

Educational Cognitive Technologies as Human Adaptation Strategies

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Modernity is characterized by profound changes in all spheres of human life caused by the global transformations on macro and micro levels of social reality. These changes allow us to speak about the present as the era of civilizational transition in the mode of uncertainty. Therefore, this situation demands qualitative transformations of human adaptive strategies and educational technologies accordingly. The dominant role in the dynamics of pedagogics and andragogy's landscape belongs to transformative learning. The transformative learning theory is considered as the relevant approach to education of the individual, which is able to become an autonomous communicative actor of the social complexity. The article considers the cognitive technologies of social cohesion development and perspectives of their implementation in the educational dimension. In addition to implementing the principles of inclusion, equity in education, an important factor for improving social cohesion, stability and unity of society is the development of cognitive educational technologies. The key factors and foundations for the cognitive educational technologies are transversal competencies. They create the conditions for civil, public dialogue, non-violent type of communication. These "21st century skills" are extremely important for better human adaptation. One of the aspects and roots of social adaptation is social cohesion. Mutual determinations and connections between social cohesion development and transversal competences have been shown. The perspective direction of further researches is to find a methodological base for the further development of cognitive education technologies and platform for realization of innovative services for educational programs. New educational paradigm offers the concept of human adaptation as cognitive effectiveness and how to reach it through educational technologies. The article includes topics of creative thinking, teambuilding abilities, effective decision-making, engagement in the learning and teaching processes, cognitive skills improvement, social cohesion abilities, etc.

Key Words: cognitive technologies, complexity, education, social cohesion, transformative learning theory, transversal competences

Introduction

The modern world is very fast changing complex system. And human needs to change its adaptation strategies because of different cognitive and evolutionary niche. Internet of Things, Augmented and Virtual Reality, 3D manufacturing, Artificial intelligence and socio-economical global crisis challenges for the new innovation approach in education and upper-education of the specialists in the future creative economics. First of all this is a challenge for the system of high education. While the concept of "triple L" (LLL) — long life learning is suited to the innovative creative society. Anyway, it means to change the educational system

of it is as creative. This is not only special course for the development of creative tools and approaches. The main task of modern high education (in particular) is to prepare new learners for the current global realities. The core problem is changing of cognitive niche of humans. Especially young people are living in informational, digital society, mostly in virtual reality. The social reality is very non-stable with the high level of uncertainty. It actualizes the problem of proper decision making skills and creative thinking. New generation needs higher order thinking, higher cognitive effectiveness. Mainly it concerns of empowerment of creativity, creative thinking. It is clear because of creative economy demands creative actors. On the other hand we have to take into the consideration the problem of academic mobility which is arising because of many political and social-economic reasons. So, one of the main factors is globalization [Svyrydenko, 2015].

Innovations in high education should be based on the latest scientific researches, approaches and technologies. Therefore, the one of the most perspective direction is cognitive. Cognitive technologies in education based on multimodal learning, embodied cognition and interactive-learning framework. Cognitive technologies aimed to cognitive effectiveness improvement not using of new neurotechnologies (neurodevices) but training of various mental abilities (neurobics, eidetic and mnemonics). Cognitive technologies based on practical technologies of interactive communication (facilitation, mediation, active learning based case studies, serious games, etc.).

Educational cognitive technologies — are the set of technologies, which are based on the using of the cognitive channels — first of visual. All these technologies aimed to the creativity development and other directions of cognitive effectiveness. In addition, they deeply involve students in interactive processes of teaching and learning for better results in education for better cohesion, teambuilding and social intellect training. One of the most innovative approaches is Interactive Visual Communicative Technologies (IVCTs) because of connections of these technologies with the most powerful mechanisms of human cognition — visual communications and mutual games. These technologies will help to improve a cognitive effectiveness and proper decision making because of involvement of learners in to the educational virtual dimension with the immersion in the real context.

Traditions of the “Future Human Image. The Scientific Journal” demands to keep both focuses of the consideration: academic and practical. Following to the scientific discourse on the pages of the above journal, “different learning theories should be viewed from the perspective of several main scientific orientations: behaviorism, cognitivism, humanism, developmental theories, social learning, constructivism, which have different philosophical background and, accordingly, different understanding of the nature and methodology of learning” [Lytovchenko, 2016: 67]. But the main focus of this consideration is opportunity of the practical implementation of methodological concepts and theories in to the modern educational system.

