

<https://doi.org/10.53656/ped2025-2.07>

*Research Insights*

*Исследовательски проникновения*

## THE USAGE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN EDUCATION OF CHILDREN AND PUPILS WITH MENTAL DISABILITY

**Dr. Lukáš Stárek, Dr. Jarmila Klugerová**

*Czech University of Life Sciences Prague –  
Institute of Education and Communication (Czech Republic)*

**Abstract.** In last decade the Czech's education have undercome significant changes. The information and communication technologies have crucial role in everyone's life. Therefore, in education they have its place as well. The information and communication technologies support schools and their systems on many levels such as education, school management, and communication. Education of children with mental disability is life-long process. However, it is also the best possible form of therapy, socialisation, and inclusion into society. During education is crucial to use specialised didactics' methods and tools to meet pupils' individual needs. The information and communication technologies have significant role within school life. Plus, the information and communication technologies are part of schools' educational plan. This article aims to highlight the information and communication technologies in education of and pupils with mental disability. Further, it will identify adequate technologies for the process, plus it will open several questions related to the topic. For example, the topic of inclusivity within specialised teachers' competencies.

**Keywords:** competencies; inclusion; information and communication technologies; mental disability; modern technologies; pupils

### Introduction

Digital competencies are skills which should a pupils obtain during education. The ability to develop and build pupils' digital competencies is a huge part of teachers' digital competencies. In 2013 the Czech's government agreed on and released conception "*Digital Czech in 2.0 The way to digital economy*". The conception states that "Information and communication technologies should pervade the whole educational process in primary schools. So, the modern technologies are not present only in "work on computer" subjects". Another paper focused on this issue is "*Strategy for digital education till 2020*" that say open educational systems have

potential to strengthen educational equality. The use of modern technologies and open educational resources offer new options and opportunities to set up system that is accessible for everyone who wants to be educated and needs to be educated without being disadvantaged on based on their socio-economic state, gender, region, nationality, religion, or culture.

The pupils' digital competencies are taken over from European frame of inhabitants' digital competencies that includes the structure and description. The competencies' names were modified according to their purpose in education. Hence education mainly focus on following media literacy, information literacy, creation of digital content, responsible usage of digital technologies, and problem solving due to digital technologies (Kopecký et al. 2021).

Teaching aids have become a standard part of the educational process and their appropriate integration into education provides countless opportunities for both teachers and students, from activation of students, their better motivation to learn, more illustrative explanation of the curriculum through demonstrations, and many others (Němejce, Smékalová, Kříž 2019).

One of the biggest benefits of digital technologies in education is their potential to support a pupil focused on didactics, it can involve every pupil into diverse activities, and thus to evoke personal relationship with the content. The technologies can help with research, experiments with diverse solutions, discovery of diverse connections, and during relaxation as well. Digital technologies provide diversification of lessons within one class, and it offers change to individualise education due to its variability as it can be modified individually to meet every pupil's needs. It is crucial to reflect there are big differences within education and it should not be deepened through schools. The access to education is basic human right and it cannot be taken from anyone nor the pupils with any disabilities. It is important to acknowledge the accessibility and inclusivity, differentiation, and individualisation of education. Plus, the activation of pupils is crucial throughout educational process. Although, we can support Daňek and Klugerová (2023) thought who recognise inclusive education as tool of social exclusion.

The evaluation of knowledge, experiences, and skills can be essential during educational process. On the other hand, it can be completely devastating as it is very dependable on individual teachers and their form of evaluation. Digital technologies can improve the evaluation as they allow new forms of evaluate areas. Every teacher should have digital competencies in their evaluation. The usage of digital technologies while education generates big amount of data which documents pupil's development and improvement over a period. Therefore, it is essential for teachers to be able to work with this data, to analyse them, and use them while deciding on their next teaching strategy.

The importance of teachers' digital competencies and its importance while teacher training, mainly within special education needs teachers, is discussed in

Stárek, Klugerová, Víšek (2023). They highlight the importance of practise while studies as it is vital to useful to combine theoretical information with practise to extend specialised competencies for future teachers.

Technologies can improve the educational process is several ways. To use digital technologies a teacher must be digital competent. The timing of technology's usage is imperative. It is not possible to use anything whenever. Technologies can be combined and in this case a teacher becomes a mentor while using them. Pupils become less dependent on a teacher, but they still need the guidance and to feel their support. Digitally competent teacher should be able to conduct educational activities that use the technologies and are focused on development of individual as well as on development of whole group.

Digital resources which can be used in education extensively and teachers are frequently introduced to these. One of the key abilities which should every teacher have is to decide which technology should be used and when. Also, they should be able to combine the technologies in the most effective way. Furthermore, they should be able to responsibly use digital content, create new materials, and organised it in a sensible way (Klement, Dostál, Kubrický, Barták 2017).

Just as choosing a teaching method is one of the key competencies of a teacher, so is it important to choose the right teaching aids. These aids support and underline teaching, especially in information and communication technologies.

