order to harmonize criminal laws in EU member countries, by which they were obliged to punish, through fines and prison – depending on the seriousness of the offense, any violation of intellectual property, done for commercial reasons. This means that copying from non-commercial reasons and for personal needs is excluded from this directive.

European international project INDICARE, as well as FP6 project AXMEDIS, has dealt with these problems,
particularly from the aspect of finding the possibilities to satisfy different interests of DRM system users [6,7].

On one hand, big film, music and software companies attempt to prevent millions of users of different torrent applications to exchange and share contents via Internet, because a great part of those contents are pirated copies. On the other hand, Internet users oppose and seek for more flexible regulations that will be in accordance with libertarian nature of Internet.

Thus, in February 2008, Pirate Party of Serbia (PPS), as one of some forty “sisters” of Pirate Party International (PPI), of which twenty were officially registered in their countries and which has even one representative in European Parliament, one in Parliament of Tunisia and a series of representatives in government or local level in various European countries. This international movement, whose aim is to connect and promote pirate parties throughout the world, seeks for the reform of laws that concern copyright, bigger right to privacy on the Internet and in real life, as well as transparency of activities of state administrations [8]. They require a right to “freely and without restrictions communicate via Internet, recommending links for downloading particular contents, just as we have a right to speak about what we want. Exchange of links is not the same as sale of pirated CDs on the street, because nobody gains profit in this way and nobody suffers damage. Arrest and punishments for data exchange on the Internet represent the repression and destruction of basic values of modern society”.

Exchange of content by using P2P (peer to peer) networking is not regulated in a unique way in European Union as well, and it makes the progress of technology of some directive adopted 10 years before obsolete. In that way, for example, in Russia, downloading of films and music for „home use“ is free, in Canada and the Netherlands it refers to music only, and in France Internet provider has a right to disconnect the user, from whom it is determined that he is engaged in these activities, after two warnings.

In Serbia, these problems are covered by Serbia Criminal Code and Law on Copyright and Related Rights, but the detection of offenders often clashes with the Law on Personal Data Protection [9].

3. CHALLENGES

There are no generally accepted standards for DRM. Many companies from the world of digital entertainment use somewhat more restrictive approach, which does not allow copying, printing, change or sending of digital material to the users. This approach often overcomes the needs of copyright protection and, for that reason, it is subject to challenge of many users, as well as libraries and educational institutions. Libraries can keep software with time-limited key for encryption and they cannot rent the content licensed for a certain computer configuration in the usual way.

Arguments against DRM are possible impairment of users’ privacy, impossibility of making copies for their needs, right of users to resell or give as present the content that he bought, obsolescence of protection after certain period, impossibility of changing the hardware without the impairment of license conditions etc.

According to some, DRM also influences the freedom of speech. The example for this is threat of lawsuits of many companies from music industry to professor Edward Felten from Princeton University, who tried to publish an article on bad DRM systems in 2001, because his studies could enable the users to avoid that protection [10].

There are many organizations, scientists and eminent individuals that are opposed to DRM application, such as co-founder of Autodesk, John Walker [11], founder of free software movement Richard Stallman [12], and professor Ross Anderson from Cambridge University, who leads British organization that confronts DRM initiatives in UK and broader. Even Bill Gates had objections to DRM, because, according to him, it does not do the job right and causes more problems with legal users [13].

Organizations such as Electronic Frontier Foundation, Free Software Foundation and similar organizations are among the most exposed opponents of DRM. Final version of GNU General Public License, version 3, issued by Free Software Foundation, enables the avoiding of DRM, without violating the provisions of DMCA. In May 2006, FSF has started a campaign against DRM, named "Defective by Design" [14,15].

Association for Computing Machinery (ACM) and Institute of Electrical and Electronics Engineers (IEEE) are also opponents of DRM.

Main arguments of opponents are the fact that in all DRM systems much greater significance is given to prohibitions rather than rights of users, i.e. that their functioning is opposed to the rights of consumers, that they violate the rights to dispose with private property and that they limit legal activities of users, limiting the functioning of their devices for reproduction, based on the type of content that is reproduced on them [16].

Disabling the making of personal or library copies, borrowing to friends or even inheritance, are only some of the arguments against DRM.

Expert for computer security Bruce Schneier refers to the intention of entertainment industry to preserve its existing business by preventing copying as an impossible undertaking, destined to fail. The attempts of making
digital files that cannot be copied is as „making the water that is not wet“ [17].

Precisely due to the objections mentioned, many companies and performers in entertainment industry have stopped using DRM systems and they even began to advertise their products as “DRM-Free”.

From previous analysis, it can be seen that application and respecting the laws and regulations that refer to DRM is not a simple thing, and contractual relationships between seller and user can rapidly and easily be defined, so that the user also finds it difficult to determine the moment in which the laws are violated. For example, whether the offense is burning a music CD, lending a purchased or burned CD to a friend, its resale, etc. that is one of the reasons for which millions of Internet users in a way violate laws on copyright, only through exchanging the music, on daily basis.

Sometimes the violation of copyright, especially when it comes to copying the software, is beneficial for the producer of that software, due to the expansion of customer base and small real losses.

For that reason, problem of copyright protection, especially when distribution of music contents via Internet is in question, in addition to the application of different protection systems, has also led to the need for changing the business of publishing companies and online stores.

One of the ways is providing easy and cheap takeover, because many non-commercial sites for download of music are complex for use, slow and they are nurseries of malicious programmes that are obtained in package with desired music content. If all the songs are available on one technically correct site, by reasonable prices, we can expect that users will prefer it than site with free music, but illegal, slow and full of viruses.

Free download of music on the Internet is also provided by numerous performers in order to draw attention to new releases and their purchase, to eliminate intermediaries in sale, or promote concert activities, by which they can compensate for losses occurred by free distribution of music. Certainly, publishing houses, which base their profit on album sale, are not big supporters of such business model.

4. FIELDS OF APPLICATION

Development and application of particular DRM technologies have greatly depended on the field in which the control of the use of digital content was necessary. DRM was most frequently used in entertainment industry (music, film, television), and lately, in software industry as well.

DRM, when it comes to prohibition of copying, is not a new concept (specially protected floppy or compact discs, hardware accessories – hardlock, without which the content would be unusable etc., exist for a long time), so modern DRM systems should offer some other possibilities and provide stronger connection between publisher and user, in addition to copying.

Usual DRM techniques are restrictive license contracts (by which the use or takeover of digital content from particular sites is conditioned) and encryption (by which we control the approach and reproduction of digital contents, including making reserve copies for own needs) [18].

One of the earliest implementations of DRM was Software Service System (SSS), designed by Japanese engineer Ryoichi Mori, 1983, later further developed under the name superdistribution. SSS was based on encryption of content, with the use of specialized hardware for decryption and with possibility of paying the carrier of the right. Main principle of this system is limited distribution of encrypted digital contents [19].

Film

One of the first examples of DRM system was Content Scrambling System (CSS) developed in 1996 by DVD Forum for films on DVD media. CSS used a simple algorithm for encryption and demanded from the manufacturer of reproduction device to sign license contract, which limits the possibilities of those devices that would allow making digital copies. However, by the appearance of DeCSS programme in 1999, we have provided the reproduction of CSS encrypted DVD films on computers that have used Linux platform.

Microsoft has installed DRM system in its Windows platform, called Protected Media Path, which contains Protected Video Path (PVP). PVP attempts to prevent the DRM-protected content from reproduction, but simultaneously some software of unknown origin is performed, which could access the content. In addition, PVP can encrypt the information during their transmission from monitor to graphics card, which makes unauthorized copying (burning) even more difficult.

Advanced Access Content System (AACS) is a DRM system for HD DVD and Blue-ray discs, developed by AACS Licensing Administrator (AACS LA) consortium that consists of Disney, Intel, Microsoft, Matsushita (Panasonic), Warner Brothers, IBM, Toshiba and Sony. In December 2006, hackers have posted the encryption key on teh Internet, thus providing the unlimited access to AACS protected HD DVD content. This was followed by change of keys by AACS, but they were some cracked also [20].
Some DRM solutions, in DVD protection, use the weaknesses of software for „burning“ in order to prevent the copying of discs. Small programme code is burned to DVD, which, by using observed deficiencies of DeCSS code on which majority of programmes for copying are based, stops the copying process. of course, this protection is not efficient of software for copying is not based on DeCSS. Although Digital Millennium Copyright Act from 1998, in USA prohibits the disabling of DRM system functioning, thousands of people actively do it and publish methods by which they achieve it.

According to this act, the creation, ordering or downloading any product that allows the circumvention of DRM restrictions. Different associations for protection of consumers require the amendment of this act, because, in their opinion, it gives an incorrect advantage to carriers of the right, since it does not limit them in any way in application of any DRM system.

TV

In the USA, CableCard standard was used by providers of cable TV, in order to enable the access to particular channels, only to subscribed users [21].

Concept broadcast flag was developed by Fox Broadcasting in 2001 and supported by Motion Picture Association of America (MPAA) and Federal Communications Commission (FCC). After many challenges, especially because of the problem that it caused to users who wanted to record the contents in order to watch them when it suits them more, it was successfully applied only when it was accepted by Digital Video Broadcasting Project consortium (DVB), which consisted of 250 stations, manufacturers, network providers, software companies and regulatory bodies from 35 countries, with the attempt to create new standards for digital television. In Europe in 2007, a variant of this solution was developed - Content Protection and Copy Management (DVB-CPCM), which controls the use of protected material, as the majority of DRM solutions, by the instructions of the owner of rights over that material. Although it normatively came to life as standard (ETSI TS 102 825-X), there is still no full implementation by manufacturer of device (because nobody gives the certificates) [22].

Music

Discs that have used some of DRM systems could not be played on all CD players, or computers, by which the standard for audio discs wasn’t satisfied (known as Red Book standard).

Sony BMG has announced new DRM system in 2005, which has installed DRM software on computer of the user without any announcement or permission, and which has, among other things, also contained a hidden programme, known as rootkit, which provides a privileged access to computer resources, thus making that computer sensitive to possible malicious attacks. After the great storm that was raised in this occasion, and due to poor efficiency of this system, Sony was forced to definitely withdraw this solution [23].

In January 2007, company EMI has stopped issuing audio discs for DRM, because it was estimated that costs of applying DRM are not followed by appropriate results, and their example was followed by another four music publishers [24].

Internet music

Many online music stores use some form of DRM in order to limit the use of ordered and downloaded music from the Internet in a way.

Until 2009, Apple’s and iTunes Store have used FairPlay DRM system for distribution of music content, and later because of competition they have abandon it and kept only for distribution of video contents and software applications.

Napster music store offers DRM system that is based on subscription, so that subscribers can download unlimited amount of music in Windows Media Audio (WMA) format. When subscription expires, all downloaded music becomes unusable, until the subscription is renewed. The use of downloaded music on portable devices is especially charged, or the possibility of recording (burning) on CD. Devices that can play music downloaded from Napster carry Microsoft PlaysForSure logo (which iPod players and Zune players from Microsoft do not have). Since June 2009, Napster also gives music in MP3 format, without limits, which can be listened on iPhone and iPod.

Wal-Mart Music Downloads, online music store, charges $0.94 per a song for each download, where the reproduction is possible on each Windows PlaysForSure marked product, having in mind that in case of some MP3 players, the content has to be recorded in internal memory and it cannot be played via SD card.

Sony has used own DRM system OpenMG, in its store "Connect", which allowed playing the content only on computers with MS Windows operating system and Sony hardware (including Playstation and some Sony Ericsson telephones).

Kazaa offers subscription system, and downloaded music contents can be reproduced only on devices that own Windows Media Player, for as long as the user is subscribed to this service.

These different services are not interoperable, even if they use DRM systems. Almost all of them require
downloading some client software, or plug-in, small software component that increases the possibilities of a bigger software application. There are a few of them compatible to one of the mostly used portable music players - Apple iPod.

Although DRM prevails when it comes to Internet music, some online shops (Amazon, eMusic etc) do not use it, although they are against free sharing of music among users. And some sellers even encourage their buyers to share downloaded music among themselves, so that popularity of performers could be increased. Increasing number of publishers give up on DRM when it comes to online distributions, because they realize that they cannot have complete control over entire music market and they decide for selling the music that could be played on any other digital audio player. That is precisely what eMusic does and that has brought it second position in the market, right behind iTunes [25].

In his open letter, Steve Jobs has called music industry to eliminate DRM, and Musicload.de, one of the biggest European online music sellers, has declared himself against DRM in 2007, because service for customers support spend three quarters of its time on solving the problems related to DRM [26].

Computer games

Computer games sometimes use DRM in order to limit the number of systems on which that game can be installed, requiring the authentication via online server. Most games allow three to five installations, which can be a problem if the user changes the computer, or some part of the computer, or reinstall operating system, because game can become unusable after a certain number of installations, even if it is used by one user on one computer. The consequences of this, most frequently, are the use of pirated copies.

Many game manufacturers are trying to use some kind of online DRM (for example, SecuROM), in a way that user during the game needs to gradually download further parts of the game from the server of manufacturer. However, those servers are particularly exposed to hacker attacks (examples Ubisoft Uplay server in March 2010 and Sony PSP server in April 2011).

E-books

E-books that are read on computer or a special reader, use DRM in order to constrain the possibilities of copying, printing and sharing those editions. There are four main formats of electronic books. Those are PDF, Mobipocket, Topaz and ePub. Some devices support several formats (Amazon Kindle), and some only ePub format, using thus different DRM schemes (Adobe's Adept DRM, Apple's Fairplay DRM, Barnes & Noble's, Amazon's DRM).

Reading e-books is provided by two programmes Adobe Reader and Microsoft Reader, each with his version of DRM. In case of Adobe system, depending on the type of e-book, the user (doesn't) have particular functions at disposal (print, copy, paste), which is explained to him at the beginning of reading. Level of constraints is determined by publisher or seller.

Microsoft Reader, which reads e-books in .lit format, uses three levels of access control: sealed e-books (the smallest limitations, the change of content is the only thing that is prohibited), inscribed e-books (prevents further distribution of the book by installing ID tag by which the first owner is identified) and owner exclusive e-books (the most restrictive – which allows reading the book only on computer by which it was downloaded, with the prohibition of copying and distribution) [27].

Amazon had a problem with this type of DRM, which has remotely erased copies of books from users’ Amazon Kindle readers. Although an apology followed, refundation of users and explanation that this has occurred due to the problem with copyright at publishing company that has given online sale to Amazon, this procedure was commented as „orwellian“ (alluding to Orwell’s book „Big Brother“), particularly because two Orwell’s books were in question (“1984” and “Animal Farm”), with requirements for Amazon to abolish DRM [28].

Documents

Enterprise digital rights management (E-DRM or ERM) is the application of DRM technology of access to documents of organization, such as Microsoft Word, PDF and AutoCAD files, e-mail messages, intranet web pages etc., rather than media with contents for end users. E-DRM is frequently called IRM (Information Rights Management), whose basic purpose is prevention of unauthorized use of organizational documents and which is usually integrated with content management software.

Digital watermarks

Somewhat rarely used DRM system is the one that uses digital watermark. Those are actually the data (on copyright owner, distributor or purchaser – buyer), who are invisibly written in audio and video contents on media during production or distribution, by using steganography. Applied in video contents protection, it consists of a small programme code, which is sent along with digital video signal and which „tells“ the recording device that the content is protected, which prevents its recording. This system requires media and devices that can read digital watermark, but the issue of the legality of application is also present, because the court in USA in 2005 has ruled that FCC has no right to decide what can a device of a user do with digital signal when it is delivered.
Watermarks can be used as a part of DRM system, but more in order to prove ownership right, than as means of direct limitation of the use. Some programmes for editing audio and video contents can delete or damage watermarks. In addition, by comparing two separate downloaded, the same audio contents, it is possible to set aside watermark in a relatively simple way.

Sometimes, for example, the name of purchaser, e-mail address etc., are added when downloading certain digital content, not as watermark, installed in that content, but separately as MPEG standard metadata (Apple iTunes Store does this for its DRM-protected and unprotected versions of music and video content).

**Software protection**

There are different opinions regarding the causes of software piracy, but we should certainly take into account the factors such as possibility of easy money, lightheadedness, unfamiliarity (or lack) with the law, and especially lack of perceiving the software as valuable intellectual property. The first two factors are present in all fields of human activity, so the very manufacturers of the software need to eliminate the risk by using particular protection measures, while the last two factors are most frequently the subject of actions of appropriate social and state institutions.

In the future, the issue of software piracy will be affected by an increasing number of installed PCs, growth of the number of rapid Internet connections, growth of local software markets, technology of software protection and local factors, such as culture, political conditions, efficiency of institutions etc.

The distribution of this phenomenon was influenced by certain misapprehensions, such as [9]:

- Copying harms no one
- It is not a theft, unless it creates profit by further distribution
- Company’s costs are reduced in this way
- There is a little chance of criminal responsibility
- Everyone does it, etc.

Even in case of many business people and governments of some countries, software piracy is viewed as an easy way to enter the new global economy, based on new information technologies.

Serbia, where piracy during the 90’s was a way to survive, not only in case of an individual, but also the state as a whole, is an exceptionally appropriate land for development of different pirate activities. According to Microsoft, in Serbia there are 1.2 million computers and every fourth has a licensed operating system, and the number of those that have a legal MS Office package is even lower. According to the data from one of the most famous sites for downloading pirate films http://oneclickmoview.com, on the list of countries from which the greatest number of people visits the site, Serbia with 3.565.158 visits is in the fourth place.

The usual way of protecting the software is encryption and use of encrypted software is a specially delivered decryption key. That key can enable only one-time installation of software, where for all future installation we need to look for compliance, or it can be a permanent key, where it is usually related to ID numbers of elements of computer hardware of a certain computer, so that software wouldn’t be installed in any number of computers.