Perspectives of Interactive visual communicative technologies in education

The objective of the above approach is implementation of interactive communicative cognitive technologies based on the visualization. They are applied in the gaming, design, marketing and business spheres. Now they are successfully implementing into the educational system. These are technologies of video scribing, doodle video, serious games, graphic

facilitation and art scribing which could be effectively connected with the teaching and learning processes. These cognitive technologies will help to increase a cognitive effectiveness, social cohesion in education, motivation and involvement in teaching & learning processes. These techniques will allow starting education from the youngest students and successfully educating them by creating of motivated learning dimension. Therefore, these IVCTs will strengthen the concept of secondary and high education. In addition, this approach will help to solve the problem of social cohesion by education of various groups of students (with different social and cognitive styles).

Implementation of the visual technologies in the educational processes started very early. For instance, the predecessor of modern visual presentation technologies (like Microsoft Power Point or Prezi) — Kamishibai theatre. Kamishibai is part of an ancient visual storytelling tradition that originated during the 12th century in Buddhist temples in Japan (kami = paper, shibai = drama; paper dramas). Monks there used picture scrolls to pass moralistic stories to a largely illiterate audience. Traditionally it is a small theatre box in which large prints can be inserted. On the back of these prints is a story that the kamishibai narrator reads or tells: image and language coincide perfectly. A kamishibai story is reminiscent of delayed animation. For thirty years, from 1920 to 1950, this narrative technique was all the rage in Japan; it was the forerunner of the popular manga culture. For the past several years, this unique narrative form has made a global comeback not only in Japan but also in Europe. Kamishibai stories for educational purposes are still being published and can be found in schools and libraries throughout Japan and more recently, through the efforts of Kamishibai for Kids, in the United States and Canada. (www.kamishibai.com). It is very popular in kindergartens and various types of schools. It is connected with the one of main task of education — morality and sense making. The main approach is to develop thinking of the students, to increase the level of their cognitive ability. Moreover, the one of the efficient methods is implementing of philosophy in the system of high education. This approach is well known in the pedagogics. PHILOSOPHY FOR CHILDREN (P4C) is a worldwide educational movement that began in 1972 with the work of Professor Matthew Lipman and colleagues at the IAPC. Matthew Lipman wrote special “philosophical novels” for use with children and comprehensive “manuals” of accompanying resources. He also suggested the “community of inquiry” as an appropriate method and aim of P4C. Now Philosophy for Children is practiced in more than thirty countries around the world (www.P4C.co.uk). Doubtless, this approach with the proper impact of visualization should be implemented (in accordance with the age psychology and axiology) into the system of high education. Lack of values platform for the successful adaptation and personal self-development of youth is the one of the most fundamental and painful problem nowadays.

The normal practice of using innovative cognitive technologies is video scribing in the education processes. It is really practical because of possibility in a 5 steps to create your own whiteboard video (<http://www.videoscribe.co>). The same approach proposes other companies like Sparkol — Doodle Video, etc. This is sort of a new type of kamishibai: an interactive approach in drawing the pictures and following speech.

It is actual, that the above cognitive educational technologies are aimed to the involvement and motivation for learning of youth. Video and graphic connects with young people. Multimedia whiteboard videos are not just fun — they are shown to grab attention, invite engagement and boost retention for exams. In addition, it will help to empower teachers by using interactive visual communicative technologies (Video Scribe, in particular) to illustrate complex and difficult for understanding ideas. These technologies will bring dry topics

alive, teach storytelling, design and media, to learn IT skills. The results of the application of the above cognitive educational technologies — new educational tools, new approach for subject education, methodological courses for supervision and upper-qualification of teachers (especially of high education schools).

Methodological foundations of cognitive educational technologies

It is necessary to find methodological foundations for the implementation of new approach in the educational system. This approach should be based on the recent achievements of cognitive researches, neurosciences, social/communicative educational technologies implementation, etc. It should be taken into the consideration that practical educational tools also need to be upgrade according to the recent innovations. It means that cognitive technologies (for example, Interactive Visual Communicative Technologies — IVCTs) both as advanced courses and as important educational tools should be precisely implemented into the education system. This process should be based on the relevant aspects of European educational policy (including social cohesion and transversal competences studies). The main task is the dissemination of this direction of educational policy cognitive principles. Innovations in high education should be based on the latest scientific researches, approaches and technologies. Therefore, the one of the most perspective direction is cognitive.

