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SOME QUESTIONS ABOUT CREATIVITY IN DIGITAL AGE[2]

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Abstract   *The subject of interest in this paper relates to the expression of creativity from childhood to adolescence in the society today, which many mirror as the digital age. Firstly, the paper presents a Developmental model of creativity developed in a research study focused on personal explicit theories of educational researchers. The model defines key descriptors and describes the manifestations of creativity from the preschool years all the way to the adulthood, when the individual joins the labour market. Secondly, the paper focuses onto the Digital Natives concept and attempts to describe the youngsters today taking into account research results from different settings. Thirdly, in the remaining part the manifestations of creativity from the model are associated with the characteristics of young people who were born in digital age in order to enhance understanding of creativity expression in digital age. Based on a thorough examination a list of questions and needed research studies about creativity of Digital Natives is presented, under the assumption that the digital media will only be further developed and their influence over the young generations will be even more copious. The concluding remark problematizes the notion on whether everybody may be regarded as creative in the digital age realm and if so how this changes the overall meaning of the concept of creativity?*

Keywords: *creativity, digital age, the young, development model of creativity, personal explicit theories.*

Introduction

Creativity appears as one of supreme social and individual values for the progress of modern society and people. It is a highly valued goal of education within the frame of many educational systems around the world, but the support for creativity in schools is considered by all interested parts included in the process to be unsatisfactory (Maksić, 2006). The analysis of the presence of creativity in the national curricula for primary and secondary schools disclosed unequal demands in different teaching subjects which were

in some cases too high, and in others insufficiently clear (Maksić, 1999). Difficulties with the recognition and identification of creativity in the educational process are directly linked to problems in measuring creativity which in turn results in a sort of Pyrrhic victory: great effort and little effect (Maksić, 2009).

There is general agreement about the information revolution during the 20th century which introduced digital culture as a particular way of life. The term digital refers to the applications and media forms that digital technology has made possible (Gere, 2008). The latest achievement of the digital age is the World Wide Web which represents a new space for learning, collaboration and reciprocal communication (Attwell & Hughes, 2010). It seems that The Internet makes possible the rise of a planetary civilization that will network all people of the world (Kaku, 2014). The Web 1.0 brings enormous options of linking information. The Web 2.0 included the development of social networking software which promoted the development of online communities and equipped people to create their own content. The Web 3.0 is based on linking knowledge and combines data from different sources to generate new meanings.

The subject of interest in this paper is the expression of creativity in childhood and adolescence which has happened within digital culture. The paper first presents the Developmental model of creativity developed on the basis of research into explicit personal theories of educational researchers. The model defines the key descriptors and describes the manifestations of creativity from preschool age to adulthood, when the individual joins the sphere of work. The next part of the paper describes the current young generation on the basis of research results from different environments and the concept of Digital Natives. The manifestations of creativity from the model are related with the characteristics of young people who were born in the digital age in order to achieve better understanding of creative expression in digital age. Based on a thorough examination a list of questions and needed research studies in the field is produced.

The development of creativity in childhood and adolescence

Apart from great number of theories and models of creativity, only few of them deal with the development of creativity (Beghetto & Kaufman, 2007; Csikszentmihalyi, 1996; 1999; Feldman, 1999; Gagné, 2004; Gardner, 1994; Glăveanu, 2010; Runco, 1999; Sternberg & Lubart, 1991). The most significant dimensions of creative development are: cognitive, social and emotional processes; family aspects, education and preparation; characteristics of the domain and field; socio-cultural forces; and events and trends (Feldman, 1999). The development of creativity has following resources: intellectual processes, knowledge, intellectual style, personality, motivation, and environmental context (Sternberg & Lubart, 1991). Types of developing creative activities are: problem-solving, theory-building, work in a genre, stylized works, and "high-stake" performance (Gardner, 1994). The process of creative production is called flow of creativity, but it was defined on the basis of the studies of eminent experts who had made significant creative contributions (Csikszentmihalyi, 1996; 1999).

