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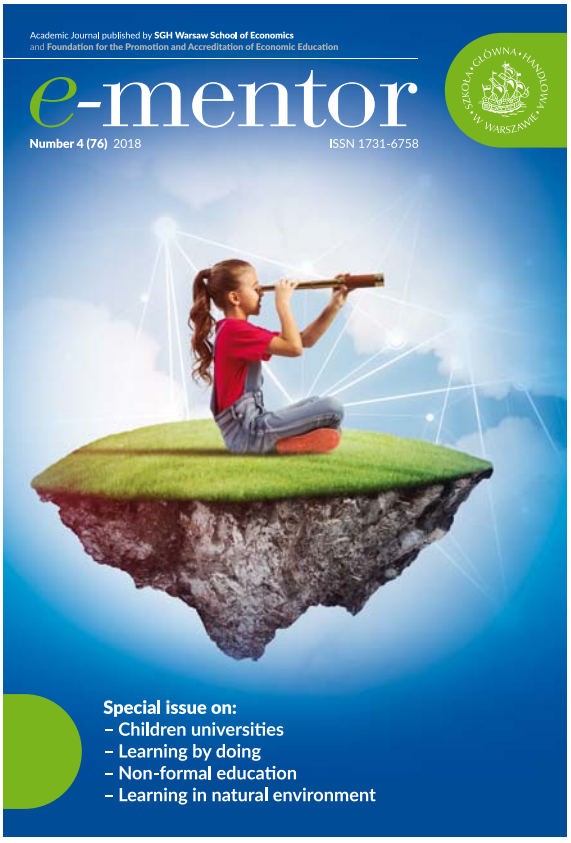
WSPÓŁWYDAWCA: FUNDACJA PROMOCJI I AKREDYTACJ KIERUNKÓW EKONOMICZNYCH



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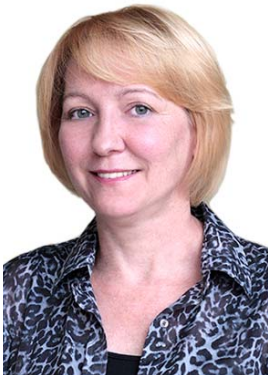
The role of children's universities in developing key competences and universal skills of children and teenagers



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The digital revolution has created new patterns of behavior, ways of activity and thinking. It has radically changed the labor market as well. The information society is developing, which implies the necessity of preparing the mankind to living in a specific cyberculture, defined as the whole range of human activities related to the use of modern IT tools (Lévy, 2001, pp. 107–112). The most important task of education is to prepare young generations for rational and efficient functioning in the reality which is a synergy of the real and virtual world. The aim of the article is to show the role of children's universities in developing the skills recognized today as crucial, the possession of which will decide about the future of the whole generations. Particular attention was paid to the development of logical-mathematical intelligence and digital competence.

Cyberculture – contemporary educational challenges

The situation of permanent change, caused by the development of modern technologies, requires a contemporary human being to interpret and understand the new circumstances and to adapt to them all the time. Continuous self-improvement, reflection and the ability to be innovative are indispensable in this process. Such cognition of the world enables each active individual to build his or her own knowledge about the environment in which (s)he exists and works or learns. Every human being is subjected to changes while experiencing modernity what opens them to the future life in a new interpretative context. Building one's own system of knowledge is one of the key activities of a person, which should result from his or her general situation and previous experiences, combined with the individual personality features and attitudes. Such hermeneutical-phenomenological experience is a characteristic feature of present society, functioning in a digital, extremely dynamically evolving reality. It is an inseparable element of everyone's cognitive activity, regardless of age. Therefore, the ability to rationally use the opportunities created by information and communication technologies in everyday life requires an understanding of cyberculture that creates a specific cognitive context. The development of skills necessary in a digitized future, necessary for the rational exploitation of the achievements of civilization, accompanied by the ability to avoid dangers is a challenge for contemporary societies.