Cognitive technologies in education based on multimodal learning, embodied cognition and interactive-learning framework. Cognitive technologies aimed to cognitive effectiveness improvement not using of new neurotechnologies (neurodevices) but training of various mental abilities (neurobics, eidetic and mnemonics). Cognitive technologies based on practical technologies of interactive communication (facilitation, mediation, active learning based case studies, serious games, etc.). Implementation of educational cognitive technologies has to take into consideration the basic cognitive mechanism. One of the major cognitive mechanism is the game — trough the game, as evolutionary epistemology shows to us, a person learns and develops. In addition, the game is one of the most emotionally deep, exciting process not only for children and young people but for adults too. This specificity of our cognitive system is successfully taken into account in “the experience economy”, “economy of entertainment.” The existing trend of development of social reality reflected in this area — “virtual offset”: more and more games are transferred to virtual reality, and even in the space of social networks. The development of technology speeds up this process — right now, there are gamers devices that combine the real physicality of the player with a virtual “avatar.” Helmets for the other sensory experiences of reality are improving very quickly, along with a variety of devices that enhance our cognitive capabilities (for example, see or hear in the human range). However, even without these devices a virtual game captures an increasing number of people. Some modern cognitive technologies, for instance, mediation, also could be applying in the educational dimension. Their application could be by the innovative modern approach called “Serious Games”. The Serious Games are the new technologies of involvement of young and adult learners into the educational dimension amplified by the thinking and social cooperation. This is a recent evolution in training technology, bought about by the rise of gamification (the use of game theory and game mechanics such as points, leader boards, badges, progress bars etc., in non-game contexts to engage users). The main purpose of Serious Games is the development of the skills of the player. However, it reaches by retaining attention and engagement through immersive and entertaining media sources and attracting scenarios.

We can consider a gamification as the one of the most perspective educational cognitive technologies. At the recent decades, the gamification is intensively spread in the education system. An important aspect of applying a particular category of games (including in education) is in focus of interests of the company Serious Games — the Serious Games Society (www.seriousgamessociety.org). Recently the Serious Games Society conducted the international conference on The Games and Learning Alliance conference (GALA 2015), which was dedicated to scientific and applied researches and developments in the field of “serious” games. They are considered as a useful and effective tool for better learning, study, training, and evaluation in the education system.

Educational cognitive technologies for the social cohesion development

Education and training are key factors in maintaining social cohesion and competitiveness in the European Union. Lisbon strategy fifth updated social EB confirms that education is one of the key elements of the European social model. But the modern problem of the separation of society due to the war (Ukraine) and waves of migrants (Europe) or internally displaced persons (Ukraine), requires go to another level of consideration of educational strategies focus on enhancing social cohesion. Educational cognitive practices are based on the using of the cognitive channels. In addition, they deeply involve students in interactive processes of teaching and learning for better results in education for better cohesion, teambuilding and social intellect training. From my point of view, they are so effective because of connections with the most powerful mechanisms of human cognition — visual communications and mutual games. Mutual games to be considered as one of the most effective way to reach social cohesion in educational dimension.

It is very important to notice that the problem of new educational technologies is actual because of increasing social problems in the modern society. In particular, the problem of social cohesion and its educational background is very painful worldwide. The society meets new and unprecedented challenge of responding to its own staggering complexity. The structure of our society needs to change. Around the world, people are creating revolutionary movement against their governments. They do not want to live under the rules of government’s dysfunction and corruption. People are trying to create a new world in which individual capabilities and the implementation is not detrimental to collective action.

In some places violence destabilize state power and social order. In others, mass dissatisfaction and frustration lead to unprecedented social movements. Unrest in rich and poor societies called deep and comprehensive frustration from a lack of something vital, for example, the food, and the stalled, sustainable economic and other expectations. Local communities as one of the most predictable and effective tools on this matter should be developed, for instance, during the program of decentralization (the core direction of reforms in Ukraine). To support this direction of reform and economy development should be change the educational dimension to enhance the social cohesion processes for better communities strengthening.

There is a very perspective approach in this direction — community based universities. One of the best practices is University of Brighton (www.brighton.ac.uk). From small beginnings in 1850s Brighton, the University of Brighton has grown to a complex and diverse institution based in three towns across the south coast of England. The ethos of this University is defined by four core values: inclusivity; sustainability; creativity; partnership. These core

values help to keep the students to be a part of a dynamic, diverse and creative community that embraces partnership working and that makes a positive difference to society. Important to notice, that all these values are seemed to be very perspective not only to educational but societal development.