The gap between the conceptions of creativity at a younger and older age is so great that the question arises as to whether children are creative at all according to those criteria which, by default, refer to adults (Glăveanu, 2011). Different types of creativities are

postulated in order to answer the challenge, such as big, little, mini and pro creativity (Kaufman & Begneto, 2009). Big and pro creativity are connected to highly achieving creators and professional creative contribution of adults. Little and mini creativity are relevant for children because they can be reached in everyday settings and put creativity in the process of learning. From cultural and constructionist perspective, children are creative because they are active and interactive beings: they play, experiment, enjoy the task, disregard conventions; children have expressiveness that is "a precursor of later creative achievement" (Glăveanu, 2011, p. 217).

Within the framework of research into the personal, explicit theories of creativity, Maksić and Pavlović (2011) explored the views of educational researchers on the manifestations of creativity. The views of educational researchers are important for designing their own research studies, as well for the influence which the same researchers may have on the opinions and attitudes of other people, such as teachers, members of the school administration, policy-makers, etc. The focus of the study was on the manifestations of creativity at different ages, with a hypothesis that uncovering implicit knowledge of educational experts about these developmental manifestations could bridge the gap between child and adult creativity, which currently exists in the theory of creativity. The participants were educational researchers (N=25) who answered at least one out of five questions referring to the manifestation of creativity at various ages. The characteristics of the research participants are shown in Table 1.

Table 1. Research participants

Characteristics	Modes or Variations
Gender	18 females; 7 males
Age	M=41 years; R (25-68 years)
Education	12 Psychologists; 12 Pedagogues; 1 Sociologist
Academic Title	12 PhD; 10 M.A.; 3 Research Assistants
Work Experience	M=16 years; R (1-40 years)

N=25

The participants were sent a questionnaire with open-ended questions concerning manifestations of creativity during the preschool, primary school, secondary school, university and post university/employment periods. The selected periods were determined pursuant to the formal organization of the national education system. The preschool period refers to children up to seven years of age; primary school is from age seven to fifteen; secondary school from age fifteen to nineteen; university education formally starts at the age of nineteen and basic studies last between four and six years. A young person with university education may start working at the age of 23-25. Qualitative analysis of the gathered data was carried out in order to seek the dominant patterns in the data without a predefined coding scheme (Braun & Clarke, 2006). The manifestations of creativity at different life stages were derived from the key themes and topics in the answers.

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There were defined five types of answers about manifestation of creativity: curiosity and imagination; finding and developing interests; experimenting and searching for personal expression; mastering the content and independence in thinking and acting; initiative and contributions. Table 2 shows the distribution of categories of manifestations of creativities at different ages. All the defined categories of manifestations were present at all ages, but for each defined developmental age one category of manifestations was dominant: curiosity and imagination during preschool years; finding and developing interests during primary school education; experimenting and searching for personal expression during secondary school education; mastering the content and independence in thinking and acting during university education; initiative and contributions after schooling/at work. It seems that the structure of creative manifestations is clearest for the youngest and oldest ages, and the least clear for the primary school period.

Table 2. Frequencies of manifestations of creativity in developmental stages

Key descriptors	Developmental stages				
	Preschool years	Primary school	Secondary school	University education	At work
	f	f	f	f	f
Curiosity and imagination	15	7	4	3	5
Interests	3	11	6	3	7
Experimenting and personal expression	4	8	14	8	4
Mastering and independence	1	2	6	14	7
Initiative and contributions	5	5	5	5	17
Unclassified answers	2	2	2	2	2
No answer	1	1	1	2	0