Some products use the systems of protection against the unauthorized use based on Web. By software installation on a certain computer, we contact the server for verification of licences, in order to obtain the permission (access key) for starting the programme. If it is the first computer that needs the permission for installing the software, server sends the appropriate key, or refuses the request, so the user needs to address the supplier for permission for the installation on the other computer.

Financial effects, i.e. losses that authors, manufacturers, sellers and, indirectly, the states suffer due to software piracy (due to non-payment of taxes), are such (more than 60 billion dollars, at global level in 2007) [29], that DRM solutions have found their last, but strongest foothold precisely in the field of software protection.

**5. ARCHITECTURE OF DRM SYSTEM**

Ideal DRM system is flexible, completely transparent to user, and simultaneously complex software problem. The first generation of DRM software was mostly oriented on safety and encryption as a way of solving problems of unauthorized copying of digital content, while the second generation of DRM, in addition to protection, should also introduce the elements of commercial activities of monitoring and control of users’ behaviour, so that DRM becomes „(all) rights digital management“ not only „digital rights management“.

In designing and application of DRM system, two basic approaches are observed. One is functional approach, which defines modules (components) of the system at the highest level, and the other is information approach, which deals with modelling the entity within DRM system and their mutual connectedness [30].

**5.1. Functional approach**

Entire DRM system can be observed at three levels:

1. Creation of intellectual property (digital content) and defining the type of protection for a particular content,
2. Managing the distribution of protected content,
3. Control of user’s use of the content.

Each of the levels mentioned consists of a series of mutually related modules (Figure 1). At the first level, those are:

- Module for validation of rights – it is provided for the new content to be created based on the existing, in accordance with defined rights,
- Module for creating rights – provides the assignment of certain rights to use the new content (right of owners and right to use),
- Module for verification and approval of certain rights, for the content given.

At the second level, those are:

- Modules for approach to contents in certain repositories and metadatas (Parties, Rights, Works)
- Module with commercial conditions (licenses, payment, configuration of contents etc.).

At the level of use, there are:

- Module for complying the use with rights for a certain content (for example, the viewing of documents is allowed, but printing isn’t)
- Module for monitoring the use – control whether the content is used in accordance with license conditions (for example, 5 initiations of a particular content are allowed). This module needs to be realized with commercial module, if the payment is agreed after the use of a particular content.

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5.2. Information approach

Functional approach presents DRM structure at the most general level. Complex relations among modules and their entities should be modelled more precisely by using information approach, which performs three basic functions:

- Modelling the entity
- Identification and description of entity
- Expression of (license) rights.

In that sense, DRM programme should define well and also describe three basic element – user, content and user rights – as well as relations among them.

Entity of users is unchangeable, while the content, user rights, as well as relations of users to contents and rights, can be changed. DRM system needs to adapt rapidly to teh changes, while working.
Modeling the entities

The most frequently used model is so-called INDECS model (Interoperability of data in e-commerce systems) [32], whose basic principle is a clear delineation and identification of three basic entities – Contents, Users and Rights (Figure 2). Users can be carriers of rights and end users. Content is any type of content, and entity Rights refers to permissions, limitations and obligations between Content and Users. This model provides a great flexibility in assignment of rights for any combination of users and contents and allows the use of content even within business models. It is implied that metadata about all three entities should also contain the mechanisms for their mutual connections.

Entity Content should also be modelled, where we start from basic principle that it contains more „layers“, as a result of its development. Model of international library association (International Federation of Library Associations – IFLA) within Content recognizes layers: work, expression, manifestation and item. Such a model provides a clearer assignment of attributes to information on rights, and on each layer, there can be different rights and carriers of those rights supported (Figure 3).

Work (layer of content that represents clear intellectual or artistic creation) and expression (intellectual or artistic implementation of work) are creative forms of content. Manifestation (digital embodiment of work expression) and item (one example of manifestation) reflect physical or digital form of content.

In any point of this model, it is possible to observe different carriers of rights, and the case when content
consists of several parts is also possible, parts which perhaps assign different rights, which also needs to be taken into consideration.

**Identification and description of entities**

Identification of each entity in the model, as well as metadata on entities, should be performed through open and standard mechanisms. Open standards, such as Uniform Resource Identifiers (URI), Digital Object Identifiers (DOI) and ISO International Standard Textual Work Code (ISTC) are most frequently used standards in identification of entities [30].

Entity Content can be described by some standard metadata for a specific genre. For example, EDIEUR ONIX standard for classical and electronic books, or IMS model (IMS Learning Resource Meta-data Information Model), for particular educational content. It is important that these standards do not introduce new metadatas on rights management, because it could cause confusion. For example, ONIX standard contains elements for defining the number of carriers of rights (authors and publishers), defining the territory on which rights and one element refer to price, which can be a problem if it is necessary to define several prices, depending on the kind of rights agreed.

The most famous standard for describing entity Users is vCard, which describes people and, to a certain degree, the organizations [33].

List of roles, which can take User in relation to Content, can be found in so-called MARC code list [34].

**Expression of rights**

Entity Rights provides defining of permissions, constraints, obligations and other information on Users and Content (Figure 4). These expressions on rights depend on language that is used for that purpose and they can rapidly become very complex, so the understanding of relations among these expressions is also important.

One expression is, for example, that certain video content can be initiated (permission) maximally 10 times (constraint) in the first six months (constraint) at the price of 1000,00 dinars (obligation). Each performance of video content, brings certain percentage from the price to carriers of rights. If the user wants to change some of the conditions of use (for example, number of initiations), DRM software needs to adapt automatically to new relations, with establishment of new relations within the entity and among entities. Usually, if the right isn’t explicitly expressed, it means that it is not assigned, which makes a critical assumption of language for description of rights that should be known to all Users.

Entity Rights is not quite suitable for computer interpretation, so new languages are developed, which provide digital interpretation of these expressions. Such as, for example, MPEG REL (MPEG Right Expression Language) and ODRL (Open Digital, Rights Language), computer languages based on XML (Extended Markup Language), which contain many possible terms for permissions, constraints, obligations, payments etc. in different fields koji sadrže [35].

![Figure 4: Model of the expression of rights](image-url)
6. CONCLUSION

All mentioned controversies of the digital rights management system point to the need for the creation of a compromise system that would satisfy both copyright holders and users. Due to non-existence of standards or orders, software for DRM finds it difficult to fit into the existing architectures of e-trade. The easiest way is control of downloading from a particular site, and the difficult part is the control of using that content by the user in accordance with the agreed user rights. By its standardization, a system that can protect digital content during its entire life cycle, from production, through distribution to use, would be obtained.

Many organizations deal with DRM standardization, such as OpenEbook Forum (OEBF) and MPEG group, when it comes to electronic groups and multimedia contents, as well as Internet Engineering Task Force (IETF) and World Wide Web Consortium (W3C). Their work, as well as the work of other organizations for standardization is very important for the success of DRM concept.

Modern DRM solutions, by standardization and open approach, should provide the cooperation between owner and user of content, rather than make content owners to encode their contents in some specific formats, or using some specific systems.

DRM software will automatically, based on licensed conditions, determine which activities are allowed, when it comes to certain content. The greatest challenge will be classification, programming and installation into license conditions of "appropriate behaviour", which the computer can understand. This leaves the space for further studies regarding the application of information technologies in this field.

7. REFERENCES

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STUDYING THE FACTORS OF DIFFUSION OF FREE SOFTWARE LINUX DISTRIBUTIONS IN THE REPUBLIC OF SERBIA

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Introduction

Impact of free software on software industry at the end of the past and during the first decade of this century cannot be neglected anymore. Movement for free software has initiated the first chapter in development of software industry in the aspect of the way in which organizations evaluate, plan investments and develop their information system. Free software movement brings full freedom of choice to software users, both regarding the choice of technology and through software independence from manufacturers of software. In addition, free software movement moves the focus of software development control from development teams of manufacturers towards the end users. Free software increases the offer of products in the market and provides a basis for replacement of monolithic proprietary architectures with highly modular systems based on open code and open standards. Modularity enables the users to choose functions by themselves and adjust the core of operating system and the operating system itself to their possibilities and needs. In that way, we obtain a degree of flexibility which is unattainable by applying solutions based on proprietary software. The impact of the end-users to their very product is stronger than ever. Free software concept provides an opportunity for end-users to participate in designing, development, maintenance and testing of software products more actively than ever. Market manages the directions of software development, so we can rightfully claim that today we are not only in the era of revolution, but we are also in the era of evolution of free software. By developing a great number of applications through the projects of free software, its impact on the market will become stronger. Big software manufacturers are already adapting themselves to the time that comes. Covering all categories of software by alternative solutions on the basis of free software, its impact on the market will lead to increased pressure on manufacturers of proprietary software, and thus the reduction of the price of their products, and


that will directly affect the issue of financial sustainability of infrastructure of many companies who deal with manufacturing proprietary software (research, development, marketing, sale, testing etc.). In this way, secondary pressure will be made on manufacturers of proprietary software. Transition of increasing number of users to distributions of free software will narrow the market of proprietary software solutions. Their manufacturers will have to re-orient to manufacturing softwares for the systems that contain both free and proprietary software. Many companies already offer free of charge (but not free) versions of their programmes for platforms based on distributions of free software. Such movements have a dual purpose. First of all, they partially inhibit the development of alternative free solutions and also, they are in the function of winning market positions in the time to come.

Hybrid models, with monolithic proprietary systems and free software based systems, will be present in the future, the only question is where will the balance be established and in which direction will this process be developed. Diffusion process of free software distributions on server platforms in the world has experienced expansion at the very beginning of this century. The same thing can be said for the market of Web server. In addition, we can conclude that dynamic balance is established in both cases mentioned.

Development of the idea of free software

Richard Stallman, researcher of the MIT Artificial Intelligence Laboratory, has initiated the project of free „unixolic“ operating system in 1984. operativnog sistema. Project was named GNU, which is a recursive acronym from „GNU is not Unix“. The aim of the project, according to Stallman’s words, was the creation of condition that nobody has to buy software ever. His attitude that source code should be free, Stallman supports by a claim that otherwise a very small number of people would have the power to manage the development of computer science. While on one hand, manufacturers of proprietary software believe that knowledge needs to remain a secret, Stallman believes that knowledge needs to be available to everyone, for the purpose of overall progress. Unavailability of source code constrains the development of society and has a negative impact on dynamics of informatics and computer science development. Main goal of GNU project is providing conditions for free information exchange. Stallman was initially worried how the idea of free software will be accepted and interpreted. There was a real threat for that published source code could be slightly altered and, as such, used for gaining profit with limiting the rights to end-users. In order to eliminate this threat, Stallman introduces licensing of free software through General Public Licence, (GPL). General Public Licence gives the users a right to use, copy and distribute licensed software, under the condition that he cannot restrict that right to other users. This license requires for all the results that were obtained through the work under GPL licence also need to be included in General Public Licence. In english language, the word free stands for adjectives meaning free and free of charge. When it comes to software under GPL licence, adjective has the first meaning – free. According to the evaluation of Source Forge, until 2004, there were more than 80 000 applications developed under GPL. Creative Commons estimates that there are at least 120 000 documented modular components today.

5 Krill P., Windows loses ground with developers, http://www.infoworld.com/article/07/07/02/mswindows-share_1.html
6 Adjective free should be understood in the spirit of definition of a free software that was given by GNU foundation.

7 See the article: Richard M. Stallman, Why Software Should Not Have Owners, available at the web address http://www.gnu.org/philosophy/why-free.html
10 http://sourceforge.net/
11 http://creativecommons.org/
This fact gives a new flywheel to further development of free software, providing the skillful programmers to develop software in a more rapid, better and cheaper way by using these components.

**Definitions of the term free software**

Free Software Foundation gives two definitions of free software.

Broader definition of free software is:

"Free software“is a matter of freedom, not the price. In order to understand better what do we mean (in English adjective free is ambiguous – it can imply free, but also free of charge), you should observe the word free as in syntagm „free speech“ and not as in syntagm „free beer“.

Free software is a matter of users’ freedom to run, copy, distribute, study, change and improve the software. More precisely, it refers to four types of freedoms which are provided to its users: The freedom to run the programme, for any purpose (freedom no. 0). Freedom to study the how the programme works and adapts to your needs (freedon no. 1). Prerequisite for this is providing teh access to source code. Freedom to distribute samples of the programme so that you could help someone close to you (freedon no. 2). Freedom to improve programmes and publish your changes in public so that entire community could have benefits from it (freedom no. 3). Prerequisite for this is providing the access to source code.

Shorter definition of free software according to GNU project is: Free software is a software that can certainly be used, copied and distributed, either verbatim or with the changes, free of charge or for a particular fee.

**Definition of the term free software distribution**

By the term distribution, we imply the software ready for installation. Most frequently, it refers to distribution of operating system based on the Linux kernel and included selection of programmes, tools and documentation and within one installation package. Such distributions are usually called Linux, although it is better to refer to them as GNU with Linux or GNU/Linux. The term Linux, strictly speaking, can be exclusively used for describing the kernel of operating system whose creator is Linus Torvalds.

Many installation packages of operating systems distributions with Linux kernel and free software also contain the patents support for protected formats of documents. These distributions cannot be related to GNU project. It is only about hybrid systems that contain Linux kernel, proprietary and free software.

Due to all above-mentioned, hereinafter the term Linux operating system will be used for describing not only the kernel of operating system, but also the distributions based on free and hybrid software with limitations mentioned.

**Definition of the term Linux**

The term Linux as determination of the kernel of operating system

Linux is a kernel of operating system realized as a result of the project initiated by Linus Torvalds with wholehearted voluntary assistance of a few hundred programmers. Strictly speaking, the term Linux should be used exclusively to describe this kernel.

**Use of teh term Linux to describe operating system based on Linux kernel**

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13 http://dictionary.zdnet.com/definition/distribution.html
Linux\textsuperscript{14} as a product is developed on the idea of free software, it is free and through Internet available in the form of binary installation version, and also in the form of entire and documented source code of all its components. It is possible to download individual components – GNU applications of operating system kernel, and entire distribution as well. Today, strength of Linux is best illustrated on server platforms, where stable, sustainable, functional, safe and fast solutions are necessary. With 0.5\% of the market, which it occupied in 1995\textsuperscript{15}, more than 23.1 \% 2003\textsuperscript{16}, GNU/Linux has, according to studies performed by Gartner, Inc\textsuperscript{17}, in II quarter of 2007, lost 0.3 \% of this market and from 23.1 dropped to 22.8 \% of the market.

**Portability and modularity of Linux**

Linux is characterized by a big number of hardware platforms to which it is successfully ported. It is ported to mainframe computers, servers, workstations, desktop computers, mobile devices... However, platforms on which Linux is most frequently used are PC computers and Macintosh\textsuperscript{18}. Big software manufacturers develop their server applications to work under Linux (Oracle, Sun, Symantec, Intel). Modularity of Linux kernel implies the possibility of its reconfiguration and recompilation providing only for selected functions of the system to be built into kernel. This feature is extremely important in work with a hardware that is limited by memory requirements. Linux family of operating systems belongs to the group of unixolic operating systems.

**Definition of the term desktop platform**

Term desktop is ambiguous. Primarily, meaning of this term was related to personal computer sufficiently small so that it could stand on a work desk, but still sufficiently big to be considered easily portable (such as lap top or PalmPilot)\textsuperscript{19}. Today, the term desktop is also used to describe: type of your computer cover\textsuperscript{20}, graphical user interface of operating system or desktop such as it was for the first time seen on Apple’s computer Lisa\textsuperscript{21}.

The term platform, according to dictionary of computer terms, in computer science implies a hardware on which operating system works. Metromemetics, on-line lexicon of new media terms, describes platform in narrower sense as a type of hardware architecture that enables the software to be initiated. In a broader sense, according to the same source, this term can also include operating system, graphical interface and appropriate API.\textsuperscript{22}

Based on the above-mentioned, in this paper, by the term desktop platform we imply hardware platform of desktop computer in accordance with definitions mentioned.

**Description of the system observed**

Company for market research IDC considers that in 2007, the number of desktop computers with Linux has increased to 10 millions, which makes about 6\% of global market.\textsuperscript{23}

Total costs and issue of security, when it comes to desktop computers, are key factors when considering the use of free software distribution.

Saving total direct and indirect costs of company\textsuperscript{24} (Total cost of ownership, TCO) is

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\bibitem{23} http://www.wohl.com/wa04-62.htm
\bibitem{24} TCO is a cost of using computers and includes costs of improvement, service, maintenance, consultants’ training as well as technical support, in addition to the prices of hardware and software. For more information, see:
\end{thebibliography}
a main reason for switching to operating systems based on free software distribution. According to the research carried out in 2005 by Robert Fransis group, costs of using Linux, in the period 2002-2005, were on average by 40% lower than costs of using Windows. When costs of hardware purchase are excluded, this percentage becomes significantly higher. According to the results of this research, the biggest savings when using Linux platform are acquired through licences, costs reduction for hardware purchase and reduction of the number of system administrators, owing to higher security of these systems in relation to Microsoft Windows.

In a report which analysts of Pund-IT have implemented on the basis of conversation with users who have implemented Linux, it is stated that Linux implementation brings secondary advantages in the form of flexibility, better use of resources, as well as better alignment with business requirements.

Free software distributions are today primarily based on Unix. This fact points to the possible advantage on desktop platforms when it comes to work in multi-user environment. Very important advantage is the fact that free software distributions are based on open standards of documents, which are essential for exchanging documents between and within organizations, but they also guarantee independence of software manufacturers and users in the future.