Nowadays, it is assumed that the formation of digital competences and the development of logical-mathematical intelligence is necessary for functioning in a digitized world and determines the personal and professional success of the young generation. However, taking into account the systematically growing computerization of social life, one should ask whether the level of cyberculture of children and youth corresponds to that increase. At the same time, the autonomy and independence of young network users may facilitate their ability to cope with atypical situations and may support the development of creativity (Barney, 2008, p. 95).

Over the years, the concept of cyberculture has received many interpretations, such as, for example, culture 2.0, understood as a connection between technology and culture. Cyberculture was called by Manuel Castells (2008) the culture of 'real virtuality.' Due to the synergy of the virtual and the real world, cyberculture is perceived as a creative functioning in the new space of human life (Zawojski, 2008, pp. 21–30). Cyberculture is a combination of many technologies (material and intellectual), practices, attitudes, ways of thinking and values developed with the emergence of cyberspace (Lévy, 2001, p. 16).

When digitalization of life is more and more noticeable, the activity of the young generation in the digital environment is an extremely difficult challenge for all people who are responsible for preparing young people for future functioning. The way in which children and teenagers adapt to digital reality, its understanding, interpretation and exploitation in everyday reality depend on the process of upbringing. Therefore, the key task is to shape young people's skills of rational use and co-creation of the cyberculture.

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The development of logical and mathematical intelligence of children

Functioning in the permanently changing environment requires an ability to deal with problem situations. The ability to handle difficulties or create products that have a specific meaning in a given environment, in a cultural or social context was called by Howard Gardner the intelligence. The ability to resolve various dilemmas is related to analytical thinking and allows an individual to approach a new situation holistically. Creating a new cultural product is crucial for functions such as acquiring and transferring knowledge or expressing views and feelings (Gardner, 2011). Among the many types of intelligence indicated by Gardner is logical-mathematical intelligence, which has two essential features. First of all, gifted people show the ability to solve problems surprisingly fast. Secondly, the non-verbal nature of this intelligence may be observed, which means that it is possible to find a solution to a problem before it has been articulated. The process of solving the problem can be completely 'invisible,' i.e., impossible to trace, even for the person in whose mind it occurs. The ability to carry out in-depth observations and to draw conclusions from them constitutes a form of logical-mathematical intelligence which is called 'scientific thinking' (Gardner, 2002).

According to Gardner (as well as many other researchers), childhood is a crucial time in human development. The habits of the body and mind are established during that period. Creativity can either be released or blocked (Drygen, Vos, 2003). The task of education is to detect a given child's predispositions to support the distinctive type of intelligence adequately and to establish conditions that facilitate the development of the poorly shaped ones. Not everyone must and can be talented in a given field, but everyone should develop his/her abilities and predispositions in an individual way. An important issue, therefore, is the exact understanding of the child's intelligence profile, because it may enable finding the proper way to support a child facing problems with assimilating the knowledge being transferred (compensation). On the other hand, knowing the child's intelligence profile can also help to stimulate the development of its natural strengths. Due to the importance of logical and mathematical intelligence in preparing young generations for future functioning, it becomes crucial to exploit the potential of modern technologies available properly. Their widespread use has not only expanded the scope of possible actions but also offered new, attractive means and tools facilitating the development of children's intellectual potential.

Among the forms of extracurricular educational activity supporting the development of child's intelligence children's universities deserve special mention. They can shape key competences, in particular, IT skills as well as mathematical, scientific and technical competences (Recommendations, 2006). This initiative goes in line with the key priorities included in the national education policy. The implementation in the process of education systemic solutions that support creative thinking of children and teenagers and create conditions to stimulate their IT interests is a vital part of that policy.

The role of the Children's University of the Humanitas University in Sosnowiec in the context of identified challenges

The classes organized as part of the Children's University of the Humanitas University in Sosnowiec may serve as an example of educational activities supporting the development of key competences. The initiative was addressed to the children aged 6 to 12 in thirteen locations in the Śląskie and Małopolskie Voivodeships. At the same time, in nine locations in the Śląskie, Małopolskie and Opolskie Voivodeships activities for pre-school children were carried out. The latter initiative has a name 'Pre-schooler at the university'.