N=25

Two participants in the research study answered the questions about manifestations of creativity with 'always' and 'there is no rule' and these answers were not categorized. However, both answers highlighted the need to pay attention in categorized answers to those responses where the participants emphasized continuity in the manifestation of creativity from one age to the next: for instance, responses related to the manifestation of creativity at secondary school age which began with "the same as in primary school…" or answers to the question about manifestations of creativity during university education which started with the words "similar to secondary school…". One forth to one third of participants emphasized continuity of creativity manifestations during the lifespan. These results were interpreted as a support for the idea that manifestations of creativity at different ages could be linked to one, developing function of creativity in childhood and adolescence (Figure 1).
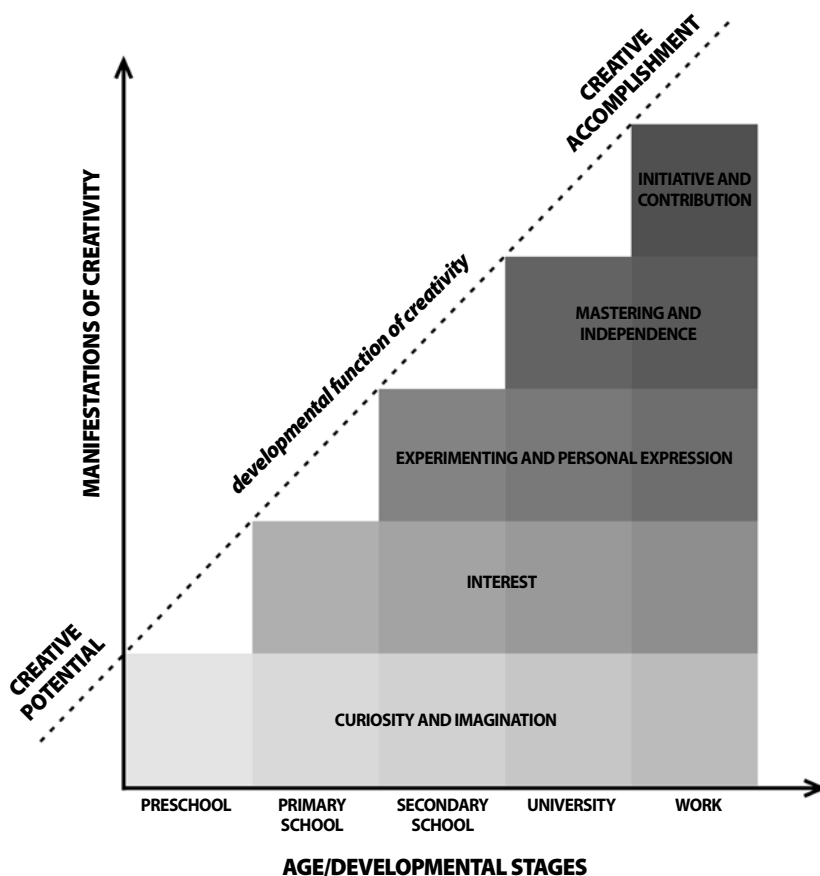
Figure 1. Developmental function of creativity

Up to seven years of age, the dominant manifestation of creativity is characterized by openness, where a child accepts various sensations from the surrounding world and turns them into feelings which he defines and upgrades in his imagination. Aged between seven and fifteen a child structures the units of the world which he observes by connecting and classifying them; some of his observations attract him more, are more interesting and pleasurable than others, and they become his interests. Young people continue their path towards creativity, seeking out what interests them. In the next phase, which encompasses age fifteen to nineteen, a young person forms a relationship with what interests him, what seems relevant or imposes itself, and experiments, tests and changes things, following what effects that has on the subject of his interest. What follows is the period after secondary school education during which a young person's experiences of what interests him are expanded and demand new structuring: taking on a critical attitude towards what is known and opening up space for personal contributions. After the end of formal

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education/at work the manifestation of creativity dominates where by a creative contribution is made through identifying problems alongside the initiative to resolve such problems in an original and timely manner.

The Developmental model of creativity closely resembles Feldman's developmental model (1999), because it relies on development phases. Individual development differs in that it shows deviations, differs from the average and standard in the sense of being faster, bigger, better, more precise, beautiful etc. Curiosity and imagination as characteristic relevant for creativity are well known from many theories (Csikszentmihalyi, 1996; Gagné, 2004; Vigotski 2005). Interests are a very important aspect of the Renzulli (1992) model. The dominant themes, finding and developing interests during the primary school period and experimenting and searching for personal expression during secondary school, could be connected with looking for the domain (Csikszentmihalyi, 1996) and children's readiness for creative production (Glăveanu, 2011). Also, experimenting in secondary school and mastering the content during university education could be linked with finding the field in which the creative contribution will occur (Csikszentmihalyi, 1996).