Big number of public services and governments of many countries (Germany, Venezuela, France, Nigeria, Brasil) today replace the proprietary software-based platforms by free software distributions.

Advantages of free software and its source code openness primarily come from the fact that it is most frequently followed by better improvement of each issued software version – cleaner code, but also successful development of new functionalities.

If, according to Andy Groove, Internet transformation from scientific-research into commercial network can be considered inflection point – i.e. a change that entirely changes the way in which job is done, then the change in software market that causes the impact of free software (especially in public and educational sector) on software market can also be considered an inflection point.

Free software has a positive impact on changes that occur in the market. It also directly affects the increase of software quality and its several times lower price. Organizations that neglect potential threats and advantages of free software leave the competition an opportunity to achieve competitive advantage. Level of free software distribution and level of its impact of software market will vary depending on a greater number of factors that characterize each individual market.

Factors that influence the diffusion process of free software, according to the character of impact, we can classify into: Driving and Inhibitory.

Driving factors are the factors that influence organizations or individuals to make a decision of switching to operating system based on Linux free kernel with accompanying software.

http://www.pcmag.com/encyclopedia_term/0,2542,t=TCO&i=52609,00.asp
http://www-03.ibm.com/linux/whitepapers/robertFrancesGroupLinuxTCOAnalysis05.pdf
http://www.rfgonline.com
German Linux migration not a taxing decision, http://news.zdnet.co.uk/software/0,100000121,39274196,00.html

32 http://www.osia.net.au/news/brazil_to_migrate_300_000_pcs_to_linux
Inhibitory factors influence the above-mention decision to be made. According to the type, these factors can divide into: Technical-technological, Educational, Sociological and Legally-political.

Newer studies and papers on free software development

Motivation of participants within the community that develops free software is studies by Zeitlyn, Hertel, Sven and Herrmann, O’Mahony. In his paper, Zeitlyn, referring to the work of Eric Raymond The Cathedral & the Bazaar, concludes that key element of motivation of work on free software projects is a desire for self-proving and building personal reputation within a group. Hertel and colleagues study motivation of team members who work on Linux kernel development. They see the impact of acknowledgements that programmers receive from free software community on the readiness increase the time that they spend in developing kernel. In addition, there is no difference in motivation degree depending whether or not they receive the fee for their work on the kernel. Engineering aspect of development and maintenance of free software, as well as evolution of Linux kernel development, are studied by Godfrey and Qiang. They are studying the sample of 96 different versions of kernel, of which number 34 are stable and 62 developmental versions and they observe almost linear dependence of the number of lines of kernel code in observation period (1994-2001).

Managing the projects of free software development is studied by Ćubranić and Kellogg, with a special reference to the issue of coordination between team members, problems of previous practice and proposals of possible solutions. Theoretical principles of the model of collaboration and innovativeness of the free software development processes were studied by Ćubranić and Booth, as well as Von Hippel and Von Krogh. Von Hippel and Von Krogh observe proprietary aspect of innovation on the example of free software as a combination of two accepted models – models of private investment and collective model, introducing the term private-collective innovation model. Social aspect of innovativeness of the free software movement is described by Raymond in his work The Cathedral & the Bazaar. Economic issues of initiatives related to the projects of free software are studied by Bonaccorsi and Rossi, Lerner and Tirole, Pal and Madanmohan, West and Dedrick.

Studies and theoretical concepts of the processes of diffusion and innovations

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Process of innovations diffusion and factors of this process are studied by Rogers. Han and Mekduael also deal with factors that influence the diffusion, as well as with the impact of new technologies on the market. Relationship between diffusion of new technologies and social behaviour is studied by Dosi, while Geroski sets the models of the diffusion of technology. Metcalfe studies diffusion process and evolutionary character of this process. David deals with competitive advantages that the adoption of new technologies brings to the structures that accept it first. Stoneman processes diffusion of computer technology during the ’70 of previous century.

**Reasons for which organizations decide to adopt free software**

Directions of developing free software are not determined by desires of the very companies, as a rule. Motives of companies to adopt free software and materially support the community that produces it were studied by many scientists. Lerner and Tirole have determined that companies that distribute free software (e.g. Red Hat), acquire profit indirectly, by providing services to the users of GNU/Linux. Companies such as HP (Hewlett-Packard), by publishing the source code of their applications, also acquire indirect profit, through the increase of sale of their products in the market segment that belongs to free software. By publishing source code of management applications for supporting hardware components, this code becomes public property, which, in addition to increasing the sale of hardware in the mentioned market part, also reduces the costs of maintenance and improvement of application, and a better management software increases the value of the very hardware component (Hawkins 2002)).

According to West and Dedrick, support to the free software community by big multinational companies such as Sun, IBM, and Oracle are nothing but the answer to market requirements in relation to costs reduction. Big companies in a server market, such as IBM and HP use GNU/Linux in order to get as closer as possible to the products of Sun company, while smaller companies choose GNU/Linux to achieve independence from Microsoft. (West and Dedrick 2001))

**Definition of innovation**

In this chapter we will more precisely describe the concept of innovations diffusion. We will begin with definitions of the term innovation. According to Tidd, Besant and Pavitt, innovation is a two-dimensional change. The first dimension is the very subject of change – in technological aspect, innovation is a product or service by which organization offers a new way of production or a new service. The second dimension, according to Tidd, Besant and Pavitt, is degree of change. It is about a relative dimension that reflects degree of change in relation to previous situation. According to Rogers, innovation is the idea, practical knowledge or object that an individual or another group sees as novelty. According to Rogers, this observation is essential.
Rogers’ model of diffusion of innovations

Ovaj model opisuje način i dinamiku na koji grupa odgovara po pitanju usvajanja inovacije.

Rogers’ diffusion determination

According to Rogers, diffusion is a process of communicating the innovation, in particular period by different communication channels, with members of social system. Here, by communication we imply the process of creating and sharing the information for the sake of mutual understanding. Communication process can be realized as convergent (or divergent), i.e. process of convergence (or distancing) of the attitudes in relation to understanding certain phenomena.

Diffusion is, according to Rogers, a special type of communication where the message in related to new idea. New idea gives teh character, but also includes a certain degree of uncertainty to diffusion process. This uncertainty represents a degree of visibility of innovation and its relative advantages. Uncertainty is reversely proportional to predictability and structure of information – as the solution is less visible and as its structure is less predictable – the degree of uncertainty is higher.

Four basic elements of innovation by Rogers

From his definition of diffusion, Rogers derives four main elements of diffusion. These are: innovation, communication, communication channels, time frame.

These four elements can be recognized in each research or campaign of the diffusion of innovations. Rogers has observed that dependence of the number of persons who have accepted the innovation can be approximated by normal distribution curve. Rogers has used two statistical dimensions – arithemtic mean and standard deviation to classify the participants of diffusion into five categories. Depending on the fact in which phase particualt entity adopts the innovation, Rogers has classified the population into the following categories: innovators, early adopters, early majority, late majority and laggards.

Figure 1. Distribution according to Rogers’ model of diffusion of innovations

In Figure 1, we can observe that left and right from arithmetic mean for a length of standard deviation, there are 34% of total population on each side. If we observe the rest of distribution curve (out of the segments that are one standard deviation away from arithmetic mean), we can see that there is total 32%, i.e. about 16% of population on each size. Rogers has divided left infinite segment in two parts: infinite segment that is left from the point $x - 2sd$ and finite segment between the points $x - 2sd$ and $x - sd$. Innovators are eager to try new ideas and technologies. They accept new technology in order to explore its possibilities. In case of diffusion of free software distributions on desktop platform, the groups of technological enthusiasts who have developed the first versions of GNU/Linux can be considered innovators. Early adopters, according to Rogers, the reason for adopting new technologies see exclusively in using the advantages that they can have from the technology which they are adopting, but also the advantages that they will have in relation to those who haven’t adopted the technology. Early majority of Rogers’ model adopts new ideas in the part of the curve between $x - 2sd$ and $x - sd$. This group of consumers of new technology adopts the same because of the fear to remain out of modern technology trends. When a group of early adopters discovers advantages of new technology, it rapidly becomes followed by early majority.

\[
X - 2SD \quad X - SD \quad X \quad X + 2SD
\]

Figure 2. Cumulative curve of Rogers’ distribution

59 Downloaded from: Peng Z., Linux adoption by firms, Department of Systems and Computer Engineering, Carleton University, Ottawa, 2004. pp. 11.
Late majority adopts new ideas directly after one half of population does so. This group is careful and it does not adopt technology until it is sufficiently spread and until consistent and positive, public and expert opinion is created.

Laggards are the last group that adopts innovation. They openly express suspicion regarding new things, they only see shortcomings and flaws and they are critics of all that is new. They are the harshest opponents of change. They have a resistance towards accepting everything that is new. Very often it occurs that criticized idea gets replaced by a new one before it is adopted by laggards.

**Dimensions (factors) of Rogers’ model of diffusion of innovations**

According to theoretical model set by Rogers (1962), five dominant factors (dimensions) influence the adoption of innovation. These dimensions are: relative advantage, compatibility, complexity, observability, trialability.

In 1974, Ostlund\(^60\) has added another dimension to Rogers’ model – understanding the risks of adopting innovation.

In 1982, Tornatzky and Klein\(^61\) expand Rogers’ model with the following five dimensions: cost, communicatability, divisibility, profitability, social approval.

Numerous studies are carried out to expand this model by identification of other additional factors.

In 1991, Moore and Benbasat\(^62\) identified eight characteristics by which they expand Rogers model. Those characteristics are: relative advantage, compatibility, easiness of use, effectiveness of demonstration, effect on the user, obviousness, possibility of testing and voluntariness.

By detailed study of mutual dependences of newly-introduced dimensions with source dimensions postulated by Rogers, it was determined that they are not mutually independent.

In 2003, Wee\(^63\) has established the existence of correlation between dimensions communicatability and observability of advantages, but also that observability of advantages and divisibility are in relation to the possibility of testing which was postulated by Rogers.

From all the above-mentioned, we can conclude that characteristics of a particular technology that influence its diffusion can be presented with 5 dimensions suggested by Rogers.

**Defining the subject and problems of this paper**

**Subject:** Based on previously presented theoretical assumption, subject of the paper is diffusion process of free software distributions on desktop platform in Serbia.

**Problem:** Main scientific problem is lack of research when it comes to character and mutual interdependence of Rogers’ factors of free software distributions diffusion in Serbia.

The increase of the rate of accepting GNU/Linux from the part of a great number of entrepreneurs, or public and government sector in the most developed countries of the world should also be interesting to us in Serbia. Situation in economy and limited budget funds


are another reason to consider the application of free software for business purposes, as well as in public and government sector. When it comes to desktops, pirated operating systems and applications rule in Serbia. Reasons for this situation are not explored. Appearance of Linux has influenced the markets of software and hardware. Manufacturers of software and hardware are aware of the fact that they can lose a part of the market if they neglect users of GNU/Linux (Berkvist et al., 2003). For that reason, projects of developing open code software increasingly gain support from commercial manufacturers of software and hardware. Careful study of literature is related to diffusion of open code software, in the world and in our country, has shown that this process is not sufficiently described in literature, and lack of research regarding the problem of diffusion of free software distribution on desktop platform in Serbia contributes to the relevance of this study.

The aim of this paper is: Discover the character of factors (dimensions) of Rogers’ model of diffusion of innovations on the example of the diffusion of free software distributions on desktop platform in Serbia.

Research problem is given in the form of the following question: What is the nature of Rogers’ factors of diffusion of innovations in case of diffusion of GNU/Linux distributions on desktop platform in Serbia?

Hypotheses of the paper
Based on research tasks presented, we set the hypotheses of this paper:

Hypotheses of the paper are:

H1: As crucial driving factors of diffusion of GNU/Linux distributions on desktop computers in Serbia, IT experts identify: stability of the system, data security, reduction of costs related to software licenses and possibility of adapting source code to own needs.

H2: As crucial inhibitory factors of diffusion of GNU/Linux distributions on desktop computers in Serbia, IT experts identify: higher level of complexity of administration and use in relation to MS Windows, not sanctioning the use of
pirated software and the problem of lack of control software for a new hardware.

**H3:** Majority of ICT students and IT experts believe that modularity and portability are the advantages of GNU/Linux.

**H4:** More than three quarters of respondents believe that usability of free software distributions is very good or excellent.

**H5:** Majority of IT experts and ICT students believe that switching to Linux requires tedious learning whose learning curve does not suit the beginners.

**H6:** Two thirds of respondents believe that installation and maintenance of Linux are tasks of higher level of complexity.

**H7:** Use of developer tools by respondents and degree of observing the complexity of installation and maintenance of GNU/Linux are dependent variables.

**H8:** More than one half of respondents positively evaluate the observability degree of the advantages of GNU/Linux over competition.

**H9:** Majority of respondents assess the triability of Linux prior to the use as very good or excellent.

**H10:** Three quarters of IT experts believe that „live“ distributions provide a good possibility of testing the operating system.

By studying academic and expert public, as well as the population of Linux users, and by processing the research results obtained, hypotheses would be either confirmed or disproved.

Research will include two groups of respondents: IT experts in economy and non-economic activities, IT students and computer science students. Sample will be limited to the territory of the Republic of Serbia.

**Methods used**

Research was set as explanatory – descriptive and it is not a continuation of a previous study.

In this research, two basic methods for collecting and analysis of data are applied: theoretical analysis method and survey method. Theoretical analysis method is used in studying secondary structure. Available published expert and scientific discussions on free software development and process of diffusion of innovations. Results of this analysis have served, primarily, as a guide for design and implementation of empirical research. As main research method we have used Kao survey method, so that we could collected desired data on an appropriate sample of respondents in the field. These data were processed with the help of statistical procedures and techniques in order to show and interpret results and to draw appropriate conclusions based on them. In research process, qualitative and quantitative approach were combined – triangulation method. Techniques and instruments were selected within a descriptive research method which is appropriate to the subject and aim of research. Instrument that we have used is made of: Questionnaire by which students and their teachers were examined (control group), Questionnaire by which IT experts in economy, non-economic activities and public services were examined. Data obtained by research were processed: a) quantitatively (by appropriate mathematical-statistical method); b) qualitatively (method of induction, analysis, synthesis, description). In this part of the study, we will deal with presentation and interpretation of the results obtained. Firstly, we will analyze the character of diffusion factors (direction and intensity) and then the attitudes of respondents regarding the diffusion of free software distributions on desktop computers in Serbia.

**Sample of respondents**

Research has included students of academic and professional studies who rely on IT in their work, graduate IT students, IT managers,
administrators of systems, networks and databases based on proprietary and/or free software, Web developers, IS designers and programmers.

Research is carried out on following faculties and high schools: Faculty of Management Novi Sad; Faculty of Organizational Sciences, University of Belgrade; Faculty of Mathematics, University of Belgrade; High Electrical Engineering School in Belgrade, High Polytechnical School in Belgrade, High Technical School in Novi Sad, Technical Faculty in Zrenjanin.

Research has included 287 respondents. Of that number, 97 IT experts (84 male and 13 female) and 190 students (160 male and 30 female).

**Identification of essential characteristics when assessing the quality of software platform**

By this set of questions we wanted to explore characteristics that the users identify as essential when assessing the quality of software platform. Both groups of respondents had the task to rank the following offered characteristics of operating systems and accompanying software according to the importance: stability, speed, easiness in operation, compatibility with competing applications, security and easiness of installing and maintenance.

Respondents have performed the ranking through a closed questionnaire on the scale from 1 to 6 (1- the most important characteristic, 6- the least important characteristics). Results were presented in tables 1. and 2. 97 respondents who belong to the group of IT professionals has answered to this question. Of 190 examined students, 166 of them have given the answer.

### Table 1. Identification of essential characteristics when assessing the quality of software platform – IT experts

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>ARITHMETIC MEAN</th>
<th>STANDARD DEVIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>STABILITY</td>
<td>1,7</td>
<td>1,47</td>
</tr>
<tr>
<td>SECURITY</td>
<td>2,6</td>
<td>1,24</td>
</tr>
<tr>
<td>SPEED</td>
<td>3,6</td>
<td>1,27</td>
</tr>
<tr>
<td>EASINESS IN OPERATION</td>
<td>3,8</td>
<td>1,27</td>
</tr>
<tr>
<td>COMPATIBILITY</td>
<td>4,6</td>
<td>1,32</td>
</tr>
<tr>
<td>EASINESS OF INSTALLING AND SETUP</td>
<td>4,8</td>
<td>1,40</td>
</tr>
</tbody>
</table>

### Table 2. Identification of essential characteristics when assessing the quality of software platform – ICT students

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>ARITHMETIC MEAN</th>
<th>STANDARD DEVIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>STABILITY</td>
<td>2,18</td>
<td>1,15</td>
</tr>
<tr>
<td>SPEED</td>
<td>2,45</td>
<td>1,19</td>
</tr>
<tr>
<td>SECURITY</td>
<td>3,03</td>
<td>1,50</td>
</tr>
<tr>
<td>EASINESS IN OPERATION</td>
<td>3,50</td>
<td>1,4</td>
</tr>
<tr>
<td>COMPATIBILITY</td>
<td>4,45</td>
<td>1,37</td>
</tr>
<tr>
<td>EASINESS OF INSTALLING AND SETUP</td>
<td>5,19</td>
<td>1,42</td>
</tr>
</tbody>
</table>

From the results obtained, we conclude that both groups of respondents observe the same characteristics as essential when assessing the quality of operating system, noting that students, unlike IT experts, prefer speed than security.
Identification of driving factors when switching to GNU/Linux platform

Through this group of questions we wanted to examine the attitudes of both groups of respondents regarding possible advantages of work on GNU/Linux desktop platform.