The choice of computer science subject should correspond to the level of the student's intellectual abilities. It is necessary assign simple and clear tasks to such pupils due to a reduced level of reasoning capabilities and lower memory capacity. Working with a computer may not be particularly suitable for pupils with mild mental disabilities as complicated as it might seem at first glance. It can generally be said that a large percentage of pupils with mild mental disabilities shows effort and performance in the field of computer technology comparable to ordinary children. Only for pupils with moderate mental disabilities should the teacher calculate with only a very small percentage of these children learning to read at least partially understood the text. They can also handle numerical operations at different levels. As for the students with a more severe mental disability, for some, working on a computer is possible, albeit very difficult simple level. For children with severe and profound mental disabilities, it should focus especially on simulations of perception and development of motor skills or mastering the basics of self computer operator. Both special hardware and software are necessary for these children. On today, special equipment can be used to control a computer by an individual with a disability.

### **Modern technologies in educational process**

Whether we want to use modern technologies in educational process we should ask for many questions related to didactics, psychology, their real role in

our society and their prescribed role in society, what is expected from their usage during education, and what changes have been raised since their usage.

Due to everyday presence of technologies in our life i.e. mobile phones, and their constant accessibility modern technologies have significant impact on people's everyday life. Technologies influence relationships, social services, communication, entertainment, leisure time, and of course education. The extension of social sites and mobile technologies mean that education can more easily improve or reform traditional form of education. The traditional borders can be crossed, and forms of education and learning can be improved within new form of human's interaction supported with modern technologies. In this context e-learning is developing. E-learning seeks to purposely connect modern technologies with aims and needs of current education and learning (Zounek 2009).

Pros and cons of information and communication technologies (ICT) in education militates all human senses. Plus, they provide diverse tools that can offer new educational opportunities in a classroom. It allows for individualised education for every pupil (Polakovič, Dubovská, Hennyeyová 2016). Modern technologies can help while teaching, lessons planning, easier actualisation of educational materials, they can help during solving issues, support creativity, improve pupils' presentational skills. Further, teachers can use for further education and self-development. Plus, ICT presents important motivational factor for students while a lesson. It is expected from ICT to support innovative procedures in education. However, there are some cons as well into these we include teachers' insufficient skills to use ICT, lack of confidence, and teachers' motivation to use ICT in their lessons. In schools it can be lack or bad quality of technological infrastructure, old hardware, limited access to ICT, lack of educational programs or insufficient placement of ICT, and lack of strategy in usage of ICT (Brynjolfsson 2015).

ICT is part of schools' educational plan for primary education (further "RVP ZV") (2023) – the content of primary education is divided into nine parts. One part of education is also educational and communication technologies which allows pupils to gain skills to use the modern informational technologies, creatively work with information, orient in them, and use them for further in their life not only for educational purposes. Educational area of informational and communication technologies was introduced due to the growing need for ability to use these technologies. Therefore, work with these technologies is part of primary education at 1<sup>st</sup> and 2<sup>nd</sup> level of primary schools. The gained skills and abilities are condition to develop and to improve professional and leisure time activities and skills. Plus, they are expected on job market. They allow pupils to work with a huge amount of educational software and informational resources from a whole range of educational area of ICT. The minimal level for

changes of obtained skills from educational process can be reflected in individual educational plan.

ICT as part in context of specialised education origins from schools' educational plan for major education special primary education (further "RVP ZŠS") (2023). In the first part of this plan, which is followed in schools focused on students with middle hard mental disability, the ICT is one of the nine educational areas. This area included basic of work with personal computer and chosen basics of programs' tools.

The attention is focused mainly on text editor and specialised educational programs whose help allow pupils to gain the basics of manipulation with personal computer. Skills that pupils gain become essential advantage in their future personal life as it helps them to communicate. Education in this area lead pupils to improve their cognitive skills; to develop their sensitive motor skills; to use more senses at time, to choose relevant information. Finally, it contributes to pupils' knowledge about content on the internet, or to communication via ICT.

The Czech Republic is the only country that has established national tests using technology for purposes quality assurance within the entire school system. In the Czech Republic in 2016/17, digital competence testing was introduced as one of the six basic types literacy, which the school inspectorate should monitor regularly through surveys and tests. Class (or year group) of tested pupils differs in individual years.

The document "Strategy of the Education Policy of the Czech Republic until 2030+" (2024) emphasizes the importance critical and responsible use of digital technologies during and outside of teaching. Education within this Strategy will include media, information and data literacy, cooperation with communication, production of digital content, safety within online environment, but also problem solving and critical thinking.

Since 2019, a large-scale revision of the national curriculum has been underway as one of the goals set out in the Czech digital education strategy. Although the existing national the curriculum focuses mainly on knowledge of technologies and competences for them use, the ongoing revision should move it to a broader understanding, including a critical one thinking, problem solving, data literacy, security issues, flexibility, communication and the use of digital technologies to improve learning outcomes (European Commission/EACEA/Eurydice, 2019).