Transversal competences and educational technologies

Thus, it leads to the problem of proper changes and innovations in the educational system. Education policies and curricula aim to incorporate a broad range of skills and competencies necessary for learners to successfully navigate the changing global landscape. “Transversal competencies”, sometimes referred to as “21st Century skills”, are broad based skills that aim to meet these challenges, such as technological advances and intercultural communication. Education policies and curricula aim to incorporate a broad range of skills and competencies necessary for learners to successfully navigate the changing global landscape.

There is very important direction of the development of transversal competences — implementation of their forming into the educational processes. They all solve the problem of effective response to contemporary civilizational challenges of the knowledge society. In modern conditions higher education institutions no longer dominate in the production of knowledge, but they continue to play an important role in connecting knowledge and citizenship [Delanty, 2008: 29]. Trends and challenges in integrating transversal competencies into education should be considered and applied in the educational dimension.

Nowadays the use of on-line training, stimulating has been increasing in all sectors of social activities. “From virtual reality to prepare surgeons for complex brain surgery, to airplane pilots being tested on simulators. Yet despite these advances, soft skills training like mediation, has been one of the last bastions of face-to-face only training. The reason for this of course is up until now the teaching of a process which is about human relationships always seemed impossible to deliver via technology” [South, 2017]. Now communicative cognitive technologies could be transferred into the virtual, digital sphere because of outstanding growth of its power and flexibility. However, with the trend toward on-line, interactive learning in all its forms increasing and the sophistication of the technology able to deliver many more nuanced approaches to learning. It concerns first the soft skills (facilitation, mediation, etc.) and how to transfer their art to professionals and practitioners. “We should seek to capture the spirit of mediation — which is also about innovation and flexibility — and collaborate with on-line training organisations to develop content and approaches that will meet mediator trainees needs while safeguarding the fundamental aspects of mediation and skills based training” [South, 2017].

Despite of complex problem of transfer and modification of cognitive communicative technologies into the virtual, on-line sphere, cognitive technologies in education and training are key factors in the development of transversal competences as the base of the European educational policy. In general, the main goal of education is to adopt student to the success activities in the complex, non-stabile society (do not forget about challenges of the virtual and augmented realities). To date, no consensus has been reached for referring to non-academic skills, non-cognitive skills, 21st century skills, or transversal competencies, and this is reflected in the reports from the respective countries and economies. In the report from the Philippines, the term used is “non-cognitive skills.” In its report “Future Work Skills 2020” the Phoenix Research Institute has identified these transversal skills and defined them in ten large blocks

of competences.” These competences are as follows: *Sense-Making*, *Social Intelligence*, *Adaptation thinking*; *Intercultural competences*, *Computational thinking*, *Transdisciplinarity*, *Design mentality*, *Cognitive load management*, *Virtual collaboration* [Future Work Skills 2020].

The European educational policy oriented to develop these important and useful skills. Some of them are well-known but changed a little. Therefore, strategic thinking is very important cognitive competence but it is transferred to the more complex and actual competence of *Sense-Making*. We can define it as the ability to find the deepest or most significant meaning of what is being expressed. That means the competence to synthesize the key points that help to create a unique viewpoint before taking decisions. This is sort of “mix” between strategic thinking, proper decision-making and creativity. Moreover, Interactive Visual Communicative Technologies should be the most important tool in the process of development and dissemination of sense.

The integral parameters of successful interpersonal communications are base of the competence of *Social Intelligence*: the ability to connect with other people deeply and directly, to detect and stimulate the desired reactions and interactions. Socially intelligent employees know how to rapidly evaluate the emotions of people around them and adapt their words, tone and gestures. As a result, this is a key skill for working together and building relationships of trust, and it is necessary for getting along with groups of people in different contexts.

The information society demands the competence of *Computational thinking*: the ability to translate large amounts of data into abstract concepts and understand reasoning based on data. As the quantity of data that we have available to us increases exponentially, many more functions will require computational thinking skills in order to make sense of this information

In the “behavior economics”, with its management of cognitive patterns of social activities, there is actual the competence of *Mastering the new media*: the ability to evaluate critically and develop content that uses the new media forms, using those media for persuasive communication. The coming generation of workers will have to have fluent competences in differing formats such as video, be capable of “reading” and evaluating information critically, and communicating it through a number of different channels. The unexpected growth of non-professional video blogging could be considered as the additional prove of the above trend.