Results are presented in Tables 3. and 4.

Table 3. Identification of advantages of GNU/Linux platform in relation to competition – IT experts

<table>
<thead>
<tr>
<th>NO.</th>
<th>ADVANTAGES OF GNU/LINUX PLATFORM</th>
<th>NUMBER OF RESPONDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TCO</td>
<td>53</td>
</tr>
<tr>
<td>2</td>
<td>SECURITY</td>
<td>51</td>
</tr>
<tr>
<td>3</td>
<td>STABILITY</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>OPEN SOURCE</td>
<td>32</td>
</tr>
<tr>
<td>5</td>
<td>MODULARITY</td>
<td>26</td>
</tr>
<tr>
<td>6</td>
<td>QUALITY OF APPLICATIONS</td>
<td>24</td>
</tr>
<tr>
<td>7</td>
<td>PORTABILITY</td>
<td>24</td>
</tr>
<tr>
<td>8</td>
<td>POSSIBILITY OF ADAPTATION TO OWN NEEDS</td>
<td>23</td>
</tr>
<tr>
<td>9</td>
<td>EASY AND CHEAP FOR MAINTENANCE</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>COMMUNITY SUPPORT</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>INDEPENDENCE FROM SOFTWARE MANUFACTURERS</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>LESS HARDWARE-DEMANDING THAN COMPETITION</td>
<td>11</td>
</tr>
<tr>
<td>13</td>
<td>GREAT NUMBER OF OPTIONS FOR ADMINISTRATORS</td>
<td>10</td>
</tr>
<tr>
<td>14</td>
<td>COMPATIBILITY</td>
<td>9</td>
</tr>
<tr>
<td>15</td>
<td>SPEED</td>
<td>8</td>
</tr>
<tr>
<td>16</td>
<td>TECHNICAL SUPPORT</td>
<td>6</td>
</tr>
<tr>
<td>17</td>
<td>USABILITY</td>
<td>6</td>
</tr>
<tr>
<td>18</td>
<td>GREAT NUMBER OF VERSIONS AND DISTRIBUTIONS PROVIDES A POSSIBILITY OF CHOICE</td>
<td>6</td>
</tr>
<tr>
<td>19</td>
<td>BETTER SUPPORT FOR NETWORK SOFTWARE</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>EASY FOR USE</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>BETTER ARCHITECTURE OF OS</td>
<td>4</td>
</tr>
<tr>
<td>22</td>
<td>BIG NUMBER OF APPLICATIONS WITHIN DISTRIBUTION</td>
<td>2</td>
</tr>
<tr>
<td>23</td>
<td>BETTER SUPPORT TO HARDWARE</td>
<td>2</td>
</tr>
<tr>
<td>24</td>
<td>CHALLENGE</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>LEGALY</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>LIVE DISTRIBUTIONS</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>390</td>
</tr>
</tbody>
</table>

The greatest number of respondents, 53 of them, state that advantages of GNU/Linux are primarily: low value of total ownership price, high security and stability when compared to competitive operating systems, code openness, modularity and quality of applications within distributions. 97 IT experts have mentioned 390 answers to this question, i.e. about 4.03 answers per a respondent. Based on the results obtained, we accept the additional hypothesis H1.

**H1:** As essential driving factors of diffusion of GNU/Linux distributions on desktop computers in Serbia, IT experts identify: stability of system, data security, reduction of costs related to software licences and possibility of adapting source code to own needs.
### Table 4. Identification of advantages of GNU/Linux platform in relation to competition – ICT students

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Number of Respondents</th>
<th>Agree with the Statement</th>
<th>Assessment T² ¹⁶⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>135</td>
<td>137</td>
<td>98,54</td>
</tr>
<tr>
<td>Stability</td>
<td>128</td>
<td>134</td>
<td>95,52</td>
</tr>
<tr>
<td>Possibility of complete update through the Internet</td>
<td>146</td>
<td>156</td>
<td>93,59</td>
</tr>
<tr>
<td>Live Distributions</td>
<td>121</td>
<td>130</td>
<td>93,08</td>
</tr>
<tr>
<td>Portability</td>
<td>117</td>
<td>126</td>
<td>92,86</td>
</tr>
<tr>
<td>Independence from software manufacturers</td>
<td>127</td>
<td>137</td>
<td>92,70</td>
</tr>
<tr>
<td>Modularity</td>
<td>124</td>
<td>135</td>
<td>92,53</td>
</tr>
<tr>
<td>Possibility of complete update through the Internet</td>
<td>146</td>
<td>156</td>
<td>93,59</td>
</tr>
<tr>
<td>Live Distributions</td>
<td>121</td>
<td>131</td>
<td>92,37</td>
</tr>
<tr>
<td>Portability</td>
<td>117</td>
<td>126</td>
<td>92,86</td>
</tr>
<tr>
<td>Independence from software manufacturers</td>
<td>127</td>
<td>137</td>
<td>92,70</td>
</tr>
<tr>
<td>Modularity</td>
<td>124</td>
<td>135</td>
<td>92,53</td>
</tr>
<tr>
<td>Big number of applications included in distribution</td>
<td>121</td>
<td>131</td>
<td>92,37</td>
</tr>
<tr>
<td>Code openness</td>
<td>126</td>
<td>137</td>
<td>91,97</td>
</tr>
<tr>
<td>License cost</td>
<td>145</td>
<td>159</td>
<td>91,19</td>
</tr>
<tr>
<td>Linux is a completely documented system</td>
<td>123</td>
<td>135</td>
<td>91,11</td>
</tr>
<tr>
<td>TCO</td>
<td>130</td>
<td>144</td>
<td>90,28</td>
</tr>
<tr>
<td>Linux is compatible with majority of applications written for UNIX</td>
<td>115</td>
<td>129</td>
<td>89,15</td>
</tr>
<tr>
<td>Frequent issuance of new versions</td>
<td>123</td>
<td>140</td>
<td>87,86</td>
</tr>
<tr>
<td>Localization on Serbian is better than in Windows</td>
<td>88</td>
<td>129</td>
<td>68,22</td>
</tr>
</tbody>
</table>

¹⁶⁴ Percentage of answered
Examined ICT students, as essential driving factors of diffusion of GNU/Linux on desktop platform in Serbia see: security, stability, possibility of update of entire distribution through Internet and existence of live distributions and modularity.

Based on results obtained, we partially accept the hypothesis H3.

More than 60% of respondents believe that „live“ distributions provide good possibility of testing operating system.

Results obtained confirm the hypothesis H10.

We observe that total cost of ownership, which is highly ranked with IT experts, is not among key driving factors of the process we examine when it comes to students. In this part of the paper, we present detailed results obtained by processing closed questions of the Questionnaire for ICT students.

Based on statistical processing of data, by applying statistical tests, which we will not present here, the following results are obtained:

70% of students believe that important factor when deciding to switch to /Linux platform should be the fact that work in Linux provides higher security in relation to work in MS Windows.

60% of students do not believe that the fact that Linux works on a wide range of different hardware is an important factor when deciding to switch to GNU/Linux platform.

75% of students believe that important factor when deciding to switch to GNU/Linux platform should be the fact that Linux license is free of charge. 75% of students believe that important factor in deciding about the switch to GNU/Linux platform should be the fact that overall costs of Linux maintenance are lower than costs of Windows maintenance.

90% of students who use developmental tools believe that openness of source code is a competitive advantage that provides adaptation of programme to their needs.
Table 5. Identification of shortcomings of GNU/Linux platform in relation to competition – IT experts

<table>
<thead>
<tr>
<th>NO.</th>
<th>SHORTCOMINGS OF GNU/LINUX PLATFORM</th>
<th>NUMBER OF RESPONDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>COMPLEXITY OF ADMINISTRATION</td>
<td>31</td>
</tr>
<tr>
<td>2.</td>
<td>MANAGEMENT SOFTWARE FOR NEW HARDWARE</td>
<td>29</td>
</tr>
<tr>
<td>3.</td>
<td>INSUFFICIENT LITERATURE IN OUR LANGUAGE</td>
<td>24</td>
</tr>
<tr>
<td>4.</td>
<td>COMPLEXITY OF USE FOR BEGINNERS</td>
<td>23</td>
</tr>
<tr>
<td>5.</td>
<td>INCOMPATIBILITY TO WINDOWS</td>
<td>17</td>
</tr>
<tr>
<td>6.</td>
<td>LACK OF SYSTEM SUPPORT</td>
<td>6</td>
</tr>
<tr>
<td>7.</td>
<td>CODE OPENNESS</td>
<td>6</td>
</tr>
<tr>
<td>8.</td>
<td>SMALL DISTRIBUTION</td>
<td>5</td>
</tr>
<tr>
<td>9.</td>
<td>SMALL REPRESENTATION AT FACULTIES</td>
<td>5</td>
</tr>
<tr>
<td>10.</td>
<td>LEARNING CURVE</td>
<td>3</td>
</tr>
<tr>
<td>11.</td>
<td>SMALL NUMBER OF BUSINESS APPLICATIONS</td>
<td>2</td>
</tr>
<tr>
<td>12.</td>
<td>SMALL NUMBER OF APPLICATIONS</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>152</td>
</tr>
</tbody>
</table>

We observe that examined IT experts identify the following key inhibitory factors:
- Complexity of administration,
- Weaker software support for new hardware,
- Lack of literature in Serbian,
- Complexity of use for beginners and
- Incompatibility to MS Windows.

In addition, we observe that this group of respondents has identified significantly smaller number of inhibitory than driving factors.

In addition, 97 IT experts have given 152 answers, i.e. 1.74 answers per a respondent, which is less than 50% in relation to 375 answers obtained regarding the identification of driving factors (3.87%).

IT expert identifies about 2.17 driving factors per one identified inhibitory.

Based on results obtained, we partially accept the set hypothesis $H_2$.

$H_2$: As crucial inhibitory factors of diffusion of GNU/Linux distributions on desktop computers in Serbia, IT experts identify: higher level of complexity of administration and use in relation to MS Windows, not sanctioning the use of pirated software and the problem of lack of control software for a new hardware.

Table 6. Identification of shortcomings of GNU/Linux platform in relation to competition – ICT students

<table>
<thead>
<tr>
<th>INHIBITORY FACTORS</th>
<th>NUMBER OF RESPONDENTS</th>
<th>AGREE WITH THE STATEMENT</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINUX IS MORE DIFFICULT TO MAINTAIN THAN PROPRIETARY SOFTWARE</td>
<td>78</td>
<td>95</td>
<td>82,11</td>
</tr>
<tr>
<td>WEAKER SUPPORT TO HARDWARE COMPONENTS</td>
<td>101</td>
<td>111</td>
<td>90,99</td>
</tr>
<tr>
<td>LINUX IS INCOMPATIBLE TO WINDOWS APPLICATIONS</td>
<td>110</td>
<td>122</td>
<td>90,16</td>
</tr>
<tr>
<td>INCOMPATIBILITY OF DISTRIBUTIONS</td>
<td>106</td>
<td>119</td>
<td>89,08</td>
</tr>
<tr>
<td>ALTHOUGH IT IS FREE OF CHARGE – „PRICE” OF SWITCHING TO LINUX IS NOT SMALL</td>
<td>88</td>
<td>119</td>
<td>73,95</td>
</tr>
<tr>
<td>WORK WITH LINUX REQUIRES PARTICULAR KNOWLEDGE</td>
<td>72</td>
<td>116</td>
<td>62,07</td>
</tr>
</tbody>
</table>
Examined students as key inhibitory factors see: more difficult maintenance of Linux distributions in relation to competition, weaker support to new hardware components, incompatibility to MS Windows applications and mutual incompatibility. We can see that both groups of respondents largely agree regarding inhibitory factors of the process examined. Detailed review of data on the attitudes of ICT students that are received based on responses for this group of questions are given further in the text.

30% of respondents believe that MS Windows is better operating system than GNU/Linux.

Majority of IT experts observe the advantages of MS Windows, while the greatest part of students do not have an attitude regarding this issue. Such result is consistent with results obtained regarding the number of respondents from the lines of students who had the chance to try Linux.

### Attitudes of respondents regarding Rogers’ factors of diffusion of innovations

By this group of innovations we wanted to investigate attitudes of respondents regarding each of the five Rogers’ dimensions of the diffusion of innovations process.

### Usability of Linux

#### Table 7. Usability of Linux

<table>
<thead>
<tr>
<th>Type of respondent</th>
<th>N Answered</th>
<th>Not answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT expert</td>
<td>93</td>
<td>4</td>
</tr>
<tr>
<td>Student</td>
<td>113</td>
<td>77</td>
</tr>
<tr>
<td><strong>Arithmetic mean</strong></td>
<td>4.05</td>
<td>3.35</td>
</tr>
<tr>
<td><strong>Standard deviation</strong></td>
<td>.852</td>
<td>1.187</td>
</tr>
</tbody>
</table>

#### Table 8. Usability of Linux

<table>
<thead>
<tr>
<th>Type of respondent</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Percentage of answered</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IT expert</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answered</td>
<td>1 Unsatisfactory</td>
<td>3</td>
<td>3.1</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>3 Good</td>
<td>13</td>
<td>13.4</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>4 Very good</td>
<td>50</td>
<td>51.5</td>
<td>53.8</td>
</tr>
<tr>
<td></td>
<td>5 Excellent</td>
<td>27</td>
<td>27.8</td>
<td>29.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>93</td>
<td>95.9</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Not answered</td>
<td>4</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>97</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>2 Student</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answered</td>
<td>1 Unsatisfactory</td>
<td>11</td>
<td>5.8</td>
<td>9.7</td>
</tr>
<tr>
<td></td>
<td>2 Satisfactory</td>
<td>15</td>
<td>7.9</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td>3 Good</td>
<td>28</td>
<td>14.7</td>
<td>24.8</td>
</tr>
<tr>
<td></td>
<td>4 Very good</td>
<td>41</td>
<td>21.6</td>
<td>36.3</td>
</tr>
<tr>
<td></td>
<td>5 Excellent</td>
<td>18</td>
<td>9.5</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>113</td>
<td>59.5</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Not answered</td>
<td>77</td>
<td>40.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>190</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Both groups of respondents have expressed positive opinion regarding the use of Linux. Arithmetic mean of responses on a scale of 5 for a group of IT experts is 4,05 with standard deviation 0,852, i.e. 3,35 and standard deviation 1,187 for the group of the interviewed ICT students.

We are testing the hypothesis by chi-square test of proportion significance in relation 15:85. We normalize the values of characteristics into two values – good and weak.

### Table 9. Chi-square test of proportions significance – contingency table

<table>
<thead>
<tr>
<th></th>
<th>Received</th>
<th>Expected</th>
<th>Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 weak</td>
<td>29</td>
<td>30,9</td>
<td>-1,9</td>
</tr>
<tr>
<td>2 good</td>
<td>177</td>
<td>175,1</td>
<td>1,9</td>
</tr>
<tr>
<td>Total</td>
<td>206</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 10. Chi-square test of proportions significance – test results

<table>
<thead>
<tr>
<th>Usability of Linux</th>
<th>Chi-square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>,137</td>
<td>1</td>
<td>,711</td>
</tr>
</tbody>
</table>

Since tabular value for one degree of freedom and threshold of significance $\alpha=0,05$ $\chi^2 = 3,841$, which is higher than value calculated, we accept the hypothesis and conclude that two values of characteristics are in proportion 15:85.

Since this proportion is in compliance with hypothesis H4, we accept this hypothesis.

**H4:** More than three quarters of respondents believe that usability of free software distributions is very good or excellent.

### Complexity level of installing and using Linux

#### Table 11. Complexity level of installing and using Linux

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Answered</th>
<th>Not answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IT expert</td>
<td></td>
<td>90</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Arithmetic mean</td>
<td>3,82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard deviation</td>
<td>1,012</td>
</tr>
<tr>
<td>2 Student</td>
<td></td>
<td>115</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Arithmetic mean</td>
<td>3,68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard deviation</td>
<td>1,056</td>
</tr>
</tbody>
</table>
Table 12. Complexity level of installing and using Linux

<table>
<thead>
<tr>
<th>Type of respondents</th>
<th>2 Low</th>
<th>3 Medium</th>
<th>4 High</th>
<th>5 Very high</th>
<th>5 Excellent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IT expert</td>
<td>13</td>
<td>16</td>
<td>35</td>
<td>26</td>
<td>26</td>
<td>90</td>
</tr>
<tr>
<td>Answered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of</td>
<td>13,4</td>
<td>16,5</td>
<td>36,1</td>
<td>26,8</td>
<td>13,7</td>
<td></td>
</tr>
<tr>
<td>answered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative</td>
<td>14,4</td>
<td>32,2</td>
<td>71,1</td>
<td>100,0</td>
<td>71,1</td>
<td></td>
</tr>
<tr>
<td>percentage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not answered</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100,0</td>
</tr>
</tbody>
</table>

2 Student

<table>
<thead>
<tr>
<th>Type of respondents</th>
<th>1 Very low</th>
<th>2 Low</th>
<th>3 Medium</th>
<th>4 High</th>
<th>5 Very high</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answered</td>
<td>16</td>
<td>25</td>
<td>47</td>
<td>26</td>
<td>47</td>
<td>115</td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of</td>
<td>2,1</td>
<td>13,2</td>
<td>24,7</td>
<td>13,7</td>
<td>14,7</td>
<td></td>
</tr>
<tr>
<td>answered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative</td>
<td>3,5</td>
<td>36,5</td>
<td>77,4</td>
<td>36,5</td>
<td>77,4</td>
<td></td>
</tr>
<tr>
<td>percentage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not answered</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100,0</td>
</tr>
</tbody>
</table>

We have applied $\chi^2$ test of independence of features in order to examine whether there is a statistical difference in attitudes of two groups of respondents regarding the complexity level of installing and using Linux.