### **Modern technologies in educational process of children with mental disability**

Expected aim of ICT is to use it in education of pupils whether they have mental disability or special educational needs. The aim is to improve and extend their knowledge, skills, and abilities, which can be obtained in more complicated way with more given energy from teachers and pupils.

Areas of ICTs' usage:

- Teaching and stimulation;
- Compensation;
- Individualisation;
- Re-education;
- Diagnostics;
- Creation of specialised educational material and tools;
- Motivation;
- Admission
- Ordinary usage (Zikl 2011).

While considering the use of ICT within education of pupils with mental disability is crucial to realise significant heterogeneity of whole group. Further complication can be another disability which can join the mental disability or when the mental retardation is one of the symptoms. Opportunities of re-education are in this situation very different and thus the usage of ICT will differ as well (Zikl 2011).

Novák (1997) states that ICT is suitable to use for understanding to causes and consequences, for visual-motorial coordination, to gain the image about colours, for better results in education, and to lower behavioural issues. With regards to the problems in concrete thinking and understanding of speech which is characteristic for pupils with mental disability the visual help during their educational process is crucial. Thus, this can be provided within ICT (Berki 2014).

ICT can be used within education of children with easier disabilities similarly as with other children. The main difference within people with mental disability is in cognitive skills concretely within motivation for learning. Therefore, the usage of ICT can motivate those pupils to be more active and eager to learn, they bring concrete usage and force pupils to manage the basics of manipulation with technologies which might be not as complicated as managed trivia (counting, reading, writing). The trivia is very complicated for pupils to manage and so the ICT can help. It can be effectively used to review topics in unordinary way for example by using interactive board, educational programs, interactive worksheets. ICT can help to individualise teachers' attitude towards pupils, and it can be used as motivation for pupils as well. Especially nowadays the ability of pupils with mental disability to managed and work effectively with ICT can be an area where they can concur to their peers. Thus, can further positively influence their self-esteem, self-evaluation, and improve their ability to become a part of social groups (Terfloth, Bauersfeld 2019).

The usage of ICT within education of children with middle mental disability varies in many areas. One of the problematic areas is later development of motorial skills which complicates the usage of ICT hence there might be issues with usage of mouse and keyboard. Next barrier is in area of cognitive skills as the understanding to the whole topics might be harder than within pupils with easier mental disability.

Thus, these pupils might manage smaller bits such as work with specific educational program, play basic games. It is vital to be prepared for problems while learning new skills in unknown environment, and even the need for someone else to help (Terflloth, Cesak 2016).

Since the term ICT is umbrella term further, we will describe only the opportunities for ICT technologies which are used while educating pupils with mental disability.

Even though the assistance technologies are mainly used in social services where they help to people to choose, gain, and use these tools in this paper we define them as tools which help to improve physical and psychological functions to those who might have them limited.

The assistance technologies help to physically disabled people as a tool to reconcile with their disability. Further, it helps them to intergrade into general society. Also, the technologies not only replace the lost ability, but they help to preserve the other functions i.e. they can help to one to return to their work environment (when it is possible) and to take part in socio-integrating process (Keblová 1999).

People with mental disability used assistance technologies mainly to help them with communication. These include communication boards, bigger button with voice outcome, board's communicators. Except the communication boards one might use the communicator's software which can create communication boards, also. To use the software, one must have touch screen (Kantor 2012 in Ludíková, Kozáková 2012).

**Multimedia program** is program that combines texts, pictures, sounds, and often videos. This combination is often used in diverse types of encyclopaedias and for diverse school's subjects. Frequently these programs are used for diverse foreign languages programs although these programs will not teach someone a language without them providing their own activity (Slowík 2022).

**Robotically programmed tools** support development of creativity, logical thinking, informatic thinking, and for pupils they are strong motivation to become an active part of learning process as the whole topic of robotics is interesting for many pupils. They can be used throughout the whole primary education as the first and second level. Robotically programmed tools help pupils with understanding to algorithms which is primary part of informatic thinking. The pupils learn in natural way how does robotics work, to program, fix mistakes etc. The significant advantage of these tools is their mobility because they can be easily carried from one class to another. Plus, they can be used repeatedly. Further, their manipulation is very intuitive. One of the tools is robotic snail Qobo. It is robotic toy which is mainly used for pre-schoolers. Qobo is toys that reacts to touch, and it moves, make noises, and lights up. This toy can be programmed via specialised cards. The cards can recognise the given orders which are prepared such as move, dance, light up, recognise colours. There are thirty primary cards. The Qobo can be programmed via manipulating programs for computer (Kopecký 2021).



Another robotic toy is Code and go which is robotic game which moves after pressing arrows which are on the backs of the toy. It can turn around, turn to right and left. It teaches children to reflect their surroundings. With pressing diverse button one can start the programmed frequencies. Another toy is Matatalab which is focused on pupils at the first level of primary schools (age 7 – 11). Matatalab contains one moving robot, control tower with mat for programming where players put cubes with pre-defined orders, and playing field on which the robot moves. On the playing field are several obstacles which the robot must overcome. The game includes notebooks with several difficulties. Majority of the robotic programming tools are very popular for pupils due to its modernity and creativity.