The educational implications which could be derived from the Developmental model of creativity refer to the indexes of creativity at different ages and the possibility, by searching for them, to gain a picture of creative capacity. The other implication refers to what should be given the greatest priority when assessing creative expression from childhood to adulthood. Not sufficiently articulated conception of creativity for primary school education period could be the outcome of the complex situation of creativity development or expression at that life stage. The fact that it was difficult for educational researchers to define manifestation of creativity at the age of seven to fifteen years asks for further research but also sends some messages for the present time. It is necessary to be very cautious in creativity assessment during primary schooling and help teachers in their activities related to students' creativity (Beghetto & Kaufman, 2014; Pavlović et al., 2013).

The characteristics of the young generation in the digital age

For the first time in history younger generations know more than their older in the field of digital technology which is becoming increasingly more present in everyday life. Reducing the world to bytes and their multimedia transfer caused great enthusiasm because of the accessibility and speed of access to information but, at the same time, fear of the consequences of abuse of those same advantages by those who possess them (Bauerlein, 2011). Research findings from neurology show that character traits, talents and limitations are stored in the human brain, and that the effect of the environment reduces with the growth of the child (Svab, 2014). But physicists foresee that it may be possible in the future to interact with computers directly with the mind, to increase human intelligence, and make the Internet self-aware (Kaku, 2014).

Twinge (2006) called young people born in the USA after 1980 the Generation Me, because they put what is individual in first place. Focus on self and individuality are being actively promoted in schools. The Generation Me differs from that of their parents and teachers by a series of important characteristics which include attitudes to social rules,

norms and customs, consideration towards others, openness in communication, compassion for others etc. The Generation Me is characterized by: seeking fun; no need for travelling and searching because they can be everywhere almost immediately through the Web; they follow their dreams; they watch TV and surf the Web; they are practical; they have interest in things; and they have good feelings about themselves. But, Twinge (2006) concluded that young Americans today are more self-confident and forthright and with more rights than previous generations, and unhappier than ever before.

Those experts who emphasize the positive sides of the digital age include Tapscott (2008) who criticizes Twinge (2006) for characterizing young Americans as exceptionally narcissistic. This author advocates the understanding of youngsters whom he calls Net Geners for the sake of understanding the future of mankind. On the basis of his research results Tapscott (2008) defined Net Geners as having the following distinctive attitudinal and behavioral characteristics: freedom, customization, scrutiny, integrity, collaboration, entertainment, speed, and innovation. Net Geners seek all kinds of freedom, from freedom of choice to freedom of expression. They are ready to change everything in the world around them. They know how to use the Internet to find information. Net Geners are natural collaborators believing that they are called to work with companies in order to create better goods and services. Net Geners bring a playful mentality to work. They expect a quick response to their demands. They are constantly looking for innovative ways to collaborate, entertain themselves, learn, and work.

Some research findings about the Serbian young generation show similarities with the profile of the young generation in the USA and Canada (Tapscott, 2008; Twinge, 2006). Young people in Serbia were drawn to the world of entertainment because most of their symbolic models were from the world of show-business (Stepanović i dr., 2009). The leisure time activities of secondary school students included watching TV, surfing the Web, and using mobile phones for fun (Krnjaić i dr., 2011). Adolescents rarely took part in creative activities out of school (Krnjaić i Stepanović Ilić, 2013). Facebook represented a significant part of adolescents' daily lives and was an important form of communication with their peers (Krnjaić i Videnović, 2012). However, the presence of new media in the country was much lower than in the EU, so the use of such media, especially the Internet, appeared as a resource – the cultural capital of the young person (Tomanović i dr., 2012).

Digital Natives are persons born into the digital age who have access to networked digital technologies and strong computer skills and knowledge (Palfrey & Gasser, 2008). They are living in a participatory culture where people are encouraged to share their innovation and creativity (Gere, 2008). Digital Natives are increasingly engaged in creating information, knowledge, and entertainment in online environments. The development of digital technologies has reached such a level that reality is confirmed by the virtual – direct broadcast of pictures and sound at a distance, instead of the virtual world being verified though comparison with the real one (Weber & Dixon, 2007). Digital Natives are growing up with cell phones and toys that ask for love. Some of them are at risk of mixing the real and virtual world: virtual world has an advantage in comparison with the real world because it is simpler, but giving priority to the virtual impedes the ability to cope in the real world (Turkle, 2010).