Mission of the Children's University of the Humanitas University in Sosnowiec

Since 2015 Children's Universities established by the Humanitas University in Sosnowiec have aimed not only at arousing children's interest in various fields of science, but also at developing the competences necessary for functioning in digital reality in a systematic, coherent and planned way. Every year over 2000 children take part in the lectures. The number of lectures carried out during the year exceeds 200.

Forms of classes for children

The idea underlying the activities promoting science among children is to create conditions for active exploration of the world and its secrets. Information and communication technologies can be the tools which support cognition in that scope. Actions aimed at developing the logical and algorithmic thinking skills while solving the real problems which can be explained based on the various scientific disciplines may serve as a good example.

The classes are implemented in the form of:

- interactive problem-based lectures complemented by the show – the use of attractive presentation methods may support focusing children's attention on the selected scientific issues; Moreover, when children may collocate the topics with the adventures they have experienced, such situation stimulates them to participate actively in finding the solution to a given problem;
- workshop classes based on the use of activating methods – during the classes the organizers put a lot of effort on creating educational situations facilitating active participation of children in solving the problems. Choosing the topic which

may attract children's attention and therefore motivate them to the greater involvement in the class also influences the development of interest in new areas of knowledge. The introduction of elements of the problem-based method is conducive to the growth of design thinking and creativity. The tasks that should be solved individually teach children how to organize their own working time whereas providing them with an opportunity to participate in the teamwork results in the development of social competences.

The basic assumption behind the majority of conducted workshops is the use of IT methods and techniques as contemporary tools of a human being. The use of digital tools should be understood exclusively as a means of achieving educational goals in various fields of knowledge, and not as the goal itself. Especially popular among young learners are programming workshops in which they can develop the ability to think logically by solving various problems. The classes involving the use of Lego Robotics, Lego Mindstorms and Lego WeDo blocks are permanently the crucial part of activities carried out by the Children's University of the Humanitas University in Sosnowiec. Not all the tasks aimed at developing the logical-mathematical intelligence during the workshops require the use of IT tools, other tools such as educational mats and strategic games are applied as well. Some workshops are carried out as field activities. Thanks to that, children have an opportunity to observe and investigate some phenomena and processes directly in their environment.

So far, the lecture themes have covered the following scientific disciplines:

- biology ('The private life of plants,' 'The world of carnivorous plants,' 'Our incredible brain,' 'Do animals play Minecraft?');
- chemistry and physics ('What are fractals,' 'The flying air,' 'The rainbow our neighbor – some words on infrared and ultraviolet,' 'Freezing experiments');
- modern technologies ('Can a man get out of a printer – about 3D printing'), Lego Robotics;
- the humanities ('Did pirates really exist?,' 'Life in the late Middle Ages,' 'Is there anything rather than nothing, some words on philosophy');
- neurodidactics ('The Mind like Ferrari').

In addition to the lecture cycles, there are regular afternoon workshops for children called a 'Creativity Factory,' which includes the following classes:

- DIY – or in other words 'How to prevent boredom' – art and design classes;
- 'Dancing frenzy' – dance classes conducted by the dance studio staff;
- 'Glass painting' – art classes where the porcelain and glass are used;
- language classes – linked to the current events in a particular academic year;
- culinary workshops run by chefs of prestigious restaurants from Śląsk and Zagłębie;
- savoir-vivre – workshops aimed at disseminating the principles of good manners, including netiquette, or how to behave like a Lady and a Gentleman at the table and in other circumstances;
- 'A Young Technician – A Programmer,' that is:
  - Lego robotics – the Lego Education series of classes, related to ecological, natural and astronautics issues, conducted with the use of the Lego WeDo and Mindstorms EV 3 blocks;
  - Design and 3D printing.