Computer games are great educational tool, but education needs to avoid the thought that games are bad, and they do not help children at all. For example, they can help to extend the vocabulary knowledge for foreign languages. This happens often only one way, but it depends on type of a game. Also, they show to pupils' historical buildings, teach them logic, physical laws, and others. These include Who wants to be millionaire, Risk it. Some games should be part of schools' computers it is a phenomenon in 21<sup>st</sup> century (Čapek 2015).

A popular part of many schools is 3D printer. These printers have diverse forerunners and extensions. The easiest way to introduce 3D printing is to use 3D pens. They work very easy the plastic fibre is heated up to 200 degrees Celsius. The melted material is pressed out of the pen and in the air, it cools down and gets hard again. Due to this principle is possible to create diverse 2D and 3D products. The whole process is like 3D printers the only difference is that within 3D printers the process is completed by the machine. The 3D pens develop children's creativity, fantasy, motorial skills, and patience. This process and mainly the drawing with the pens is not easy and it does not always end up as the pupil hoped. The material itself are often natural and without any smell (Dzidová 2015).

The market with 3D pens is big and accessible although it depends on the execution and type of the pen. The pen can be bought for hundreds to thousands, and it depends on what is expected from the pen. When using the pen, it is always good to remember that for begins is good to use some template which is often included when buying the 3D pens. The most crucial is too managed pressing the fibre from the pen once this is managed one may continue to more complicated products. 3D pens are followed by 3D printers which work on similar base as the pens with the difference that they are controlled by the machine. 3D printers are very frequently within education. The pupils with specific educational needs are excited about the printers and they learn many skills and knowledge while using these technologies. 3D printing has many options in education. While using the 3D printing pupils can create products which can be normally created while using general tools. 3D printers can create educational tools, to extend diverse robotically programmed tools, but also other things like stands for phones, wheel for shopping carts, combs,



smaller toys etc. Before buying the 3D, printer is crucial to think through what it will be used for in school including pupils and teachers. Afterwards it comes the choosing process where is important to pay attention to the combination of price and performance. There is many printers and diverse financial level. Therefore, is essential to evaluate what material the printer will work with (Kopecký 2021).

Further it is important to learn to work with the printer correctly and effectively. It is vital to consider whether it is used for frequent almost daily printing or occasional. It is good to check how does the printer work after service check-ups, to try to print several trial products, to try to print something based on available internet manual. After finishing the work, it is important to clean the printing mat. The work with 3D printer is easy and there is no need for some specific IT skills. In last decade the 3D printing became very popular and the price of printers and materials went down (Pech et al. 2021).

Virtual reality is tools which can be effectively used in education and mainly within children with special educational needs. While using this technology pupils can visit environment which they might never see in person such as space, the Sun, sea bottom, desert etc. Plus, they do not need to write long notes and memorize them instead they experience the topic and learn by doing/experiencing. This applies to pupils of all ages (Cvetković 2021).

Digital technologies can help with life-long learning. On the internet we can find a lot of educational materials such as magazines, books, encyclopaedias, blogs etc. Big advantage is the 24/7 accessibility. E-learning is combined with traditional education and its movement is noticeable. Some authors even mention replacing teachers with modern technologies. However, these opinions are not welcomed (Zounek et al. 2021).

**Concept STEM** origins is the USA where is raised in 90's of 20<sup>th</sup> century. It combines teaching of all natural sciences such as technology, biology, physic, and math. Currently it combines art and become STEAM. The kit combines diverse primary parts, functional parts, and other parts which are meant for one time usage and repeated building while using diverse circuits. It is a game that allows for human naturality which often helps during learning when it is correctly placed. It can be viewed as a didactic tool. The kit combines electrotechnical, constructional skills which should be improved throughout STEM. If we want to use this tool in a class is curial to acknowledge that it is a bit more complicated, and pupils might need teachers' help (Gajzlerová 2015).

In the context of children and pupils with intellectual disabilities, we perceive art as a tool that provides a person with a higher quality of experience, throughout his life, develops skills such as problem solving, creativity, critical thinking etc. All these skills will be needed not only by a person with an intellectual disability in this technologically advanced world develops very quickly. In addition, these students support or develop their curiosity and sense of creativity. STEAM empowers

teachers include multiple subjects at the same time and deepens the learning experience for children where they can discover, ask questions, do experiments and practice new skills.

**Micro Bit** – is one of programmable microcomputers which can be used for basics of programming at primary and high school. Often it is used with children for 7 years. It is quite easy to use it with pupils with special educational needs. Its usage it has in any school subject. It is a small computer board which has diverse build-in parts such as programmable buttons. It even involves Bluetooth which allows it to relate to other devices (Gajzlerová 2015).

There can be bought other accessories such as thematical kits of diverse difficulties which can be used for pupils of general primary schools but also for pupils who are included who has specialised educational needs, there is even a kit for handy pupils, or kitchen kits. It can be combined with STEM kit. Thank to this combability it can create other toys, devices, which looks very good and have even quality technological parameters (Pech et al. 2021).