The complex social reality demands from young and adult learners becoming experts in recognizing what way of thinking each task requires and reconditioning the working environments to improve that ability to carry them out. It means that the competence of *Design mentality* is very important for the successful adaptation. This competence is the ability to represent and develop tasks and work processes in order to get results. In addition, this competence means the ability of new way of thinking — to design the mental process before the appearance of cognitive tasks. It is important to notice that these cognitive tasks could be multiply and nonrelated. Therefore, it proves that in the conditions of unlimited flows and dimensions of information extremely useful the competence of *Cognitive loads management*: the ability to discriminate and filter out the important information, and to understand how to make the most of current knowledge using a variety of tools and techniques. Young and adult learners have to develop their own techniques to deal with the problem of cognitive overload.

In the nearest future will be the most appropriate competence of *Virtual collaboration*: the ability to work productively, to enhance participation, and demonstrate a presence as a member of a virtual team now that ICT makes it easier than ever to work, share ideas and be productive in spite of physical separation [Future Work Skills 2020].

There is very important direction of the development of transversal competences — implementation of their forming into the educational processes. Trends and challenges in integrating transversal competencies into education should be considered and applied in the modern educational policy.

All terms broadly refer to the adaptation skills, competencies, values, and attitudes required for the holistic development of learners, such as: collaboration, self-discipline, resourcefulness, and respect for the environment. Therefore, it means that new approaches, which are aimed, on its development should be implemented into the educational system.

Many organizations in Europe have taken an interest in the problems of improvement of high education by implementing new approaches. For instance, National Learning and Work Institute (England and Wales) situated in UK is one of them. This is the one of the organizers of Festival of Learning. Festival of Learning is part-funded by the European Social Fund (ESF) to help promote ESF activities and successes in the field of educational policy support. The ESF is a European Union initiative that supports activities to extend employment opportunities and develop a skilled workforce. Established by the European Union, the European Social Fund helps local areas stimulate their economic development by investing in projects, which will support innovation, businesses, skills development, job creation, social inclusion and local community regenerations. This is a sufficient financial support of high education because of investing over £2.5 billion in England in the 2014-2020 programme to extend employment opportunities and develop a skilled workforce for students (<https://www.festivaloflearning.org.uk/info/european-social-fund>).

The recent project supported by EU in the frame of the Seventh Working Programme of Horizon 2020 — “Idea Garden”. This is the project based on the motivation to better support creative practices and the goal to bridge the gap between traditional, often fuzzy, nonlinear work practices and the available ICT infrastructure. The idea is to implement a creative learning environment, which will consist of state of the art hard, and software technologies that assist during all phases of the creative process (<http://idea-garden.org/>). This is a response of educators to the demands of creative economics. It is very important to notice that the problem of new technologies in the system of high education is actual because of increasing social problems worldwide. In particular, the problem of social cohesion and its educational background is actual and will be considered in more details.

All these technologies will positively impact on creativity and social cohesion development of all subjects of educational sphere. However, this way of learning is similar to instrumental learning and does not solve many actual communicative, psychological and social problems. They are seemed to be appeared nowadays and continued at least at the nearest future. Therefore, it is necessary to implement into the educational system the different approach — more holistic and compatible with the actual social challenges. This is the transformative learning approach.

Transformative learning approach as cognitive adaptation strategy

Jack Mezirow of Columbia University has developed this transformative learning approach based on the Transformative Learning Theory. The history of this approach started in the 1970's, after researching factors related to the success or lack of, and of women's re-entry to community college programs [Mezirow, 1978]. His result was that a key factor was perspective transformation. When Mezirow studied the data of his original studies, he noted

a number of participant's patterns of activities or behaviors through which they are usually held and reported. Based on these descriptions, he developed an overall step-by-step model of the process of transformative learning [Mezirow, 1978]. In a broad sense, these steps describe the general process of involving people in activities that may cause it to shift in semantic perspective as well as to different consequences. It is important to notice, that these steps were carried out in a unique individual manner. They are very different and in a different manner help learners to integrate their learning outcomes and give them important senses and meanings. In his work "Transformative changes of adult learning" Mezirow [Mezirow, 1991] scrupulously compared the proposed step-by-step model of transformative learning theory with other theories of adult learning, finding the many correspondences between them, noting that these steps can be implemented in different ways and in different orders. They can be cyclic or recursive and learn the individual may start with any of them or not include them at all. He described "10 phases of the transformational process" and argued that transformations often follow some variation of the following phases of meaning becoming clarified:

- A disorienting dilemma.
- A self-examination with feelings of guilt or shame.
- A critical assessment of epistemic, sociocultural, or psychic assumptions.
- Recognition that one's discontent and the process of transformation are shared and that others have negotiated a similar change.
- Exploration of options for new roles, relationships, and actions.
- Planning a course of action.
- Acquisition of knowledge and skills for implementing one's plan.
- Provision trying of new roles.
- Building of competence and self-confidence in new roles and relationships.
- A reintegration into one's life on the basis of conditions dictated by one's perspective [Mezirow, 1991].