The aim of the series 'A Young Technician – A Programmer' is to introduce young students to the secrets of programming and to familiarize them with the issues in the field of mathematics and physics. The use of LEGO WeDo 2.0 educational sets enables carrying out classes on diverse subjects – from ecology, nature protection, architecture and urban planning, to modern space technologies and spatial modelling. Since the academic year 2018/2019 some other innovative tools have been incorporated into the classes at the Children's Universities of the Humanitas University in Sosnowiec, thanks to which young students have an opportunity to expand their knowledge by new experiences. For instance, the VR goggles can be used to enhance the standard science workshops, what allows for the multimedia visualization of the phenomena and the processes that are investigated. Thanks to their features, the indicated devices allow conducting classes in any subject without the need for specialized and hard-to-access equipment. That is another method of exploring the world that is very attractive and liked by children.

Off-site training classes (for example a trip to the Copernicus Science Center) supplement the regular offerings.

Lecturers

The lecturers take the role of the tutors, managing the process of active construction of knowledge by children. They are specialists who convey their passion in knowledge to the youngest recipients. The group of academics includes the practitioners from the best Polish universities and science centers (including the Copernicus Science Centre and EC1 Łódź). From the very beginning, the teaching staff puts a lot of effort to make the presented offer fit into the idea of LEGO Education, which aims at providing the environment for learning by playing, which in turn may serve as a positive stimulus, facilitating the development of their cognitive curiosity and creativity.

Distinctions and awards

For Lego Robotics workshops, Children's Universities of the Humanitas University in Sosnowiec received the Słoneczniki 2017 award in the Logic category. The award has been established by the CzasDzieci.pl portal, for the most developmental initiative for children aged 0–14. The prize is all the more valuable

because it is granted by parents of children participating in actions organized by the Children's University. In 2018, classes conducted as part of the Children's University of Higher Education in Sosnowiec received the next nomination.

Cooperation with parents

While children take part in classes addressed to them, there are meetings for parents organized within the scope of 'Parent Development Academy.' The topics reflect important pedagogical and psychological issues that may be of interest to parents, for instance: How to effectively plan one's own time, A happy parent – a happy child, Prevention of threats in cyberspace.

Substantive supervision

The Institute of Innovative Education in cooperation with the Institute of Pedagogy supervise the selection of topics and the way they are delivered. Academics not only support the preparation of classes but also carry out systematic scientific research aimed at excelling the adopted methodological solutions.

The implemented projects

'A Young Da Vinci' project financed by the National Centre for Research and Development is being implemented at the Humanitas University since August 2018. It is aimed at children aged 10 to 14. A total number of 500 participants (children and parents) from seven partner communities participates in the program. Such actions aimed at developing the key and universal competences that the labor market in the future will demand are part of the university's 'third mission.' These include mathematical, naturalistic and digital competences, learning to learn, creativity, and teamwork skills. Classes conducted with adults (parents and caregivers) aim to develop parental and social competences.

Special emphasis is put on:

- arousing the cognitive curiosity of children;
- intellectual, axiological and social stimulation;
- inspiring creative thinking as well as developing interests and passions;
- promoting the culture of innovation;
- familiarizing children with the academic environment and the university as a place of scientific perception of the reality;
- integrating the local community around the academic center which can provide extracurricular educational, high quality activities, popularizing science.

The project begins and ends with a scientific conference for children, complemented by a workshop panel. The slogan 'A Young Da Vinci – biology and technology in Leonardo's life' is common to all those events. The workshop classes for children cover the following topics:

- 'A young genius' – the use of memory techniques and quick reading techniques;
- 'A young researcher' – participation in mathematics and natural science classes, that include: chemical, physical and biological experiments in a virtual and real laboratory, classes in anatomy, astronomy using VR goggles; additionally, classes on molecular cuisine and alike;
- 'A young programmer' – participating in programming classes with the use of an educational mat, Lego WeDo, and Mindstorms, Scratch as well as Dash and Dot robots.

E-learning platform

Another challenge for the children's university is the use of an e-learning platform to integrate the activities of lecturers, parents and children. The use of this method of communication and dissemination of knowledge will constitute another element supporting the development of digital competences of children and their guardians.