For its size, the Micro Bit is an educational tool that will enable teachers to parents and students to have fun while programming. During the lesson, students can create games, construct projects of wearable technologies in everyday life (wearables), such as a pedometer or a smart watch. It is important to show students various technologies that will support their creativity and taste after knowledge. The goal is to motivate the student and enable him to learn the basics of programming for further career and personal growth. In elementary school, the suitability of using the Micro Bit as educational aids as a springboard for larger, more complex tools

**Data projectors** provides to visualise dynamic and static material or computer screen on interactive board, or wall. There are diverse types of data projectors such as:

- Data projector according to visual technology which help with visual presentation. This type is due to its size suitable for mobile presentations. In general, it is suitable for presentation of picture rather dynamic so for example movies (Friedmann 2012).

LCD projectors are mainly used for presentation without regards to the lighting conditions. These projectors are suitable for all types of classes even without any blinds. There are suitable for presentation of static pictures, and texts.

Hybrid LED/laser projectors are project where the light source is replaced by highly lighting diodes combines with blue laser. This projector can be used for presentation of both dynamic and static pictures (Friedmann 2012).

In general, the data projectors are well used tools for primary school pupils. They are used for visualising any materials such as movies, documents, videos, quizzes such as Kahoot, Wocabee etc. Also, it is used for teachers' presentation as well as pupils' presentations. The projectors help to involve all pupils into the learning with or without help of teachers' assistants.

The data projector is especially suitable for practical demonstrations on the computer.

**Interactive boards** are well-used parts of almost each school. Majority of schools have several numbers of these. Interactive boards work on two main principles either it is connected to the computer and what is displayed at the teacher's computer is visible to the pupils or it can work without the connection itself. On this board one can work with several numbers of educational tools, but also entertainment activities. However, the best is combination of both parts. Teacher can display anything what they recognise as suitable. This technology is suitable for pupils with special educational needs, also.

The effective of interactive boards is of course given by teachers' attitude towards pupils with mental disability. Next significant role plays the numbers of pupils, and their level of disability. Further, the feedback on this is important as well (Tláskalová 2021).

The interactive whiteboard also has others advantages not only within the educational process of children/pupils with mental disabilities, it can become a strong motivational element, the curriculum is possible thanks to it very well visualise, the principle of visuality is applied, pupils' attention is better maintained, pupils are more easily and actively involved in the educational process. In addition, the materials can be used repeatedly, modified in various ways, changed and further worked with. Teaching through an interactive system, however, entails also certain difficulties, and not only when used as part of the educational process for pupils with mental disabilities. The interactive whiteboard should be used in one piece for a maximum period of time 20 to 30 minutes to avoid visual problems due to too long exposure bright light from the projector that illuminates the interactive whiteboard, which is quite possible prevent well. In addition, it can also be expected that it may occur, either on the part of the pupils or by teachers, to damage the blackboard, which can happen intentionally or unintentionally negotiation.

Visualiser is one of the tools that help to visualise text or pictures. Visualiser if connect via USB to the computer, notebook, or data projector and things we want to show are displayed on interactive board, screen, or a board. Often it has functions such as zoom, which allows to zoom in or out of the displayed information. Further, it has microphone and possibility to record a video. Its usage is very intuitive for teachers as well as for pupils.

There is significant number of options to used diverse technologies throughout all levels of education. Recently, there is ongoing debate about internalisation of technologies into daily life, and about the amount of information that surrounds people. thus, it is crucial to innovate the education and keep pace with current trends. Furthermore, it is essential for teachers to keep searching for new options how to embrace and modernise their lessons. Every should be able to work with their application and reflection on new methods. However, stereotypes are

prevailing and according to them for quality education is crucial to use theory as well. However, a teacher should be able to show to children the practical side of their education. They should be able to include the technologies into their lessons in an interesting and interactive way. So, the pupils will become familiar with the topic in an interesting way (Sieglová 2019).

A non-traditional and simple example of the use of ICT, specifically an internet portal, is among the teachers of vocational subjects and vocational training in the school's subject areas (Primary School and Horšovský Týn Vocational School), where they use the offers of the Internet portal Pinterest as a source of information for preparations in the subjects of confectionery, gardening and painting work, carpentry technologies, professional drawing, etc. They also use it in cases when it is necessary to prepare pupils with mild mental disabilities for professional competitions. Even the pupils themselves search for information in order to fulfill the assigned tasks. For example, the confectionery field is inspired by decorations for decorating cakes or how to properly arrange dishes on the table for various occasions. The field of gardening is inspired by various arrangements for the Christmas or Easter holidays. Here, carpenters discover carpentry tricks for building pergolas, animal hutches, feeders and furniture. Videos are available to painters with technological procedures for coating various surfaces.