Table 13. Test of independence of features – contingency table

<table>
<thead>
<tr>
<th>Level of complexity of installing and using Linux</th>
<th>1 Very low</th>
<th>2 Low</th>
<th>3 Neither high not low</th>
<th>4 High</th>
<th>5 Very high</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IT expert</td>
<td>0</td>
<td>13</td>
<td>16</td>
<td>35</td>
<td>26</td>
<td>90</td>
</tr>
<tr>
<td>2 Student</td>
<td>4</td>
<td>13</td>
<td>25</td>
<td>47</td>
<td>26</td>
<td>115</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>26</td>
<td>41</td>
<td>82</td>
<td>52</td>
<td>205</td>
</tr>
</tbody>
</table>

Table 14. Test of features independence – test results

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>4,754</td>
<td>0.314</td>
</tr>
<tr>
<td>N of answered</td>
<td>205</td>
<td></td>
</tr>
</tbody>
</table>

Since tabular value for four freedom degrees and threshold of significance is $\alpha=0,05 \chi^2 = 9,488$, which is more than value calculated, we accept the set hypothesis and conclude that there is no statistical difference in attitudes of two groups of respondents regarding the complexity level of installing and using Linux.

We will test the hypothesis H6 by using proportions significance test in relation 33:66. We will group values of features by dividing a statistical group into respondents who agree and respondents who disagree with the statement presented. Answers of respondents who haven’t declared themselves will not be taken into account.
Table 11. Proportions significance test – contigency table

<table>
<thead>
<tr>
<th></th>
<th>Obtained</th>
<th>Expected</th>
<th>Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Not high complexity</td>
<td>71</td>
<td>68,3</td>
<td>2,7</td>
</tr>
<tr>
<td>2 High complexity</td>
<td>134</td>
<td>136,7</td>
<td>-2,7</td>
</tr>
<tr>
<td>Total</td>
<td>205</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 16. Proportions significance test – test results

<table>
<thead>
<tr>
<th>Complexity level of installing and using Linux</th>
<th>Chi-square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.156</td>
<td>1</td>
<td>.693</td>
</tr>
</tbody>
</table>

Since tabular value for one degree of freedom and threshold of significance is $\alpha=0.05$ $\chi^2=3,841$, which is higher than value calculated, **we accept the hypothesis set and conclude that two thirds of respondents believe that installation and maintenance of GNU/Linux are tasks of increased level of complexity.** Received results confirm teh set hypothesis H6.

H6: **Two thirds of respondents believe that installation and maintenance of Linux are tasks of higher level of complexity.**

To the result received, we have applied $\chi^2$ test of independence of features in order to examine whether there is a statistically significant difference regarding the observed complexity level of installing and using Linux between the respondents who use and the ones who do not use developer tools.

Table 17. Test of independence of features – contigency table

<table>
<thead>
<tr>
<th>Complexity level of installing and using Linux</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Not high complexity</td>
<td></td>
</tr>
<tr>
<td>2 High complexity</td>
<td></td>
</tr>
<tr>
<td>Developer tools 1 Yes</td>
<td>46</td>
</tr>
<tr>
<td>2 No</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
</tr>
</tbody>
</table>

Table 18. Test of independence of features – test results

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>10.468</td>
<td>1</td>
</tr>
<tr>
<td>N of answered</td>
<td>205</td>
<td></td>
</tr>
</tbody>
</table>

Since tabular value for one degree of freedom and threshold of significance is $\alpha=0.05$ $\chi^2=3,841$, which is lower than value calculated, we reject the hypothesis set and conclude that there is a statistically significant difference in attitudes regarding complexity level of installing and using Linux depending on whether users use developer tools. In this way, we are proving the hypothesis H7.

H7: **Use of developer tools by respondents and degree of observing the complexity of installation and maintenance of GNU/Linux are dependent variables.**
Level of observing the advantages of Linux

Table 19. Level of observing the advantages of Linux

<table>
<thead>
<tr>
<th>Type of respondents</th>
<th>N</th>
<th>Answered</th>
<th>Not answered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>90</td>
<td>7</td>
</tr>
<tr>
<td>1 IT expert</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arithmetic mean</td>
<td></td>
<td>3,54</td>
<td></td>
</tr>
<tr>
<td>Standard deviation</td>
<td></td>
<td>0,973</td>
<td></td>
</tr>
<tr>
<td>2 Student</td>
<td></td>
<td>113</td>
<td>77</td>
</tr>
<tr>
<td>Arithmetic mean</td>
<td></td>
<td>3,68</td>
<td></td>
</tr>
<tr>
<td>Standard deviation</td>
<td></td>
<td>1,291</td>
<td></td>
</tr>
</tbody>
</table>

Table 20. Level of observing teh advantages of Linux

<table>
<thead>
<tr>
<th>Type of respondents</th>
<th>Frequency</th>
<th>Percentage of answered</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 IT expert</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Unsatisfactory</td>
<td>2</td>
<td>2,1</td>
<td>2,2</td>
</tr>
<tr>
<td>2 Satisfactory</td>
<td>10</td>
<td>10,3</td>
<td>13,3</td>
</tr>
<tr>
<td>3 Good</td>
<td>30</td>
<td>30,9</td>
<td>46,7</td>
</tr>
<tr>
<td>4 Very good</td>
<td>33</td>
<td>34,0</td>
<td>63,3</td>
</tr>
<tr>
<td>5 Excellent</td>
<td>15</td>
<td>15,5</td>
<td>83,3</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>92,8</td>
<td>100,0</td>
</tr>
<tr>
<td>Not answered</td>
<td>7</td>
<td>7,2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>97</td>
<td>100,0</td>
<td></td>
</tr>
<tr>
<td>2 Student</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Unsatisfactory</td>
<td>12</td>
<td>6,3</td>
<td>10,6</td>
</tr>
<tr>
<td>2 Satisfactory</td>
<td>8</td>
<td>4,2</td>
<td>17,7</td>
</tr>
<tr>
<td>3 Good</td>
<td>21</td>
<td>11,1</td>
<td>36,3</td>
</tr>
<tr>
<td>4 Very good</td>
<td>35</td>
<td>18,4</td>
<td>67,3</td>
</tr>
<tr>
<td>5 Excellent</td>
<td>37</td>
<td>19,5</td>
<td>100,0</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
<td>59,5</td>
<td>100,0</td>
</tr>
<tr>
<td>Not answered</td>
<td>77</td>
<td>40,5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100,0</td>
<td></td>
</tr>
</tbody>
</table>

We will test the hypothesis H8 by the test of proportions significance. We will group the values of features by dividing a statistical set into respondents who agree and the ones who disagree with teh statement presented. Answers of undecided respondents will be added to the ones who disagree with the statement. We will set a working hypothesis that 60% of respondents positively evaluate the observability degree of GNU/Linux over the competition.

Table 21. Proportions significance test – contigency table

<table>
<thead>
<tr>
<th></th>
<th>Obtained</th>
<th>Expected</th>
<th>Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Those who do not observe and restrained</td>
<td>116</td>
<td>114,8</td>
<td>1,2</td>
</tr>
<tr>
<td>2 Observed</td>
<td>171</td>
<td>172,2</td>
<td>-1,2</td>
</tr>
<tr>
<td>Total</td>
<td>287</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 22. Test of proportions significance – test results

<table>
<thead>
<tr>
<th>Level of observing Linux advantages</th>
<th>Chi-square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.021</td>
<td>1</td>
<td>0.885</td>
</tr>
</tbody>
</table>

Since for one one degree of freedom and threshold of significance \( \alpha=0.05 \) \( \chi^2 = 3.841 \), which is higher than value calculated, we accept the hypothesis set and conclude that 60% positively evaluate the degree of observability of GNU/Linux advantages over the competition.

Results obtained confirm the hypothesis H8.

**H8: More than one half of respondents positively evaluate the observability degree of the advantages of GNU/Linux over competition.**

Triability Linux prior to the use

Table 23. Triability of Linux prior to use

<table>
<thead>
<tr>
<th>Type of respondents</th>
<th>Frequency</th>
<th>Percentage of answered</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IT expert</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answered</td>
<td>5</td>
<td>5.2%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Not answered</td>
<td>3</td>
<td>3.1%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Arithmetic mean</td>
<td>1</td>
<td>1.1%</td>
<td>9.9%</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>5</td>
<td>5.5%</td>
<td>14.4%</td>
</tr>
<tr>
<td>2 Student</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Answered</td>
<td>22</td>
<td>22.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Not answered</td>
<td>28</td>
<td>28.7%</td>
<td>62.0%</td>
</tr>
<tr>
<td>Arithmetic mean</td>
<td>60</td>
<td>61.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>90</td>
<td>92.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>65.8%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

We will test the hypothesis H9 by proportions significance test in relation 15:85. We will group the values of features by dividing statistical set according to whether respondents evaluate this group as very good or weaker than that.
Table 25. Proportions significance test – contingency table

<table>
<thead>
<tr>
<th>Obtained</th>
<th>Expected</th>
<th>Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Good, sufficient and insufficient</td>
<td>30</td>
<td>32.3</td>
</tr>
<tr>
<td>2 Very good or excellent</td>
<td>185</td>
<td>182.8</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td></td>
</tr>
</tbody>
</table>

Table 26. Proportions significance test – test results

<table>
<thead>
<tr>
<th>Triability of Linux prior to use</th>
<th>Chi-square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>,185</td>
<td>1</td>
<td>,667</td>
</tr>
</tbody>
</table>

Since for one degree of freedom and threshold of significance $\alpha=0.05$ $\chi^2 = 3.841$, which is higher than value calculated, we accept the hypothesis and conclude that 85% of respondents evaluate the triability of Linux prior to the use as very good or excellent.

Results obtained confirm the hypothesis H9.

**H9:** Majority of respondents assess the triability of Linux prior to the use as very good or excellent.

Results obtained on the basis of processing the answers of respondents to this group of questions have given us a base to evaluate the character of each Rogers’ dimension.

More than a half of respondents observe the advantages of GNU/Linux platform (H8). Characteristics that respondents recognize as crucial when assessing the quality and choosing operating system are also recognized as relative advantage of GNU/Linux (stability, security, price, speed). This leads us to qualitative evaluation of Rogers’ dimension relative advantage as a dimension of driving character of the process of diffusion of innovations on the example of GNU/Linux distributions in Serbia.

Majority of decided respondents believe that there is a low level of compatibility of Linux and MS Windows platform. This leads us to qualitative evaluation of Rogers’ dimension compatibility, as a dimension of inhibitory character of the process of diffusion of innovations on the example of diffusion of GNU/Linux distributions in Serbia.

Two thirds of decided respondents believe that installation and maintenance of Linux are tasks of increased level of complexity (H6), while the use of developer tools by the respondents and degree of observing the complexity of installation and maintenance of GNU/Linux are dependent variables. This leads us to the evaluation of complexity as a dimension of inhibitory character of the process of diffusion of innovations on the example of diffusion of GNU/Linux distributions in Serbia. The data that complexity of GNU/Linux distributions is largely observed by respondents who do not use developer tools points to the presence of subjective when answering the questions asked.

Having in mind that more than three quarters of respondents believe that usability of free software distributions is very good or excellent (H4), and that there is statistically significant difference regarding the usability of GNU/Linux distributions between software developers and other groups of IT experts, observability is a dimension that has a driving character in the process of diffusion of GNU/Linux distributions in Serbia.

As the majority of decided respondents evaluate the triability of Linux prior to the use as very good or excellent (H9), we evaluate trialability is a dimension that has a driving character in
the process of diffusion of GNU/Linux distributions in Serbia.

**Summary of statistical analysis of research results**

When designing the research, 22 hypotheses were set – one primary and 21 additional hypothesis. By statistical analysis of research results and application of statistical tests, 17 additional hypothesis were confirmed, three are partially confirmed, while one is rejected. We list all additional hypothesis set.

**H1:** As crucial driving factors of diffusion of GNU/Linux distributions on desktop computers in Serbia, IT experts identify: stability of the system, data security, reduction of costs related to software licenses and possibility of adapting source code to own needs. – **Confirmed.**

**H2:** As crucial inhibitory factors of diffusion of GNU/Linux distributions on desktop computers in Serbia, IT experts identify: higher level of complexity of administration and use in relation to MS Windows, not sanctioning the use of pirated software and the problem of lack of control software for a new hardware. – **Partially confirmed.**

**H3:** Majority of ICT students and IT experts believe that modularity and portability are the advantages of GNU/Linux. – **Partially confirmed.**

**H4:** More than three quarters of respondents believe that usability of free software distributions is very good or excellent. – **Confirmed.**

**H5:** Majority of IT experts and ICT students believe that switching to Linux requires tedious learning whose learning curve does not suit the beginners. – **Confirmed.**

**H6:** Two thirds of respondents believe that installation and maintenance of Linux are tasks of higher level of complexity. – **Confirmed.**

**H7:** Use of developer tools by respondents and degree of observing the complexity of installation and maintenance of GNU/Linux are dependent variables. – **Confirmed.**

**H8:** More than one half of respondents positively evaluate the observability degree of the advantages of GNU/Linux over competition. – **Confirmed.**

**H9:** Majority of respondents assess the triability of Linux prior to the use as very good or excellent. – **Confirmed.**

**H10:** Three quarters of IT experts believe that „live“ distributions provide a good possibility of testing the operating system. – **Confirmed.**

**OPEN FIELDS OF STUDY**

In order to pint to directions of further studies, we use the answers obtained to questions at the beginning of this thesis as a guideline.

In addition to the fact that both groups of respondents evaluate stability, security and speed as essential characteristics of a good operating system, and precisely these characteristics stand out as the advantages of Linux over competitive operating systems, distribution of Linux is at a lower level in relation to the countries developed. Studying the reasons for this contrast can be one of the directions of further study.

The attitude of students that after the first level of academic studies is ended they will not own appropriate knowledge and skills to maintain systems with Linux points to the second possible direction of study – impact of formal education to the development of knowledge and skills as inhibitory factor of the process of diffusion of GNU/Linux distributions on desktop platform. The fact that respondents in different ways observe the usability of operating system based on open code depending whether they use developer tools or not. This points to the existence of mutual interaction between
innovation and its potential consumer, which is not quantitatively considered by Rogers’ model of diffusion of innovations. Quantitative and qualitative study of this thesis can be a continuation of this study.

Studying network effect and resistance to the change of acquired habits are not included in this study, so further research of this process take that direction.

By the research, we have obtained an answer to the question regarding the applications which the respondents usually use. Comparison of characteristics of these types of applications can give new answers regarding the kinetics of this process, whose monitoring and studying can be a logical continuation of this paper.

Software innovations are also characterized by the problem of property abuse, as well as danger from breaking legal norms. For that reason, the society itself is in a way in interaction with diffusion of innovations by its actions. This interaction, also, is not quantitatively considered in Rogers’ model. Qualitative and quantitative study that would deal with possible impacts that are not included in Rogers’ model and possible extention of this model would be a new possible direction of further studies.

Concluding remarks

Problems that have motivated this paper are related to studying the process of diffusion of GNU/Linux on desktop computers in Serbia.

The aim that we have set at the beginning of this paper was to Discover the character of factors (dimensions) of Rogers’ model of diffusion of innovations on the example of diffusion of free software distributions on desktop platform in Serbia. All the characters of Rogers’ model are exclusively a reflection of subjective observation of innovation from the part of potential users. In addition, five of seven goals of research conducted precisely refers to examining the attitudes of IT experts and those who will soon become experts (ICT students).

Diffusions, factors that affect it and the very kinetics of this process are not studied in this region. Current legal-political situation, regarding the ownership of not only the software but also the standard of documents in Serbia, has no instruments of repression over the subjects who use only pirated software, although there are no indications that the situation is changing regarding that issue. Policy of big manufacturers of proprietary software regarding the piracy is not aggressive in undeveloped and developing economies, and Serbia is not an exception. Previous practice from the environment shows that strengthening of economy will be followed by intensification of measures to combat piracy. As the future of the Serbian economy is in entrepreneurial initiative, small and medium companies, of which big majority should base its computer systems on desktop computer as basic construction unit, the issue of total cost of software ownership (TCO) will be increasingly interesting not only to those who start business, but to those whose software needs an improvement. Diffusion process for each organization and individual represents a change that is not followed only by the reduction of total cost of software ownership. Based on results of this paper, we have identified potential external and internal inhibitory factors of this process.

Investment, maintenance and price of proprietary software obsolescence, observed in relation to GDP, do not affect the budgets of Burundi and Sweden, or the budgets of Bijanovac and Los Angeles in the same way. Drop in hardware prices is followed by the increase of software products prices. Price of MS DOS in 1981 was only 5 American dollars. Today, for MS Windows and Office package, we need to pay almost the same amount as for a new desktop computer.

Governments of states, provinces, local community, health school systems, as well as state-owned companies worldwide increasingly abandon software solutions based on proprietary software. These changes can be planned by management, but IT experts, whose attitudes we have examined and based on which we have
brought conclusions about factors of diffusion of GNU/Linuxksa on desktop computers in Serbia, need to present them.

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JOURNALISTS OF TV RTV ON DIGITALIZATION
DUBRAVKA VALIĆ NEDELJKOVIĆ
Faculty of Philosophy, Novi Sad

Abstract: The aim of the research presented in this paper is to estimate how much do the journalists of the public service of Radio Television of Vojvodina, who are seen to be leaders in this process of transition from analogue to digital broadcasting of television program, know about this process.

In June 2011, 60 journalists of various ages and work experience levels employed on Radio Television of Vojvodina were questioned. The results confirmed our initial hypothesis that journalists and editors are not adequately informed, nor do they possess satisfactory amount of knowledge on digital media technologies.