Conclusions

The civilization changes and the information society development are not solely based on changing the tools a contemporary man uses on a daily basis, but they denote a thorough remodeling of the methods of action. This issue is particularly challenging for teachers and educators whose role is to support children and teenagers in their development. Ensuring the conditions for developing key competences indispensable in the future is one of the primary duties of those responsible for the education of young generations. Transmission of the cultural context of people's actions is equally important.

Currently, the shortage of employees with e-competences on the labor market is systematically growing (Morańska, 2016). The so-called computer hard skills are necessary for IT professionals, but in many other professions, the efficient use of IT tools and resources while solving the real-life problems may be satisfactory. It is about the ability to apply the commonly available tools to carry out current tasks (Recommendations, 2006). Therefore, the expectation that the contemporary university should promote in the social environment the modern methodological and organizational solutions fostering the development of competences necessary in the digital world seems to be entirely natural.

New multimedia evoke extreme emotions. Young people can not imagine their lives without access to common IT tools. On the other hand, some adults perceive such tools as the destructors consuming the children's time and discouraging them from undertaking sport activities as well as participating in family life, limiting their social contacts and last but not least introducing them into spheres for which they are emotionally unprepared. However – as Kazimierz Krzysztofek, a Polish researcher on digital networks, describes in the introduction to the work of Charles Jonscher – in the era of digital transmission, a human is provided with unusual opportunities, and a machine

called a computer (...) *pushes them to higher and higher intellectual areas* (Krzysztofek, 2001, p. 13).

And it is in this area, in this context that the main advantage of digital media should be perceived: although it cannot be denied that technology brings some real threats, its positive potential is incomparably greater. It is a human, with his/her attitude, who makes a choice.

It must also be added at this point that decade after decade, functioning outside the digital world will be a difficult choice, fraught with consequences, even impossible. It may result in a digital exclusion and further, in social exclusion.

It should be stressed that it is not the information technologies but a man who decides about the nature of relations with them and with other users of the network. In the digital world, the quality of 'human-technology' and 'human-human' relations depends on the level of cyberculture. If therefore, it is expected that young people obtain the competences necessary for the smooth functioning in the future, it is essential to pay attention to shaping their proper relations with those technologies. The issues of using multimedia and activating methodological solutions as well as involving students in the process of constructing knowledge, are constantly at the center of pedagogical discourse. Children's universities enable the education process to go beyond traditional institutions such as family and school. The research shows that young people are not afraid of the digital world, which is their natural environment, they only need guides, a modern Plato and Aristotle leading them to discourse that facilitates development and that reduces side effects.

And finally, the following conclusion can be formulated: we do not have to be afraid of the cyberworld but rather of refraining from active and rational participation in it (Morańska, 2017). And these are activities that can be supported by university specialists in the most professional way within the framework of children's universities, raising interest in science.

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Abstract

Civilization changes related to the development of information and communication technologies require the formation of new competences in the society, the possession of which will determine the quality of life in the digital world and rational participation in cyberculture. The implementation of this task becomes the special responsibility of educational institutions that aim at stimulating the growth of interests of children and youth in the areas of knowledge crucial for the development of the information society. It is extremely important to take actions supporting the development of logical and mathematical intelligence and digital competences. Their possession is of key importance for the conscious, rational and creative use of new technical possibilities. One of the important initiatives supporting this task is the organization of classes within children's universities. The article describes the projects undertaken at the Children's University of the Humanitas University in Sosnowiec. Their main goal is to provide conditions for facilitating the development of interest in science, through its popularization. The main assumption is to implement the idea of active learning in the digital environment. Through experiencing and experimenting with the use of information technology methods and means, children and adolescents can develop competences necessary for efficient functioning in the information society.

Key words: information society; cyber-culture; education; key competences

Danuta Morańska is a doctor of humanities, assistant professor at the Humanitas University in Sosnowiec, the director of the Institute of Innovative Education. For thirty years she has been dealing with the problems of education in the information society. Her research interests concern the issues of shaping key competences, preventing marginalization and digital exclusion, and preparing educators to perform professional tasks in a digital reality.