The first phase was a disorienting dilemma. The next two phases are important aspects of the second of the theory's themes — critical reflection. The next phase represents the third of the theory's themes, rational discourse. This is a very effective communication tools. The effectiveness lies on exploring with others the discovered "misfit" between your premises and your environment. And specifically it means that:

- "Recognition that one's discontent and the process of transformation are shared and that others have negotiated a similar change;
- Exploration of options for new roles, relationships, and actions;
- Doug's discussions with his group allowed him to explore this "misfit" how competition wasn't always the best approach to performance situations and explored other potential roles or approaches" [Mezirow's Ten Phases of Transformative Learning]. This approach seems to be a very actual in the "rainy days", which we are experiencing now. The modern society, which is oriented on to the competitiveness and "success race", should be changed to the society of support and cohesion. Therefore this finding balance approach is suitable for the transformation way.

A few years after the establishment of the theory in 1991, in response to criticism and suggestions, Mezirow revised its initial position and extended the original 10-steps model of the transformation process through the inclusion of an additional step: "review of existing and constructing of new relationships" on the basis of critical reflection and rational discourse [Mezirow 1994: 224]. This step can be regarded as a test on the formation of the individual as an autonomous, communicative

and responsible subject of social relations. Therefore, we can consider this step in the direction of critical reflection as methodological basis of human adaptation strategies.

Critical reflection as foundation of educational cognitive technologies

The way of cognitive transformation starting from competitiveness to the cohesion could not be realised without proper changes in the way of thinking. Many followers of Mezirow also assign an important role to the critical reflection in the educational processes, especially in the processes of transformative learning. “Critical reflection is a tool that we use in our beliefs and assumptions, assessing their validity in light of new experiences or knowledge, considering their sources, and learning background, their underlying” [Cranton, 2002: 65]. Patricia Cranton explains that “transformative learning theory leads us to see learning as a process of understanding assumptions and their assessment” [Cranton, 1994: 730]. She also states that we always proceed from the existing complexes of assumptions that define our teaching practice, and stresses that “if basic assumptions are not challenged, the change cannot take place” [Cranton, 1994: 739].

Therefore, finalizing main principles of the transformational learning and the difference between instrumental and transformational learnings we can share the following suggestion: “Instrumental learning is the acquisition of skills and knowledge (mastering tasks, problem solving, manipulating the environment: the “how” and the “what”). In contrast, transformative learning is perspective transformation, a paradigm shift, whereby we critically examine our prior interpretations and assumptions to form new meaning the “why.” This perspective transformation is achieved through (1) disorienting dilemmas, (2) critical reflection, (3) rational dialogue, and (4) action” [Mezirow’s 10 Phases of Transformative Learning].

Conclusion

New educational paradigm offers the concept of cognitive effectiveness and how to reach it through educational technologies. It includes topics of creative thinking, teambuilding abilities, effective decision-making, engagement in the learning and teaching processes, cognitive skills improvement, etc. The idea is application of innovative cognitive technologies (interactive visual communicative technologies, gamification, mediation, etc.) in to the system of education. It will change the existing approach to the teaching and learning in secondary schools and universities. The perspective direction of further researches is to find a methodological base for the platform for realization of innovative services for educational programs: integration of flexible teaching methods, the latest hardware and software, digital 3D-objects and multimedia content and elements of augmented reality.

In addition, the focus on transversal competences and their development by the way of applying the cognitive technologies in education will improve the process of real cognitive effectiveness and human adaptation. First, it leads to the theoretical and practical implementation of the achievements of cognitive sciences and technologies on the matters of educational motivation, creativity, values, cognitive effectiveness, etc. To increase social and personal impact it is necessary to deliver tailor-made courses on visualisation, gaming, decision-making, creativity, mediation, facilitation, non-violence communication, etc. These courses should help to improve the human adaptation strategies. However, our analysis, in any case, does not purport to cover all the problems of human adaptation strategies. We have

highlighted just the areas and identified the ideas, on the basis of which we will build proper development of cognitive technologies.

Therefore, we have considered the implementation of new cognitive technologies, primarily focused on the development of the “21st century skills.” transversal competences. These competences connected with the social intelligence, in particular, with the social cohesion development. These types of technologies are very effective because of their impact on the development of human’s social adaptation.



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