### **Recommendations for practice**

The base for use of ICT in education not only with children with mental disability is motivation. If the teacher is motivated and supports the use of the modern technologies the thought of using these technologies is more acceptable. Support of positive attitude and first contact with multi-media technologies should be part of professional training of future teachers. In this stage is suitable to present how the technologies can be incorporated into education. Thus, if they come across them later in their career the thought of using it is more acceptable. Plus, they are more likely to use them effectively. The assumption is to use them correctly and manipulate with them after some introduction to it.

From research Abed (2018), Mølster and Nes (2018), Ramos and Andrade (2014) is noticeable that teachers' competencies in area of ICT and special education needs are recognised as crucial parts of educational process in 21<sup>st</sup> century. Nevertheless, they are evaluated as insufficient and in need of improvement.

The welcome introduction, and further education, seminars, and workshops allow pedagogical workers to become familiar with these technologies, learn how to manipulate with them. Also, further education can inspire and educate pedagogical workers how to work with given group. By doing this we can avoid to feelings of despair, burn-out, and to loss of authority in front of a class. Further, it is crucial to remember that schools' support and colleagues' support is crucial as well as they can motivate and support each other, they can share their experiences and new developments.

Related to this is another condition – information about possible integration of new technologies into inclusion process. From perspective of special education, it means frequent information sharing about possibilities how to involve it in education, individual plans, and further educational processes.

For use of ICT in education is crucial to have enough equipment available in schools including hardware such as printers, interactive boards, projectors, apple TVs. If there is not unity in equipment providers there might arise issues while using due to incapability.

Significant advantage is easy connection between notebooks, diverse types of tablets, Eee tops computers etc. The tablets can be easily used due to its size and weight. Thus, it is easy to use right in front of a pupil on their desk, they can work at their place i.e. on the chairs in a circle, on the floor during group task. For practical activity is important for pupils to work with touch, with electronic pen, or via keyboard. Mainly the finger or stimuli allows them to react intuitively and work with ordinary paper notebook in “real world”.

Supporting the digital competence of all teachers is an essential element. A condition of transformation of the content of education is the mentioned support of teaching staff, which also affects the quality education in general. The development of digital education affects the role of the teacher, in which it is important undergraduate training or subsequent further education. Mentoring support is also important sharing good practice during the integration of digital technologies in teaching. They would support themselves they also had activities that strengthen teachers’ abilities to be able to work with different digital educational resources. Educators should be able to plan and use digital technology at different stages of the learning process.

Digital technologies can improve the quality and efficiency of teaching in several ways. Teachers need specific digital competences to be effective at different stages the involvement of technologies, regardless of which didactic concept he uses<sup>1</sup>.

On April 30, 2019, the Ministry of Education, Youth and Sports of the Czech Republic approved a new Framework for the digital competence of teachers. This framework serves to define continuing education needs and to develop curricula and teaching and learning methods for digital education. The development of teachers’ digital competences will also gradually be integrated into teacher training programs<sup>2</sup>.

## **Conclusion**

Education is not the only process when we should think about use of ICT mainly in these areas: knowledge and work with ICT, inclusive thinking and pedagogical competencies, and didactic knowledge. The educational of children with special educational needs happen in Czech Republic on mainstream schools (occasionally in special schools), in specific classes, departments, or study groups with

specialised educational programs, or in form of individual integration/inclusion. The assumption is to meet the individual conditions and fulfil special educational needs. It is fulfilled via combination of specialised educational procedures, alternative methods, modified methods, and via usage of supports' plans. To use these methods and tools is possible due to prepared individual plan of education. This plan is created based on individual diagnostics and needs. Similarly specific can be for example the length of a lesson, the use of special educational tools, subject of specialised educational support which reflect the individual needs. Further conditions of successful education of pupils with mental disability are differentiation and individualisation of education, to include use of ICT, to consider type, level, and stage of disability. Special educational needs of pupils are primarily defined by their disability. Within all types of disabilities is possible to use, to add, and to involve use of multi-media digital technologies.

The successful educational process with children with special educational needs with support of ICT is evident and relative. ICT supports pupils in inclusive environment, so they are more interested into knowledge and ICT teach them to know, reflect and sue their competencies.

Nowadays, ICT is natural part of educational process of children with special education needs. Even though, diverse technologies are more frequently used in educational process it is crucial to stress that in centre of educational focus are still students and their individual needs and requests, and teachers' and their didactics' lead as education without any didactics' lead would not work well.

The ICT rooms are another variant to use computer in educational process. Mutual relations of upbringing and education which influence pupils with mental disabilities and are included into live conditions provides origin for individual educational needs i.e. individual pedagogical support. Therefore, to use technologies within this group of pupils can lead to very sensible education. So, a person with special educational needs can learn, work, and play at computer it must reflect their individual characteristics and needs for example the influence of mental disability, personal learning pace, endurance etc.

The teacher must be able to not only work with digital technologies but also to be able to transfer this ability on their pupils, colleagues, parents etc. Further, each pedagogical worker should continue with their education.

Another question arising might be the evaluation and testing. It is well discussed question how to test practical integration of ICT life and educational process. It is essential to know what knowledge pupils possess the form of testing in informational technologies can be more entertaining for pupils. Another question for debate is effectivity of ICT us in education.