Key words: analogue, digital, terrestrial broadcasting of television content, journalists, editors, Public service of Vojvodina.

1. INTRODUCTION

According to so far valid determination of the Ministry for culture, informing and information technologies of Serbia, the transition to digital terrestrial broadcasting of television program should be done by 4th April 2012, therewith the existence of simulcast that is the dual regime, has not been parallely predicted. It is also foreseen that the pilot projects starts in Vojvodina as the most appropriate area for testing of the complex technical-technological procedure.

It should also be emphasized that, according to the Law on radio diffusion (2002) the public services (RTV and RTS) are precisely the ones predicted to be the bearers of the process of transition from analogue to digital broadcasting (Article 78, point 9, The Law on Radio diffusion 2002):

“For the purpose of realizing general interest in the field of public radio-diffusive service, ascertained by this law, besides common obligations of the broadcasters in relation to the program contents from the Article 68 of this law, the bearers of public radio-diffusive service are obliged to:

9) provide usage and development of modern technical-technological standards in production and broadcasting of the programs and preparations and, in predicted period of time, realize the plans of transition to the new digital technologies; It practically means that the employees in these two media houses are the most invited to own the necessary managerial, journalistic and technical-technological knowledge in order to perform the digitalization process completely.

The Law on electronic communications was enacted on 29th June 2010. The law creators within the chapter “Meaning of certain terms” in the Article 4 have defined even 54 terms relevant for electronic communications, among which are also completely new, for our ambient, terms related to digitalization. That exactly was the guiding idea for the research team to conduct a questionnaire in the public service of Vojvodina and to determine whether the journalists of the RTV know what the meaning of only 7 of the most significant terms out of
that are defined by the Law on electronic communications (2010) is.

Since 2nd July 2009 the Government of Serbia has brought the Strategy for transition from analogue to digital broadcasting of radio and television program in the Republic of Serbia. It is a basic document by which the process is opened. It should be reminded that even in 2006 on the Regional Conference on radio-communications organized by the International Telecommunication Union (ITU) in Geneva Serbia signed an agreement GE06 and therewith undertook to transit to digital broadcasting of radio and television signal at latest till 17th June 2015. The European Commission recommendation to the EU members is that the complete transition to digital broadcasting is done till the beginning of 2012. As stated in the Introduction for now Serbia has remained at the date for transition to digital terrestrial broadcasting of 4th April 2012.

In the section 1.1 The facilities of digital radio-diffusion of this Strategy it is also specified, among other, that “To the service providers digitalization will give an opportunity of adjusting the contents to the needs of various target groups, interactivity, as well as the possibility of providing the services on the request, lower broadcasting costs and the services’ convergence”. Further specified is “the chain of participants in digital broadcasting of the radio-diffusion program” with the task of every one of them from the contents’ providers, distribution systems and the users. The Strategy defines technical standards, regulatory frame of the Republic of Serbia, specifies the international documents relevant for the digitalization, suggests what still needs to be regulated in our country, describes the current state in the radio-diffusion, defines the basics for introduction of digital radio-diffusion, and also propounds the question of the dividend.

The most important for this paper is the section IV of the Strategy for transition from analogue to digital broadcasting of radio and television program in the Republic of Serbia, Program contents. “The Strategy defines the “Program contents” as “various types of multimedia contents (audio, video, text, interactive services and the combinations of the mentioned). The set goal is “generating the conditions for development of freedom of speech, informing and media pluralism, introduction of new services in the audio-visual sector, development of interactive services and other contents, with maintenance and promoting of cultural diversities and realizing the rights of the invalids”. In this section in as brief as possible, the contents of two most important European documents are stated, the Convention of across border television of the European Council and the Directive on audio-visual media services of the European Commission. Further, a list is offered of the new services that will be able to be provided by the introduction of digital television. Thus, in one place, all the interested actors of social practice can inform themselves on the new technologies and the way they will be implemented, if the Strategy is applied in the predicted form and set deadlines. It means that the prerequisite for acquiring knowledge in this area has been set since 2009. It has been expected from the television journalists and editorial management, especially of the public services, to familiarize more seriously with the Strategy for transition form analogue to digital broadcasting of radio and television program in the Republic of Serbia.

After two years finally in the procedure is the preparation of the other two strategies to be adopted. It is about the Strategy for improvement of position of the media in AP Vojvodina and the Strategy of development of the system of public informing in the Republic of Serbia till 2016. In both of the stated documents, digitalization is one of the priority tasks.

In the Strategy of public informing system development in the Republic of Serbia till 2016, the chapter 2.10, The transition from analogue to digital broadcasting of programs includes only two paragraphs and only principally defines basic guidelines directing at the Strategy of transition from analogue to digital broadcasting of radio and television program which cannot be considered as sufficient for such an important work that essentially alters the perspective in public communications (the Strategy 2011:9). Further, in 3.7- Media pluralism, also specified is that “the Republic of Serbia will follow the development of media on new technological platforms, undertaking the measures inciting the preservation and strengthening of the media pluralism and diversity of media contents” (The Proposal of the Strategy 2011:14). In 5.3.4- Development of public radio-diffusion services it is pointed out that the Republic of Serbia (will), by the reformed legal framework, enable the institutions of public service to develop in a new technological ambient so that their program would be available on different platforms as well as the possibility of offering general, specialized, personalized and services per request as well” (The Proposal of Strategy 2011:19).

Apart from digitalization being the subject in different chapters defining the fields in which it is an important element, the complete chapter 6 is dedicated exclusively to the process. However, in the proposal of the Strategy it is not spoken on the social changes that the new technologies and especially digitalization bring and about the obligations that is rights and possibilities of the creators of program contents in this new "key".

The authors of the proposal of the Strategy did not understand how this technical-technological process is in essence deeply connected with and directly influencing on democratic processes. The Strategy should clearly contain the strategic determination of our society on the issues.
It should be pointed out that the Proposal of the *Strategy of development of the public informing system* in the Republic of Serbia till 2016 in the time of writing the text (the end of September 2011) is the definitive version of the document made by the working group of the Ministry after the debate. The text is awaiting the adoption by the Government of Serbia so that it would be put to the assembly meeting even this fall. Afterwards, a public debate comes to turn on The *Strategy for improvement of media position in AP Vojvodina*. In the proposal of this provincial strategic document in the digitalization is also spoken only from the viewpoint of implementation of new technologies but not also from the perspective of the contents that the journalist will be creating in the direction of supporting the democratic processes on which it is otherwise spoken more seriously in the European Recommendations of the Committee of Ministers Recommendations Rec (2003).

Simultaneously, the international documents from this field that oblige our country as well to fulfill certain procedures in the process of digitalization imply much more than the sole transformation from the analogue to digital broadcasting of the television program. Thus, for example, in the Recommendations of the European Council (Recommendation 1641, 2004) wherein the state in public services is analyzed and the steps recommended for promotion of the status and work defined also are media policies in public radio-diffusion services. Especially emphasized also since 2004 is that public services should lead the process of digitalization and, which is more significant, that the journalists are additionally educated for it ("c. design education and training programs, adapted to the digital media environment, for journalists").

Also in the mentioned two vital European documents *The Convention on across border television* of the European Council and *the Directive on audio-visual media services* of the European Commission very clearly stated are new program possibilities, defined types and ways of the contents’ presentation (including also the advertising ones) and focused on new target groups that will be enabled an approach to the electronic media by digitalization as well.

### Digitalization

The basic change that the digital terrestrial broadcasting of TV contents brings is a different business model in which the production and distribution of programs are separated into two organizations:

- an operator for production and
- a distributor for the program distribution

The basic changes in technical-technological philosophy are:

- Several TV programs are broadcasted at one frequency (through one TV channel);
- The unified digital format enables easy convergence of television, the Internet and telephony with abundance of new services for the viewer;
- The tone and image quality are significantly improved and 3D television is possible as well.

Besides the specified in the proposal of *Strategy for development of public informing system* in the Republic of Serbia till 2016 (2011: 28) also stated is that the digitalization enables “more diverse contents and several television programs, as well as the new services intended for the persons with special needs. To the broadcasters the service of digitalization will give an opportunity of adapting the contents to the needs of different target groups, interactivity, as well as the possibility of providing services per request, that is the two-way communication between the user of the service (the viewer) and the television contents provider”.

Opened issues are the following:

- how to create an area for taking over the frequencies for digital television;
- how to make an attractive offer for the viewers with the purpose of regaining the popularity of viewing the terrestrial TV stations and that thereat the collection of subscription is made more efficient;
- how to run in the new distributive organization;
- Specific for Vojvodina: how to keep several programs for national and other minorities;
- how and to what extent, that is who will train the management and journalists for working under the new conditions;
- how to enable the audience to be able to receive the digital signal but also how to train it for using of the new possibilities offered to them.

The total value of the project by which the European Union financially helps Serbia to conduct the process of digitalization amounts to more than 14 million EURO. From the amount the EU has isolated eight millions for supply of the equipment and, more significantly, about 2,5 million for training the people in Serbia that will work on digitalization (Blic Online, 2011). The sum predicted for the training is significant and if used in appropriate manner it will contribute to better advancement of the process.

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1 *Assembly debate* on 27 January 2004 (3rd Sitting) (see Doc.10029, report of the Committee on Culture, Science and Education, rapporteur: Mr Mooney). The Assembly adopted the text on the very day.
The aim

Within the Republic project Digital media technologies and social-educational changes of the Faculty of Philosophy in Novi Sad, realized by the Department for media studies from 2010 to 2014 together with seven high schooling institutions in Serbia, this research is realized as well, the purpose of which was to estimate how well do the journalists of the public service of Vojvodina, the media seen as being the leader in transition from analogue to digital terrestrial broadcasting of television program, know the issue. The aim was also to perceive how prepared are for the change from the perspective of managerial, journalistic, technical-technological resource, as well as if they understood the significance of the new possibilities that they should offer to the audience in the digital technical-technological context and how it influenced on democratic processes in the society under transition such as is ours.

2. THE HYPOTHESIS

The starting hypothesis was that the journalists and editors are not informed to a significant extent, nor that they have enough knowledge on digital media technologies and the influence on democratic processes.

3. THE QUESTIONNAIRE AND THE EXAMINEES

The examinees

60 examinees participated in the research. Every fifth journalist employed was surveyed, that is the editor in the television RTV which is considered relevant for this type of the research. In the past five years since RTVNS, as the state-centered media, started to transform into RTV-

2 The project is financed by the Republic Ministry of education and science, the projects code III47020.

3 In the paper presented only are the results of the first part of the research that comprised the journalists and editors of the public service of Vojvodina. The second part will include the journalists and editors of the regional and local television in Vojvodina, as well as those working in other media (press, radio, internet editions). The questionnaire was created by prof. dr Sunčica Zdravković from the Department for Psychology of Faculty of Philosophy in Novi Sad, whi defined the questionnaire, trained the students conducting the survey and analyzed the results of the closed questions, and Dr. Dubravka Valič Nedeljković, associate professor from the Department for media studies of the same faculty, that created the opened questions and analyzed the results. The input of the data and the statistical processing was done by special cooperator Karlo Bala, from the Department for Media studies. The surveyors were the students of the third year at the Department for Media Studies of the Faculty of Philosophy in Novi Sad which have undergone training before setting out to conduct the questionnaire.

the public service of Vojvodina the human resources have been restructured on several occasions and the number of the employed decreased both among the journalists and among the technical support to the programs. Frequent change of positions of the employees (journalistic/editor’s position) and the number of the employees should have as a contextual information in the sample estimation.

Regarding that the feminization of the media is a phenomenon present in RTV as well, in the sample there are more women journalists (31 women) than the male journalists (29 men).

The balance is done also in relation to the position occupying in the media: TV male journalists/female journalists (42 persons/70% from the total sample), male editors/female editors (14 persons/23.3% of the total sample) and the persons related to the programs realization (4 persons /6.7 % of the total sample).

All of the surveyed are from Novi Sad, permanently employed in the television of public service of Vojvodina.

They answered the questions in a questionnaire in Serbian language regardless in which program they worked (in the language of majorities or minorities’ language). An equal number (13) of them works from 1 to 5 and from 5 to 10 years in RTV, those who work from 10 to 20 years there were 12 persons that have fulfilled the questionnaire, then those working from 20 to 30 years there were 11, more than 30 years 8, and the least there were only 2 persons that work in the media less than a year. In this way included are all age generations of the employed in the public service of Vojvodina in the ratio in which they are present in the media. There are the fewest trainees because RTV cannot employ any new personnel while being in the process of the employees’ reduction (social program). Also as the consequence of several cycles of social programs offered to the persons that are close to the retirement in order to decrease the number of employees in the most acceptable way, there have been fewer of those surveyed that have more than 30 years of service than those that belong to the group of journalists of middle-aged generation. They make more than a half of the corpus (33 persons).
Proceedings of Scientific-research interdisciplinary project Digital media technologies and social-educational changes that is financed by the Ministry of Education and Science of the Republic of Serbia

Graph 2: Years of service in RTV

The Questionnaire
It is conceived so that it is very concise, so that the examinees could find the time to fulfill it at their workplace. Despite the conciseness, we have tried to gather the data concerning both the attitudes of the examinees on digital media, and of their knowledge on new technologies and terminology.

The questionnaire had in total 6 questions therewith three of the questions were concretely associated with the digitalization process, let’s call them “the battery questions” since each of the questions had a certain number of sub-questions. In the first battery there were 16 sub-questions. In the second 7 sub-questions and the examinees were asked to define 7 key concepts from the area of digitalization in this battery. The third “battery” was an open question related to the state of being informed of the surveyed, more precisely it was expected that they specify the digital TV services they had heard of.

Especially interesting to the researchers was the second battery with 7 significant terms which the management and the journalists of the public service of Vojvodina should know about. It is concerning the following terms:

Media service provider
Physical or legal entity having the editorial responsibility for preparation and selection of audio and audio-visual contents and determining the form in which the audio and audio-visual contents are made available to the public. Audio-visual media services of public service are: production, purchase, processing and publishing of the informative, educational, scientific, cultural-artistic, contents for children, entertaining, sport and other radio and television contents that are of common interest for the citizens, and especially for the purpose of realizing their human and civil rights, exchange of ideas and opinions, concerns regarding political, sexual, international and religious tolerance as well as the national identity preservation.

Network operator
Physical or legal entity that has to be organized as a special subject in relation to the media service provider, and which constructs, owns or uses public network of electronic communications for media service providing (cable operator, satellite station operator, multiplex operator and other).

Allotment zone
The allotment zone is the area within which the transmitting locations are allocated in order to provide coverage by the digital terrestrial television signal within the area in accordance with the Law on confirmation of final acts of the Regional Conference on radio-communications for planning of the digital terrestrial radio-diffusive department in the parts of the Region 1 and 3, in the frequency ranges 174-230 MHz and 470-862 MHz (RRC-06) (“Official Gazette RS The International Agreements”, no. 4/2010).

Media service on request (non-linear media service) is the service of receiving the programs provided by the provider, and in the time chosen by the user at his/her own request based on the catalogue of programs chosen by the provider.

Protected service
Is a media service of television and radio and, as any other audio-visual media service, it is provided with conditional access.

Must carry
Implies that the network operator has to include all the relevant providers of media service primarily the public service.

Must offer
Implies that the public services and media services providers with greatest share have to answer to any operator of the network and give their media products.

4. THE RESULTS
It was shown that the journalists and management of the public service of Vojvodina in answering the questions apply the discourse strategy of the type of agreeing with general principles, but disagreeing with their implementation on a concrete example, that is the job the employees perform in RTV. We also remind that it is a very spread model in media interview thereat that in the broadest sense also a questionnaire can be considered as one kind of an interview especially because the surveyors were asking questions from the questionnaire and the journalists responded to them.

In the research it is about answers on two sub-questions:

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4 Discourse strategy in the original form is identified as “a positive orientation to dialogue in principle, documented by numerous distinct negative illustrations” (Valić Nedeljković, 1998)
a) Transition to digital terrestrial broadcasting will promote television in general and
b) Transition to digital terrestrial broadcasting will promote the television content and program.

In the first case the surveyed have in a highly great percentage (72%) answered that the transition to digital terrestrial broadcasting will promote TV in general because by it they have shown their tendency and openness towards new trends in media industry. However, as soon as it should be applied on their own everyday work (b) it was shown that they were yet very reserved to the whole process and that they were not really prepared to accept new challenges. More precisely, only 47% of them replied confirmatively that the transition to digital terrestrial broadcasting will promote television contents and program and in the way that a third (33.3%) completely agreed with the point of view, partially 15% of them, but disagreeing completely is even 13.3% of the examinees.

The ignorance of journalists of the technical-technological process of digital production of programs reflects also in the fact that more than a half of the examinees (53%) replying on the sub-question Since when do your media produce program using digital technology (EMG cameras, computer editing) answered that they did not know, or left the sub-question unanswered, which practically means that they did not understand what was the task, since the public service for the programs preparation has been using in good part the digital technology for years back.

The journalists have shown that they are aware of the fact on the extent of not being well informed on the incoming changes, more precisely they were realistic in the estimates on how much they have been (un)prepared for the transition to digital terrestrial broadcasting of programs. Even 40% thinks that they are not prepared for the new situation in which they should produce the program, and almost a third thinks that they could anyhow do something.

Simultaneously they were less critical when they should answer whether their editorial office is prepared for such serious changes in the preparation of program contents. Less than a third thinks that they are prepared as an editorial office to respond to the set task, and 26.7% of them are indeterminate. Thus, when the complete RTV is in question, the examinees have been much stricter in the estimates because in essence it does not present them in a negative light, that is as the ones that are not competent enough, as individuals the tasks of which is to master new technologies and view new possibilities in preparation of program contents under conditions of digital broadcasting. However, when estimating their narrower working unit, of which they are the integral and visible part, then they were softer in estimating the situation.