Needed research studies about creativity in digital age

The digital era can be seen as the development of an evolutionary system (Shepherd, 2004). The benefits and risks which the digital age brings are particularly significant for young people growing up in this context who, by nature, should be the holders of future civil development. Is creativity the premise of progress in the digital world, just as it is believed to be the holder of the development of human civilization so far? The accessibility and connecting of information, people and meanings opens up unimagined possibilities for the creation of innovations, some of which could turn out to be appropriate. Each aspect which is defined in the presented developmental model of creativity points out potential creativity, and could therefore be considered as its indicator and sought in the evaluation process of individual creative expression. Table 3 shows the main characteristics of the defined categories of manifestations of creativity and the potentials and needs of Digital Natives.

Table 3. Implementation of the Developmental model of creativity for Digital Natives

Manifestation of creativity	Type of activity	Digital Natives' needs
Curiosity and imagination	• Perception and spontaneous activity (play) • Mastering development stages (language, physical, intellectual, social and emotional development)	Satisfies 1.0 Web + Accessibility of information – Accuracy
Finding and developing interests	• Dedication • Focusing and purposeful gathering of information • Making choices • Additional engagement • Finding domains • Pleasant emotions • Hobbies	Enables 1.0 Web and 2.0 Web + Quantity and speed of access – Relevance
Experimenting and searching for personal expression	• Researching, experimenting, fun • Learning and gaining basic knowledge in the domain • Works in his own way and develops his own style • Taking a position/having an opinion	Supports 1.0 Web and 2.0 Web + Open source + Cooperation and equal relationships
Mastering the content and independence in thinking and acting	• Higher levels of learning and knowledge • Familiar with the domain and chooses the field • Critical approach towards existing knowledge • Advocates and defends his perspective and views	Does not enable 1.0 Web and 2.0 Web
Initiative and contributions	• Notices problems and solves them • Changes things and introduces innovations	Brings into question 3.0 Web

The digital age offers easy, accessible information about an unlimited number of subjects which could lead to overload. How can we set aside important and eliminate less important information, which previous research recognized as a significant characteristic of creative thinking? Creativity is usually defined in terms of novelty and appropriateness or originality and usefulness (Paletz & Peng, 2009; Runco, 1999). Should we stimulate Digital Natives' curiosity, if they have already been stimulated so much? How do we differentiate between those who are more curious and those who are less so? How will Digital Natives develop their interests and find the field where they can make their own creative contributions? What can be learned, and what can be wrongly interpreted from what was obtained by combining accessible data? How do Digital Natives search the database and who do they trust?

Will it be enough to see and hear what was simulated, or is something else needed in order to develop personal expression? To what extent does reality differ from virtuality and what will be more important in the future? Do all or how many Digital Natives experiment by using information technologies? How will Digital Natives master the required knowledge and develop a critical approach toward it? Who and what will lead the learning process for a person to become a field expert? What will the creative contribution of Digital Natives be? Autonomy encompasses freedom of choice of life goals, the possibility of making different decisions during life and the possibility of creating choices as well (Đurišić Bojanović, 2009).

The democracy of creation in the digital age is indubitable: anybody can make anything because of the availability of enormous amount of material which he can change at his discretion. The use of the Internet is cheaper in comparison with classic ways of work, which demanded the purchase of books, travelling to mentors, work in materials which incurred certain costs, finding and informing the interested public about one's work, etc. The creator can offer his work to the public for evaluation very fast, almost immediately. Many people can express their opinion about the work, but in most cases those are not experts in the field and do not know how new and useful or creative that piece of work is. All predictions lead to new questions which should be the subject of further research. Do we know how the digital age and Digital Natives will develop in the future? What will happen to schools? What about values and generation differences when Digital Natives become parents and teachers? Who will be more creative in the future, people or machines?

Conclusion

This paper provides a review of the Developmental model of creativity and an analysis of the possibilities of its use in the context of the characteristics and needs of the young generation born in the digital age. The idea of carrying out the integration of data related to the manifesting of creativities at different ages, which could simulate development, is based on the current state in science and needs from educational practice. The Developmental model of creativity tells us that the development of creativity could be monitored on the level of manifestations, which does not lessen the mystique of internal development or help us gain a better understanding of what lies within. Further work

on the development of the developmental theory of creativity is needed: can the beliefs about manifestations be considered as development phases; what happens in adulthood, do things change further, and if so, how? The data from other research support the life span developmental model of creativity more than the peak and decline model (Levy & Langer, 1999).