## NOTES

1. EUROPEAN FRAMEWORK DIGITAL COMPETENCES OF TEACHERS. [cit. 2024-06-05]. Available from: <https://revize.edu.cz/files/evropsky-ramec-digitalnich-kompetenci-pedagogu-digcompedu.pdf>
2. EUROPEAN COMMISSION/EACEA/EURYDICE, 2019. DIGITAL EDUCATION IN SCHOOLS IN EUROPE. [cit. 2024-05-25]. Available from: [https://www.dzs.cz/sites/default/files/2021-11/Digit%C3%A1ln%C3%AD\\_vzd%C4%9B%C3%A1v%C3%A1n%C3%AD\\_ve\\_%C5%A1kol%C3%A1ch\\_v\\_Evrop%C4%9B.pdf](https://www.dzs.cz/sites/default/files/2021-11/Digit%C3%A1ln%C3%AD_vzd%C4%9B%C3%A1v%C3%A1n%C3%AD_ve_%C5%A1kol%C3%A1ch_v_Evrop%C4%9B.pdf)
3. DIGITAL CZECH REPUBLIC V. 2.0 - THE WAY TO THE DIGITAL ECONOMY. [cit. 2024-04-10]. Available from: <https://www.mpo.gov.cz/assets/dokumenty/50381/57162/612104/priloha001.pdf>
4. DIGITAL STRATEGY EDUCATION UNTIL 2020. [cit. 2024-02-07]. Available from: <https://www.msmt.cz/uploads/DigiStrategie.pdf>
5. FRAMEWORK EDUCATIONAL PROGRAM FOR BASIC EDUCATION. [cit. 2023-12-05]. Available from: <https://www.msmt.cz/vzdelavani/skolstvi-v-cr/skolskareforma/ramcove-vzdelavaci-programy>
6. FRAMEWORK EDUCATIONAL PROGRAM FOR THE FIELD OF EDUCATION ELEMENTARY SPECIAL SCHOOL. [cit. 2023-12-05]. Available from: [https://www.edu.cz/wp-content/uploads/2020/08/RVP-ZSS\\_kor-final.pdf](https://www.edu.cz/wp-content/uploads/2020/08/RVP-ZSS_kor-final.pdf)
7. STRATEGY OF THE EDUCATION POLICY OF THE CZECH REPUBLIC UNTIL 2030+. [cit. 2024-01-05]. Available from: [https://msmt.gov.cz/uploads/brozura\\_S2030\\_en\\_fin\\_online.pdf](https://msmt.gov.cz/uploads/brozura_S2030_en_fin_online.pdf)
8. PRIMARY SCHOOL AND HORŠOVSKÝ TÝN VOCATIONAL SCHOOL. [cit. 2024-06-05]. Available from: <https://www.zs-oshtyn.cz/o-nas/>

## REFERENCES

- ABED, M. G., 2018. Teachers' Perspectives Surrounding ICT Use amongst SEN Students in the Mainstream Educational Setting. *World Journal of Education* [online], vol. 8, no. 1, pp. 6 – 16 [viewed 15 Januar 2024]. DOI 10.5430/wje.v8n1p6.
- BERKI, J., 2014. *How to support teaching with e-technologies*. Liberec: Technická univerzita. ISBN 978-80-7494-134-4.
- BRYNJOLFSSON, E., 2015. *The Second Machine Age: Work, Progress and Prosperity in an Era of High Technology*. Brno: Jan Melvil Publishing. ISBN 978-80-87270-71-4.
- CVETKOVIĆ, D., 2021. *Virtual Reality and Its Application in Education*. London: IntechOpen. ISBN 978-1-83880-860-0.