Most of the examinees believe that the technical segment satisfies the set standard, meaning that the journalists of public service are mostly informed in how much of the equipment has been supplied in the past few years.
Apart from the technical accomplishments, it is very important how much are the journalists themselves prepared to change “the perspective” on the programs production. It has been shown that they are not certain that it is possible at the moment. Even a third has not agreed with the offered attitude My editorial office is prepared for transition to digital production of programs, and 18.2% of them partially disagrees. When we add the indeterminate ones to the percentage, and those that only partially agree, then we obtain a high percentage (in total 86.7%) of RTV journalists and editors that are practically not sure that they would manage well under new conditions. Since only somewhat more than a half of year has remained before shutting out the analogue broadcasting and transition to the digital one it is a discouraging result.

In the introductory part we have mentioned that the newly adopted laws and strategies enabling and providing the legal frame to transition from analogue to digital terrestrial broadc asting of television program in Serbia are mostly enacted in time.

According to the research, the journalists and even the management of RTV are not sufficiently familiarized with the texts even though it is a basis for the everyday job they do. On the sub-question We are familiar with the legal changes the transition to digital terrestrial broadcasting brings even 46% of them replied that in the essence they were not familiar with it. The variables “totally not” and “partially yes” we have considered in this case in the essence as the same answer, therewith that the second offered variant served to the examinees as a desirable answer, and yet not really untruthful. Only 10% of them answered that they were familiar with it.

Having in mind the pointed out, it is completely clear that the results of the answers on the second battery of our questionnaire in which it was asked that the examinees define 7 terms important for understanding the digitalization, point out to a high level of the RTV journalists and editors not-being-informed.

Only 29% of the examinees have tried at all to define at least some of the offered terms. 47% of which has defined only ONE from the offered seven terms. The percentage of incorrect and correct answers in relation to the complete sample even better shows how much are the journalists and editors not informed that is that they did not read not even for example The Law on Electronic communications (2010) in which all the wanted definitions exist.

Therefore, 71% has not even tried to define the set terms at all. 11% of them stated that they did not know, 11% answered incorrectly and only 7% have partially correct defined at least some of the terms. No one completely defined all the terms and it being correct.

From the next year RTV will be “provider of media services” only 22% of the examinees have at least partially managed to define the term, or to mention descriptively what does it imply and withal it is the greatest realized percentage.
For “the network operator” partially knew 8%, somewhat more examinees, 10% partially knew on what the term “media service on request” meant.

What is implied under “protected service”, “must carry” and “must offer” partially responded between 2% and 3% of the examinees. All the others have not even tried to define the specified terms.

And in the end the open question For which services of digital television have you heard of? Only 16% of the examinees (27%) replied out of 60 journalists and editors of the public service of Vojvodina that have fulfilled the questionnaire. The most frequent answer was “media service on request”. Simultaneously, 90% of the examined journalists and editors of RTV did not know to define the term.

5. CONCLUSION

Serbia has entered into the process of digitalization of television terrestrial broadcasting in time when regarding the international activity (in 2006 it signed the agreement GE06 in Geneva) and preparation of the corresponding strategic and legal documents. Concerning the technical-technological and especially the educational preparation it is still far from the optimum so that the process would be rounded up on 04.04.2012 as specified in the Strategy and Action plan for transition from analogue to digital broadcasting of radio and television program in the Republic of Serbia (2009). The EU has provided financial assistance mainly for the technical-technological preparations and the minor share for training.

Judging to the results of the conducted survey in June 2011 in the television of the public service of Vojvodina, the journalists and editors of various ages and from all the editorial offices that replied on the questionnaire (60 of them) are not informed to a sufficient extent on the forthcoming greatest change in the history of our television so far- the transition from analogue to digital terrestrial broadcasting of the programs. The examinees have responded in general on the media digitalization, then on the digital production and broadcasting of the contents, the preparedness of RTV for these changes, but also on the own narrower production unit (editorial offices) and in the end on their personal state of being informed on new technologies, only in a socially desirable manner (indefinitely), but yet in that way specifying enough that the public service of Vojvodina, concerning the production of the program contents in question, is not prepared for the forthcoming changes. Let us remind that according to the Strategy (2009) it is predicted that the pilot project is realized on the most appropriate area and that is Vojvodina.

New digital technologies ask for certain pre-preparation so that they would be used for program production in “the new key”. So far in Vojvodina, such trainings for raising the professional standard have not been organized and the journalists have, with a critical distance, realistically estimated that they are not yet prepared. This clearly shows that if the public service wants to promote the production of contents it has to invest in the permanent education of the journalists.

If the term of the transition isn't changed, only seven months remain for the management of the public service of Vojvodina to organize and realize the trainings for the journalists and editors in order to prepare them for the complex task as much as possible. The trainings should include both a theoretical and practical part since the essence is in the fact that the producers of media services change the way of creating the contents under new technical-technological conditions.

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http://eur-lex.europa.eu, sajt gde se nalaze svi evropski dokumenti (the site whereat all the European documents can be found).
IMPACT OF MEDIA GLOBALIZATION AND MEDIA EDUCATION ON MEDIA CULTURE

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Abstract: Observing recent human history, role of the media in modeling human opinion, understanding the world, as well as running it, is not only noticeable, but it is recognized as one of the most important factors of modeling social culture. Recently, modern technological inventions and progress in the field of media communication, have enabled greater connectedness between people in all parts of the world and availability of information, so they have thus contributed to development of the idea on global system. Depending on the interest and point of view, globalization has its good and bad sides, and thus the question is asked in which way the media influence individual cultures in this process: whether media can provide a solution for elimination of bad products of globalization, such as growing divisions, inequalities and manipulations. From ethnical standpoint, it is required to achieve the need for approaching of all the cultures, which would reduce the misunderstandings and conflicts, and the society as a whole would be more productive and successful. However, this has to be achieved in way not to jeopardize the very characteristics of a particular culture, ideas, beliefs and customs that make it specific. This paper precisely observes the way in which media influence the modelling of this global culture, whether specificities of individual societies are taken into account, or, however, they have a desire to model the world according to certain pattern which in their opinion will be the most productive, without considering real importance of cultural inheritance of each participant in this global system.

Key words: media, globalization, system, culture, communication.

INTRODUCTION

For many years now, globalization is one of the themes that is increasingly written and discussed about. It is present in different contexts, so discussions regarding it can be read in materials from the most diverse journals, to scientific papers.(Vidaković, 2008., 289)

Media cultures, as a subsystem of general culture, is susceptible to the impact of all social subsystems and exponential changes in environment (internal and external), and also has a retroactive effect on all of them. This means that among the subsystems mentioned there are constant interactive effects. Through that prism, we try to explain the impact of globalization to media and vice versa, media on globalization and prove the hypothesis on the existence of specific difference among media globalization and media culture globalization, as well as much smaller impact of globalization on the media culture in relation to the media.

High growth rate of technological progress (informational, communicational, transport etc.) had a crucial contribution to development of globalization processes, among which there is also the globalization of media industry. Interest-profit motives are basic initiators of economic globalization, which is essentially found in the basis of media globalization, which is also characterized by the economies of time, space and money and dominance of transnational big capital.

Financial globalization, virtualization and transnationalization of economic and integration processes are basic manifestations and common elements of economic and media globalization. They significantly contribute to design creation of the model of so-called «civilizational uniformity», to which the majority of media industries institutionally adapts in almost all countries. In the field of media culture, there also comes to consequences of the application of information technologies. Professor of sociology at University of Berkeley (California) M. Castells in his major work „The Information Age: Economy, Society and Culture“ (1996-1998) has announced the growing significance of media mediating image of reality and growing impact of virtual reality culture, conditioned by inputs of cheap information.

Most authors agree that globalization is an important characteristics of modern global economy, and, in our opinion, media industry as well. It is about real historical process of universalization, homogenization and unification of media entities and media contents by some significant principles, guidelines and standards of behaviour, as well as the affirmation of growing interconnectivity interdependence between particular media entities.

Therefore, many authors consider that it comes to underestimation of other people’s cultures, historical traditions, customs and heritage and that, in one way or another, the western pattern of media culture is imposed
to many people. The first statement seriously impairs the credibility of universality of rules and principles that are proclaimed under the banner of globalization in general and globalization of media separately. Therefore, all attempts to create global developmental paradigm in all fields, including media sphere, are invalidated. Because, if globalization strives for the global universalization and unification, world of interconnectivity and interdependence, it should refer to all fields and subjects, under equal conditions, so, in practice, the imposed dualisms, polarisms, principles of double standards, unequal exchange, a number of inequalities and disproportions should be happening, or approved or widely affirmed.

This actualizes the question: whether media globalization is developed according to neo-liberal model which is described by Nobel laureate J. Stiglitz (in the book “Making Globalization Work”) and many other famous authors? (Drašković, 2008, 72)

But, unfortunately, “in multiculturized world, constructive approach is to give up on universalism, accept the diversity and aspire to similarities” (Huntington 1998, 355). Universal uniqueness of anything, and particularly when it has supranational character was always a fertile basis for totalitarianism, which was implemented by violence. Ideal of globalization in general and ideal of media globalization, especially in its tendency towards the universal, has some common points with totalitarianism as well.

Media culture globalization, in the way in which we consider and interpret it, wouldn’t probably have more contact points with totalitarianism. If that is the case, then, objectively, it is not desirable as well.

When writing this text, we have analyzed three theoretical approaches in relation of media and globalization, as well as their criticisms: developmentalism, cultural imperialism and concept of information society. In addition, media globalization is also observed through the prism of development (even virtual) collective systems of different opinions and perceptions regarding the events about which interest groups try to control and discipline the citizens and influence their attitudes through media imaginations.

1. MEDIA GLOBALIZATION

The illusion is that almost everything related with globalization in general and media globalization is based, begins and ends in the market as regulator of economic behaviour and competition as its primary lever. (Drašković, 2008, 73) Essentially, however, everything is done so that market would be controlled through monopolies and to reduce competition by top competences of media magnates, to affirm the government of supranational media elite which sets new orientations of development of global media industry.

Economic and media globalization is programmed and oriented by the most developed countries, the biggest transnational corporations and the most powerful world financial centres, in order to provide business continuity, spreading and obtaining as higher profit as possible. Media globalization puts before the society the problems of ownership and control of activities of global media companies.

Reality of media globalization is indisputable question today, because it is implicated by the process of general globalization into economic, political, cultural, environmental, institutional and other activities, as well as development of mutual global connectedness of society. Among general globalization and its key segments (economic, political etc.), on one hand, and media globalization, as specific segment that covers all other segments on the other hand, there is a close cause-effect connection and continuous feedback. There is, of course, common propulsive common denominator, which includes the most modern ICTs which enable simultaneous occurrence of the mentioned mutual impact and interaction among any two locations on Earth.

Today, former division criteria (political, ideological, national, class, racial and religious) blur through the media, marginalize and subject themselves to basic economic and geopolitical criteria, which as global guidelines lead to dominance and power of those who own the capital, through which everything else is solved. This aim does not choose the means and methods of realization, everything is subjected to him, especially media industry.

Therefore, all modern human inventions and achievements are used, but also many seemingly outdated dogmas. Great influence and role of the media helps the economic, political and other competitiveness and competences to dominantly and often uncritically follow key highways of global policy (V. Drašković 2009, 121 ). Global media, in which “new” media dominate have strong and imposed behavior rules, in which there is no space for naive idyll and altruism. They are highly interesting and profitable, they have complex phenomenology, which isn’t sufficiently researched and explained. However, they are one of the main promoters of globalization, because they serve it through their sophisticated and aggressive glocalistic strategy (Ibid., 127).

Globalization of the subject matter develops rapidly and by it we imply transborder announcement of standardized media abridgement and entertainment programmes on globalized and networked channels of mass information means (MTV, CNN, Fox News, BBC, Sky News etc.). Simultaneously, the concept of “auditory globalization”, which refers to tastes and preferences of the audience, also develops. In addition, the processes of monopolization of information resources in global
proportions also progress. On western communication, the term *global language* is used. We cannot deny the existence of particular global media, nor particular (very significant) media aspects of globalization (e.g. cheaper and faster media flow, transfer and transport of information, CNN, Sky News and other local television networks, Internet as world wide web etc). However, more complex and uncertain is to advocate the existence of media culture globalization, which will be considered in this paper.

For that reason, many questions were open, of which, the most significant are probably the following two: whether the technology is sufficient for media culture globalization and is the strong media influence on globalization teh same thing as media culture globalization?

1.1. Media and globalization

We have entered the third millenium with a new civilization paradigm of global social development, as M. Drašković (2008, 80) says, stressing the “communication networking at all levels and in almost all fields, which enables and frequently creates virtual reality”. The same author states that global civilization transformation is revolutionary by its nature and significance and it must have one of central positions in media, for which reason some authors use teh expression „media company”, having in mind global massiveness of information. In addition, he observes that „globalization has contributed to increasing social organization and communication through media, through which and in which communication culture is realized” (Ibid, 82).

Media globalization was contributed by leading technologies, and globalized media, on the other hand, make all global events and trends widely available. Expansion of media globalization, in which they become main guidelines in market and global aspect (Ibid., 88) has numerous and enormous consequences, about which many authors have written.

It is important that the same author in citated paper „Application of management in media” treats the impact of globalization on media and thus conceptually initiate very significant and complex theme of this scientific meeting. He rightly observes that „media globalization implies erasing local media borders”, with immense advantages and disadvantages from present perspective (Ibid., pp. 94). However, we can hardly agree with the statement in the continuation of the citated sentence– „and increasing unification of media culture”, which will be discussed further in this paper. Furthermore, the same author rightly points to main promoters of media globalization, as well as decisive impact of big capital, i.e. interest principle in media industry. Media globalization is, of course, influenced by the application of global management strategies.(Drašković, Dorokhov, 2010, 34)

Direct and close communication with any medium, as Inglis (Inglis, 1997, 106) points out, is achieved with standard (bigger or smaller) impact and mediation of wide publishing industry, from publisher through seller, critics, advertisers and manufacturers, to distributors. In this chain, there is a whole range of complex and structural interests whose motivational framework was expanded by globalization and deepened to unimagined proportions. In which way? Primarily through technological innovations, even growing hyperproductions in the part of media contents: gramophone record, cassettes, CD, colour TV, satellite news, electronic printing, new media, data banks etc. Old media survive in one way or another, with visible modifications and reduced profitability, but the penetration of new media and media contents obviously reflects mutual impact, i.e. feedback between globalization and media, where the interest component is dominant and determining.

Orientation on values (cultural, moral, srstic etc.) is not very binding, on the contrary. Media market is specific, but, however, it is only a market in essence – it si full of media products, and something of it goes well with globalized audience. Among these, there are many things that shouldn’t go well. Globalization helps here a lot, especially in the part of globalized innovations. Criteria are always the same: mass and selective expansion of markets, modern technologies, impeccable organizations and maximization of profits with maximal possible circulation of original matrixes (economy of scale) and rapid distribution. This is a basis of success and its main cause and rare are those to care for the consequences.

Information society with the reduction of time and narrowing of space is, as appears, an ideal basis for it. Communication competition of media multinational magnates goes on global field, which is often tilted to one side – big capital and strong lobby interests. Prey is huge, global competitors share it, and cultural consequences and terrible (Drašković, 2008, 125). In all of this, we can ask the question of rare creations and limitless imitations, particularly through the prism of Picasso’s statement that „computers are useless because everything that can give us are the answers to our questions” (Hantington, 1998). Globalized media offer much more, even the things no one needs or wants.

Modern global and exponential character of changes in telecommunication technologies announces the impossibility of blocking much greater than before in telecommunication technologies. Therefore, the danger in which traditional media are is obvious, but, that’s the way it goes, it is our reality. Media were and remained the backbone of democracy, and the level of their freedom is its essential indicators.

If contemporary global audience actually becomes left to blogs and posts on Twitter, as Tirk says (2010, 15), how
will the citizens manage the „information without proper instructions“ (Plato). Media globalization and contribution of media to globalization were quite opposed processes, each for itself, because global concentration of power, inevitably, contains inmanent threat, both for media freedom and free choice of media audience. Threat to media is historically reproduced, as it appears, and waves of globalization do not reduce it or deaden it. This is particularly noticeable in all bigger global crises, such as this contemporary. It is, however, only a reflection of another threat that communication technologies, big and rapid flow of information create to all tycoons and monopolists. Free electronic connections and communications as the most efficient form of social organization is a fact, a threat for some people and hope for the others that there are democratic oasis, alternatives to omnipotence of monopolists.

Is it possible, in the „empire” of information technologies and so-called information society (knowledge), to talk about „media empire” as well (Hantington, 1998), as their consequence? Particularly through the prism of exceptional increase of systemic interactivity, programme standardizations of media content preparation, super rapid analysis of data, integration of information and telecommunication technologies and possibilities of high-quality and real home media creations.

Drucker’s „information revolution” as the fourth (after the discoveries of letter, book and printing machine), no matter how heterogeneous (information and communication revolution), has produced numerous positive and negative consequences and verification of existence of „media empire” would have negative foreigns, having in mind the above-mentioned.

Market globalization is a product of communication revolution, which is also the electronic trade. The first guideline is typical for the media. Developed regional and global media markets are one of the best indicators of the range and limits of general globalization.