Digital technology has overcome their role of tools to become participants in our culture (Gere, 2008). History teaches us that people are creative when they want to solve a problem, make their and the lives of others easier and more pleasant, when they feel the need to express their opinions and make judgments etc. Will everybody be creative in the digital age and, if that happens, is the current meaning of the term creativity changing? How will the individual recognize his field of interest in the ocean of information which is offered, and whose attractiveness is determined by the power of the advertiser? Will the capacity of the individual determine the amount of information to be accepted, and select among it the field of interest and the field where he can make a creative contribution? Or will somebody else carry out the selection?

The proposal of the internet as a good setting for creative expression is highly promising, but it has to be carefully study on the individual level. We do not know in what direction creativity is going to change in the future. Whatever answers would be to questions cited above, it is obvious that the education system ought to take into consideration the characteristics of Digital Natives in the process of schooling when designing teaching and learning contents and methods. Preschool institutions, schools, and universities have to answer to educational and developmental needs of the young generation in appropriate ways not only as much as possible but also as fast as possible. Otherwise, educational institutions will not be able to fulfill their social role, to keep the young within the system and contribute substantially to their preparation into competent citizens able to think and act creatively.

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НЕКА ПИТАЊА О КРЕАТИВНОСТИ У ДИГИТАЛНОМ ДОБУ

Айсшракш Предмет интересовања у овом раду је изражавање креативности у детињству и младости у нашем времену које многи виде као дигитално доба. У раду се йрво йредставља развојни модел креативности који је добијен у истраживачкој студији о личним експлицитним теоријама креативности истраживача који йроучавају образовање. Модел дефинише кључне дескрийторе и ойисује манифестације креативности од йредшколског узраста до одраслог доба када особа йочиње да ради. У другом делу рада ойисана је савремена млада генерација на основу резултата истраживања из различитих средина и концейт Дигитални урођеници. У трећем делу рада, манифестације креативности из модела доводе се у везу с карактеристикама младих који су рођени у дигиталном добу у намери да се боље разуме креативно изражавање у дигиталном добу. Найрављена је листа йитања и йотребних истраживачких студија о креативности дигиталаца, с йретйоставком да ће се дигиталне технологије даље развијати и да ће њихов утицај на младе расти. Завршни коментар односи се на йитање да ли би сваки могао бити креативан у дигиталном добу, а ако се то деси, да ли се мења значење йојма креативности.

Кључне речи: креативност, дигитално доба, млади, развојни модел креативности, личне експлицитне теорије.

К ПРОБЛЕМЕ КРЕАТИВНОСТИ В ДИГИТАЛЬНОМ ВЕКЕ

Резюме Предметом внимания в данной работе является выражение творческой личности в детстве и юности в наше время, которое многие называют дигитальным веком. В статье приводится Модель развития творческого потенциала, созданная исследователями, изучающими образование в рамках более обширного исследования личных эксплицитных теорий творчества. Модель определяет ключевые дескрипторы и описывает проявления творчества от дошкольного возраста до взрослой жизни, когда человек начинает работать. Во второй части статьи описывается современное молодое поколение на основе результатов ряда исследований, проведенных в разных странах. В третьей части статьи проявление творчества по модели связывается с характеристиками молодых людей, которые родились и живут в эпохе дигитальных технологий. Это способствует лучшему пониманию творческого потенциала дигитальной эпохи. Приводится перечень вопросов и необходимых исследований творчества молодого поколения. Высказано предположение, что дигитальная технология продолжит развиваться и что ее влияние следовательно будет увеличиваться. Последнее замечание относится к вопросу о том, может ли каждый человек быть творческой личностью в периоде дигитальных технологий, и если это произойдет, меняет ли этот факт значение понятия „творчество".

Ключевые слова: креативность, дигитальный век, молодые люди, модель развития творчества, личные эксплицитные теории.