- ČAPEK, R., 2015. *Modern didactics: a lexicon of teaching and assessment methods*. Praha: Grada. ISBN 978-80-247-3450-7.
- DANĚK, A. & KLUGEROVÁ, J., 2023. Inclusive Education as an Instrument for Preventing Social Exclusion. *ALTA: Journal of Interdisciplinary Research* [online], vol. 13, no. 2, pp. 142 – 144 [viewed 10 December 2023]. DOI 10.33543/j.1302.142144.
- DZIDOVÁ, L., 2015. Aplikace 3D interaktivní technologie v rámci snoezelenu jako současný trend speciálně pedagogické intervence. *Special pedagogy in perspectives III. Olomouc Special Education Days. Collection of contributions*. Olomouc: Univerzita Palackého v Olomouci. ISBN 978-80-244-4920-3.
- FRIEDMANN, Z., 2012. *The world of digital technologies. Good school*. Praha: Raabe. ISBN 978-80-86307-02-2.
- GAJZLEROVÁ, L., 2015. *Multimedia technologies and their use by pupils with special educational needs in an inclusive school environment*. Brno: Masarykova univerzita. ISBN 978-80-210-8109-3.
- KEBLOVÁ, A., 1999. *Compensatory aids for visually impaired primary school pupils*. Praha: Septima. ISBN 80-7216-104-0.
- KLEMENT, M.; DOSTÁL, J.; KUBRICKÝ, J. & BÁRTEK, K., 2017. *ICT tools and teachers: adoration or resistance?* Olomouc: Univerzita Palackého v Olomouci. ISBN 978-80-244-5092-6.
- KOPECKÝ, K.; SZOTKOWSKI, R.; KUBALA, L.; KREJČÍ, V. & HAVELKA, M., 2021. *Modern technologies in education: (about modern technologies in education with educators for educators)*. Olomouc: Univerzita Palackého v Olomouci.
- LUDÍKOVÁ, L. & KOZÁKOVÁ, Z., 2012. *Proceedings of the conference on the project Creation and implementation of courses focused on working with pupils with special educational needs for teaching staff of secondary schools and the second level of primary schools*. Olomouc: Univerzita Palackého v Olomouci. ISBN 978-80-244-3105-5.
- MØLSTER, T. & NES, K., 2018. To What Extent Does Information and Communication Technology Support Inclusion in Education of Students with Learning Difficulties? *Universal Journal of Educational Research* [online], vol. 6, no. 1, pp. 598 – 612 [viewed 12 December 2023]. DOI 10.13189/ujer.2018.060403.
- NĚMEJC, K.; SMĚKALOVÁ, L. & KŘÍŽ, E., 2019. A Reflection of the Quality of Education in the Use of Teaching Aids and the Importance of Lifelong Learning. *Rural, Environment Education Personality (REEP)* [online], vol. 12, no. 1, pp. 94 – 103 [viewed 18 December 2023]. DOI 10.22616/REEP.2019.012.

- NOVÁK, J., 1997. *Use of computer technology for the disabled*. Brno: Paido. ISBN 80-85931-44-3.
- PECH, J. et al., 2021. *Robotics for primary schools: we program MICRO:BIT using MAKECODE*. České Budějovice: Jihočeská univerzita v Českých Budějovicích, Pedagogická fakulta. ISBN 978-80-7394-851-1.
- POLAKOVIČ, P.; DUBOVSKÁ, R. & HENNYEYOVÁ, K., 2016. *Information and communication technologies - a means of increasing the effectiveness of the educational process. Didactics, pedagogy*. Praha: Extrasystem Praha. ISBN 978-80-87570-31-9.
- RAMOS, S. & ANDRADE, A., 2014. ICT in Portuguese reference schools for the education of blind and partially sighted students. *Education and Information Technologies* [online], vol. 21, no. 1, pp. 625 – 641 [viewed 15 Januar 2024]. DOI 10.1007/s10639-014-9344-6.
- SIEGLOVÁ, D., 2019. *The end of school boredom: didactic methods for the 21st century*. Praha: Grada. ISBN 978-80-271-2254-7.
- SLOWÍK, J., 2022. *Inclusive special education*. Praha: Grada. ISBN 978-80-271-3010-8.
- STÁREK, L.; KLUGEROVÁ, J. & VÍŠEK, J., 2023. The influence of work placement in the context of pregraduate preparation of students from the department of special-needs pedagogy. *Conhecimento & Diversidade* [online], vol. 15, no. 37, pp. 93 – 117 [viewed 11 Januar 2024]. DOI 10.18316/rcd.v15i37.10934.
- TERFLOTH, K. & BAUERSFELD, S., 2019. *Students with intellectual disabilities teach didactics for special and mainstream schools*. München: Ernst Reinhardt, GmbH&Co KG, Verlag. ISBN 978-3-8252-5215-1.
- TERFLOTH, K. & CESAK, H., 2016. *Students with intellectual disabilities in inclusive classes. Practical tips for teachers*. München: Ernst Reinhardt, GmbH&Co KG, Verlag. ISBN 978-3-497-60360-2.
- TLÁSKALOVÁ, A., 2021. *123 teaching tips that both children and teachers enjoy*. Praha: Grada. ISBN 978-80-271-3335-2.
- ZIKL, P., 2011. *Use of ICT in children with special needs*. Praha: Grada. ISBN 978-80-247-3852-9.
- ZOUNEK, J., 2009. *E-learning – one of the forms of learning in modern society*. Brno: Masarykova univerzita. ISBN 978-80-210-5123-2.
- ZOUNEK, J.; JUHAŇÁK, L.; STAUDKOVÁ, H. & POLÁČEK, J., 2021. *E-learning: learning with digital technologies: a book with online support*. Praha: Wolters Kluwer. ISBN 978-80-7676-175-9.

✉ **Dr. Lukáš Stárek**

ORCID iD: 0000-0002-6068-215X

SCOPUS ID: 57222578369

WoS ResearcherID: ACO-3262-2022

✉ **Dr. Jarmila Klugerová**

ORCID iD: 0000-0002-7174-3704

Department of Pedagogy

Institute of Education and Communication

Czech University of Life Sciences Prague

Prague, Czech Republic

E-mail: starekl@ivp.czu.cz

E-mail: klugerovaj@ivp.czu.cz