2. MEDIA CULTURE

Globalization of media is contributed by spontaneity, monopolization and determination by interests of big capital in media industry. There are, also, the attempts for such as global media pattern to be imposed and formed by the impact of dominating strengths on media market. However, big differences in a) development and profitability of media industry from country to country, from region to region, etc., b) number of audience and c) numerous culturological, social, economic, institutional, ideological, political, systemic and other insurmountable specificities do not suit the creation of one such global media pattern, nor it can be predicted from current positions. There is also a wide range of pattern behaviours, organizational cultures, tradition, life styles, beliefs, value systems, civilization characteristics and level of applied technologies. Multi-layers of media culture comes from its numerous and complex components.

In addition, we need to have in mind that a) heterogeneity of determinations of media culture, term that is ambiguous and unical manifestations and it represents the outgrowth of modern cultural theory, b) serves for marking a special type of culture of information society, which appears as mediator between society and the state (government) and c) includes information-communication means, intellectual and material values of humanity formed in the process of cultural-historical development of society, which contribute to the formation of social consciousness and socialization of personality (Kirillova 2006, 8). Media culture is a witness and participant of the the process of forming global opinion, which is instrumentalized and operationalized through media, whose level of realization is difficult to measure. It is equally difficult to measure the role of media culture in society, as well as its impact on social, intellectual, artistic, psychological, consumer and other aspects.

Aspirations of big ones (in form of neocolonialism, imperialism, etc.) are one, and reality (with really universal problems and mass application of technological achievements on narrowing the space and time) are something quite different. This is certainly affected by the existence of cruel and highly interested globalistic ideology that the ones (usually technologically and economically developed) imposed to the others (usually undeveloped). Through that prism, globalization process looks completely different, because all its advantages are clearly seen, as well as deficiencies, achievements, challenges that act (sometimes rather destructive, as waves of global financial crisis, which has transformed itself into global economic crisis). In addition, different fields in which globalization has a positive effect are more clearly delineated (such as for example “knowledge economy”) or negative effect (for example, neoliberal economy, social stratification etc.). The questions mentioned analyzed to what extent can globalization homogenize the spece of media culture. Especially when we take into consideration the objective threat of specific features of local and national cultures, but also the fact that globalization creates diversity, rather than only homogenization. (Drašković, Dorkhov, 2010, 38)

Globalization of mass media is probably the most efficient way of suppressing different cultures, their transformation and modelling towards molds and requirements of western corporation system. Blinded by profits and other personal interests, media neglect many important issues and problems, among them is also, for example, the inability of limitless economic growth on questionable principles, unequal exchange, technological leadership, etc. As if there isn’t the growing danger of limited resources.
Media do not help in any way, on the contrary, to be understood that modern global problems come from inconsistent policies (V. Drašković, 2008, 122). Homogenization and convergence of basic symbols of media culture is developing in a real and incontinent way, to smaller or greater extent in different regions, states and local communities, under dominant impact of communication-information technological innovations. However, its still does not imply the unification of media standards (developmental, organizational, designer, professional, content etc.), nor too diverse identities of media culture. Global synthesis is the mentioned aspect is simply impossible. The impact of global trends and global media interaction are spread (via Internet, satellite and cable TV and the most modern technological inventions). (Vidaković, 2008, 307) However, objectively, it is not too far away from the creation of universal identities in the field of media culture.

Historical memory and technologically networked media-informational space reminds us of colonialism, wars, crisis, global problems, conflicts etc. However, those are only technological and constructed aspects, which do not contribute to the creation and implementation of media culture standards in heterogeneous world of media industries, nor some universal and global identity of media culture. As we cannot unite and globalize categories of humanity, justice, democracy, even collective media identity, so we cannot create global media culture. Problems of people, social conflicts and citizen values are unfortunately on the margins of media content. When we speak about globalization of media culture, it is necessary to be careful and to have in mind that it is more about somebody’s theoretical construction that can be attractive and popular (to the same extent as reckless), than an objective chance for the existence and creation of global media culture in the real sense of that word. There is no doubt that there are isolated and strong globalistic tendencies, virtual connectivity and irrevocable technological-network interaction, but we do not believe that there are real conditions for such a thing. Numerous inequalities, local interests (national, developmental and other), specific factors of impact and localistic paradoxes are main barriers to the mentioned theoretical constructions, which are blinded by the flourishing of transcontinental communications. We forget on the possible conflicts of centralization and decentralization, globalization and localization, globalization totalitarianism. Therefore, we also forget about the questionable universal and systematic interconnectivity and interdependence in media culture.

Regardless a) that it is considered that general term globalization is significantly modelled by the impact of the idea of Marshall McLuan on „global village”, which he has explained in his monograph „Communications research” (1960), b) that the development of electronic media, which are in the focus of their study in the mentioned work, strongly influenced the global awareness and the idea of global community, i.e. the „strengthening of awareness of the world as a whole” (Robertson 1999, 36) and c) which new forms of informational and communicational technologies create the phenomenon of cyber space, however, we are not sure that all of that, as well as many other segments and symbols of penetration of globalization in the field of media, it is sufficient that it is spoken about the globalization of media culture. (Vidaković, 2008, 319) Trend of creation, i.e. global culture, if it can generally be spoken of such theoretical construction, through mass media, represents the attempt of homogenization and standardization of cultural values, artefacts and universal symbols of different people, nations and civilizations. Some authors (Ritzer 1995) interprete it as an attempt of americanization of „small cultures” and national identities, which can objectively lead to their annulement. From that aspect, the chances for the creation of a coalition of national media cultures, which, for now, have an exclusive right to vote on their geographic fields and they do not even think of making a rational framework for global image.

The appearance of uniform forms of media culture, which the Appadurai (1990) has called media and idea landscapes, and Sclar (1991) called it the ideology of consumer culture, does not imply the dominance or victory of transnational cultural imperialism. Because they are not rooted in any national media culture, regardless of their aggressive attempts and impacts and hybrid forms that exist and that change rapidly, with teh changes of styles, fashion and consumption of media products. (Drašković, Dorokhov, 2010, 40)

As much as teh culture is a social process that is developed in balance points of universal and particular, the question of defining the borders of that crossing is asked, the borders that are quite distant from the ideals of liberty, equality and justice, without which no global culture is possible. Mentioned perception is in the same field with Appadurai’s perception of culture as the site of conflicts, differences and comparisons. The other thing is that it is attempted to implement the projects of political, geopolitical, ideological, economic, institutional and other forms of dominance and imperialism under the mask of cultural globalization in general and globalization of media culture.

3. MEDIA FUTURE OF THE WORLD

All the power of scientific opinion, almost all humanist and social disciplines and, as we have seen, also those that belong to natural sciences, participate today in identification of problems related to new media civilization, predictions on its further development and suggesting the best ways for its successful functioning. Two basic aspects dominate is all this. One, apocaltic, which sees a path towards total mastery of the world, creation of a perfect „surveillance society”, in the
spreading of new media technologies. From the variant by which centres of power in whose hand the media are found can indoctrinate and change the world of entire humanity, through the one in which human nature will lose basic attributes and reduce its intellectual and creative potentials to mere perception of images, to the variant by which due to enormous amount of information, the man entirely loses knowledge and wisdom, apocalypsts predict the future without a man we knew so far. Those are the visions of completely alienated world, reduced emotions, reduced to mere affects, the world in which love statements will be encoded and encrypted rather than whispered in the ear, and hugs and kisses will be transferred by image, with no touch or smell.

The second, optimistic and activist view on media future of the world points to the expansion of the field in which it is possible to express diversity, subjectivity, creativity and freedom. This would be a world where human intellectual attributes are accomplished to the extreme, the world deprived of pressures and necessities that are imposed by nature, the world of continuous and active communication and bonding between people.

Based on everything above-mentioned, the issue of media education is set as urgent and prompt. But, firstly it is important that we define what is implied under that term. In general, media education implies the preparation of the young and future generations for life in the world that cannot be back to romantic union between man and nature, to idyllic past of the chosen ones and authorities, who set the world on solid foundations with their power of knowledge and intellect. Only today’s generations of middle-aged people can allow themselves the pleasure of the past, and the future ones will live with media and in media from their birth to their death. This will be their reality. In that sense, it is necessary to access new order of things with big capacity of knowledge, possibility of reasonable evaluation, ethical principles established in unquestionable values of interhuman communication and trace the ground where the people will feel comfortable, but create social and individual life with full responsibility. Media education should teach the reading of media messages, which means accepting that they do not „convey” what happens in reality, „that they are not a window into the world”, but they are active creators of that world. Decoding media messages implies a sharpened eye and reading between the lines in order to recognize partial interests, knowledge and intentions, which, owing to their public status, the media tend to impose as general, universal view of the world. It is necessary to teach the young people to question and from “subcutaneous” effect of media images and messages, which, in other words, implies development of open critical consciousness. If in social, economic and political organization of modern world there is no space for some radical systemic upheavals and changes, then there certainly are numerous possibilities for causing „microresistance” in small „capillaries” of society. For that reason, development of critical consciousness, in spite of the fact that this term is considered to be outdated and too much in the spirit of some „outdated” technologies, should remain the goal not only for future generations, but also for those that give up at this point, suspecting that their work and actions can be effective.

Another aspect of media education is certainly the learning how to creatively participate in them. “There is almost no field of art that hasn’t moved to media from ones high spheres. There is almost no field of knowledge that the media cannot formulate and communicate, participating in one comprehensive and continuous process of education. In other words, media education should begin from the earliest age and last permanently until maturity, having in mind that speed of changes and amount of information that we encounter today are so big that no one in this process can stop and be satisfied with all that he has acquired and learned”. (Ilić, 1990)

What is in the end left as basic issue is certainly the way in which we should approach to this new education and which is the basic medium that will take part in it. It appears that in this aspect we will have to return to the good, old book, which is still the only medium that can systematize a lot of facts, organize immense amount of information, affecting not only the senses and perception, but also deeper layers of spirit.

In our environment, the awareness on the necessity of media education is not developed and very small number of publishers try to comprehensively access this problem from the perspective of various disciplines. Media education also implies the inclusion of new disciplines, interdisciplinary cooperation, readings that will be prepared for all ages, not only students and adults, but also for the younger, as well as the education of people that will be ready to participate in permanent education.

### 3.1. Need for media education

Idea on media education does not represent the novelty of our age. Sometimes it was linked with general processes of education (acquisition of so-called general culture, which is within the family, school syste, group of peers etc., adopted in its either formal or informal form), or it has followed specialized processes, oriented primarily on artistic creations, usually implemented sporadically, in different creative workshops, tribunes, courses, scientific conferences and seminars, i.e. in context of achieving technicing process within the system of higher education. However, current media – and this primarily refers to visual and, more precisely, mass communication media, have long since overcome the boundaries of modern art activities, and also reshaping of the culture world or to suppress it to the very edge of disappearance in its traditional form of being. Today, in the era of the expansion of electronically generated visual interactions
and communications, which increasingly constitutes our living environment and experience, the need for this form of education, to much greater extent than before, gains in urgency, intensity and significance. Therefore, the problem spectar of movement of the processes of media learning moves in the range from education for strategic purposes, i.e. in function of military training and achievement of primarily war goals, until peaceful domains of their use, for example, for the purpose of solving the issues of transport communications, distance learning or public health.

Therefore, the conceptual phase „media education”, which implies the widest approach to studying some general media environment of modern age, i.e. reality itself, most frequently related to terminologically similar educational processes – media literacy (in the sense of elementary education: familiarity with the nature of modern media, their theoretical understanding, i.e. reading media messages, possible practical uses and finally, reflected criticism) and education for the media (which actually completes educational processes in the sphere of studying certain professional profiles, i.e. professional and pedagogical resources, in this specific domain of research).

„Media education”, as Nada Korač claims in the journal Pedagogy, „before other things, implies the acquisition of media literacy. As well as the acquisition of any other literacy, it can be truly successful only if we have in mind the connectedness between two key factors of specificity of the (given) media and the way in which those specificities understand the ones that are educated. As one of the necessary conditions for establishment and development of democratic society, thus conceived media literacy can significantly contribute the adoption of democratic values in case of children and young people higher ages, including the pre-school.” (Korač, 2005, 51)

Basically, this idea implies the emphasis of the need for introducing media literacy as a separate teaching subject or, perhaps, entire set of similar subjects and scientific disciplines, in educational processes that include all levels and forms of education, as well as dispersion, i.e. implementation of these techniques, skills and knowledge in all available teaching processes, regardless of different subjects of teaching. Simultaneously, it is based on belief, which numerous critically oriented contemporary media theorists today rightly deny, that media literacy is one of the conditions for development of civic democratic values, particularly if it is understood automatically and unambiguously.

However, paradox of our age is based, among other things, on the fact that comprehensive media expansion which, at the same time, represents main characteristic of our age, has no counterpart in theoretical thinking and understanding of this complex (industrial, economic, social and „cultural”) activity. Moreover, with the exception of examples that are almost incidental in socio-economic context of observing the problems related to today’s world of mass media, they are frequently used and abused without any idea (i.e. awareness and self-awareness) on the position, value, impacts and future practice of their use in contemporary cultures.

Therefore, it appears that media content and its derivatives (media education, media literacy, etc.) do not represent only mere need for learning and knowledge acquisition in the fields that thematize the whole sphere of cultural industry and domain of so-called „media culture”, i.e. democratic societies in postindustrial/information age, but the necessity, determined by the „spirit of time” (or, possibly, its opposite, i.e absence), and all in the function of existing in significantly changed socio-cultural circumstances, which are, finally, continuously created by the media themselves, so their excessive production and simulation of signs, meanings and, generally, semiocity as such. In our opinion, media education, as a kind of ideological construction of new sociability, as well as the necessity of contemporary moment, shouldn’t be some mere theoretically-analytical attitude for construction of so-called information society (contemporary Americal concept of technologized knowledge and its instrumentalization in social-economic context of appearance) or a practical introduction into proclaimed „knowledge society”, which makes one of the basic developmental strategies of EU member countries.

Some theoreticians and pedagogues of media have suggested that media education, i.e. media literacy, is preceded by a kind of epistemological introduction, which would represent on introductory, critically derived cognitive reflection of various theoretical concepts on which it is actually possible to base different theories and forms of media literacy. Such an approach, reduced to a kind of epistemological field of studying the media world, without the possibility of considering their communicational, social, cultural, civilization (technical-technological) and the like intersubject assumptions, which all makes one whole „media ontology”, appears to be, certainly, insufficient for descriptions, state diagnosis and critics of phenomena of contemporary media, as well as new, different perception of reality, which comes from this.

For these reasons, in modern literature on culture and media, and parallely with the thesis in scientific-technological progress, which coincides with overall cultural development, and simultaneously there is a counterbalance on the end of culture or its continuous process of disappearing, which is a consequence of escalation of media effects in now already largely globalized „cultural space", transformed into a planetary village. Whether it is about the processes of culture transformation or its extinction, not only in the existing, but in every other manifestation, it is obvious that so-called media culture (with its various forms of
interculturality) pushes the world of traditionally perceived cultural forms to the second plan, which is, of course, the consequence of current „IT revolution“.

Although the last thesis radicalizes the issue of the relationship between media and culture, which is, at the first sight, realized at the expense of culture and it is directly opposed to defining this relation posted on Unesco’s site on programmes of media education, for example, (where current media are treated as the encouragement to understanding the issues of culture and social development, for the purpose of mutual enrichment and parallel development, especially when the activities of the young are in question), it simultaneously underlines the necessity of media education, which will, through responsible use of media not only provide better and more comprehensive participation of citizens in political and cultural life of one community, but there will come primarily to strengthening of the survival of the culture itself, which „media effects” on today’s society entirely threaten to suffocate and even completely abolish.

Therefore, the thesis that media education cannot be achieved without parallel processes of education that refer to promoting universal cultural values, which together with democratic processes, revived in one real society that affirms the culture and education as self-purpose, rather than means/instruments for achieving something else, provides not only the survival of culture and basic values of civic world, but also humanistic foundations of these values, which at least in this point, stand directly opposed to fetishistic, techno-economical ideology of so-called media sphere. Current media education, therefore, should not imply only those processes of learning about the media that imply a direct training for the use of new means of communication, as well as acquiring the knowledge about their altered and increasingly significant role (socialization etc.) that they undoubtedly gain in contemporary society, but it should include all other processes which contribute to the survival and improvement of culture and humanity.

4. CONCLUSION

There is no doubt that mass media, through their content, model development and formation of both personality, as well as entire cultures and societies and this impact is total. Instead of being the source of real knowledge, the information turns into its opposite, so instead of informing us about something, it creates an increasing confusion that can further be used for different purposes, of which the majority stands on unstable moral grounds. Media are powerful and omnipresent global factor of impact, because they represent a set of powerful content, knowledge and technologies, as well as synergy of knowledge management, techniques and their application in the field of media culture (Drašković 2008, 58). Media globalization practically has no limits, if they, however, do exist, then it seems that is just – imagination.

The momentum of globalization essentially coincides with the appearance of new media that have announced the processes of media globalization. Without the new media the world couldn’t be teh so-called global village. New media have primarily and dominantly influenced the media globalization, as well as the recurrent strong impact of media on globalization processes.

There is a strong feedback between media and globalization, because new media and communications have contributed to acceleration of general process of globalization, which has from its side contributed to the creation of mega-media. This relationship is much less expressed on teh relation globalization-media culture, because „global connectedness and interdependence” has a much less impact on unification of media culture than globalization of individual media. It can be said that media globalization is reality, but media culture globalization – is not reality.

It is not easy to believe that cosmopolit ideology, which is promoted through media day and night, will manage to smooth and reconcile millenium civilization conflicts. The issue of the price of this uncertain and questionable process, which supposedly should uniform different beliefs, ideas, habits, values, philosophies, traditions, education and all other content of hybrid cultural pluralism.

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