Sergo Kuruliszwili
ORCID: 0000-0001-7358-8659

DOI: 10.34866/hdw9-wq76

The expectations of primary, high school and university students towards ICT education

Oczekiwania uczniów szkół podstawowych, ponadpodstawowych i wyższych w stosunku do edukacji informatycznej

Keywords: teaching of information technology, information and communication technologies, ICT, electronic education, information technology curricula, digital competence, digital literacy, lifelong learning.

Abstract: Selection of the curriculum content in information technology education is a difficult task, both due to the different range of skill levels in various groups of students and the rapid devaluation of some of the subjects. Curriculums, which usually contain generally defined content, giving the freedom of choice as to how to implement it, are developed by expert teams, not leaving much margin for the needs formulated by students. The paper attempts to discuss the process of creating information technology curricula for primary, secondary and humanities students. In the line of deliberations there is a question whether the opinion of students who articulate their expectations in this respect should be taken into account in the process of creating ICT curricula. This opinion is presented in the results of conducted research.

Słowa kluczowe: nauczanie technologii informacyjnych, technologie informacyjno-komunikacyjne, edukacja elektroniczna, programy nauczania technologii informacyjnej, kompetencje cyfrowe, umiejętności cyfrowe, uczenie się przez całe życie.

Streszczenie: Wybór treści programowych w edukacji informatycznej jest trudnym zadaniem, zarówno ze względu na zróżnicowany zakres poziomów umiejętności w różnych grupach uczniów, jak i szybką dewaluację niektórych zagadnień. Programy nauczania, które zazwyczaj zawierają ogólnie zdefiniowane treści, dające swobodę wyboru sposobu ich realizacji, opracowywane są przez zespoły ekspertów, nie pozostawiając dużego marginesu na formułowane przez studentów potrzeby. W artykule podjęto próbę omówienia procesu tworzenia programów nauczania informatyki dla uczniów szkół podstawowych, średnich i humanistycznych. W toku rozważań pojawia się pytanie, czy w procesie tworzenia programów nauczania ICT należy brać pod uwagę opinię uczniów, którzy wyrażają swoje oczekiwania w tym zakresie. Taka opinia znajduje odzwierciedlenie w wynikach przeprowadzonych badań.

Introduction

The choice of educational content is an issue constantly undertaken by educational authorities all over the world. The obvious reason for the need to constantly update the range of issues being taught at different educational stages is the changing

reality. Changes covering almost all areas of our lives force us to adjust the content and teaching methods to the existing world. The school should prepare for life to help students understand reality and find their place in it (Konarzewski K, 2012). The reality changing with great dynamics requires constant and – which is difficult given the inertia of changes in education – rapid adaptation of methods, forms and ways of teaching. The inertia mentioned in the previous verse has its determinants in the specificity of educational change process. A school is "an educational institution which deals with the education and upbringing of children, young people and adults in accordance with society's objectives and targets as well as its educational concepts and programmes; the achievement of these objectives..." (Okoń W., 1998, p. 383). The definition of W. Okonia indicates a process of change leading to changes in school activities. Changing goals, tasks and social concepts leads to educational changes. The implementation of such a sequence of process elements is not conducive to dynamics, it is difficult to keep up with the pace of development imposed by reality. This difficulty is particularly visible in the case of teaching information technology issues. In this field the pace of change is particularly high. New technologies require both updating the content of teaching on the technologies and their use, as well as addressing the issues related to social change and the risks associated with it. Another field of difficulty is the mismatch between the content of Information and Communication Technologies (ICT), which, according to the pace of change, is partially devalued and the educational expectations of students. Currently, it is particularly difficult to educate people building their professional future in the area of science-related professions focused around STEM (Science Technology Engineering Mathematics). Teaching here includes many issues related to the use of information technology. In this sector, the problem of proper preparation of graduates is difficult. 58 % of employment in the STEM sector is in IT-related fields. In addition to general knowledge and skills related to information technology, the expectations of students and their future employers are related to the spectrum of issues in the area of implementation of IT to solve problems with the specificity of particular fields.

Determination of students to achieve skills that will satisfy their future employer is strong because, among others, salaries in this sector are the highest (Bureau of Labour Ststistics, 2019).

The expectations and needs of humanities students regarding knowledge and digital competence are different.

The deliberations included in this paper will address the issues related to the selection of content addressed to students of mass schools (primary school, junior high school and high school level as well as humanities students and the expectations of this group of recipients in this respect.)

The problem with the selection of content and educational methods concerning ICT issues is multidimensional. The following issues are related to it: development

of basic IT skills, which is of a general nature – this applies both to common school students and university students. Providing knowledge and skills related to the performance of professional tasks with the use of IT tools and meeting students' expectations related to their cognitive needs in this area. The compromise between what the authors of the curriculum believe we should teach in the area of ICT and what digital users expect will become the main point of deliberations addressed in the paper. The educational expectations of surveyed pupils and students will be made public, which will be presented based on own research results.

Digital literacy – basic digital competence and media sensitivity as a foundation for lifelong development

The need for ICT education is evident. The legitimacy of research undertaken – what to teach in ICT – will become more apparent when the reasons why IT education is absolutely necessary are identified. The arguments for a strong need for the development of basic digital literacy competences among children and young people are aptly put forward in the document "Assessing Information and Communications Technology Literacy for Higher Education": – ICT changes the nature and value of knowledge and information; ICT in its best form has the potential to change the way we live, learn and work; ICT cannot be understood as merely the acquisition of technical skills… (Katz I.R., Williamson D.M., Nadelman H.L., Kirsch I., Almond R.G., Cooper P.L., Redman M.L., Zapata D., 2004, pp. 2–3). Computer literacy forms an attitude of lifelong learning. It is a part of the learning environment of all scientific disciplines at all educational levels (The Association of College and Research Libraries, 2000, p. 2). In this report, the authors address other arguments resulting from the analysis of data, which argue for the necessity of IT education. The data analyzed[1] by them indicate correlations between the level and universality of IT education and the ability to analyze citizens' data and features such as the desire for lifelong learning, the ease of finding a job, the level of social participation and the quality of health care in the country (Katz I.R., Williamson D.M., Nadelman H.L., Kirsch I., Almond R.G., Cooper P.L., Redman M.L., Zapata D., 2004). The above arguments, although far from being the only one, sufficiently justify the importance of issue, including the discussion on the appropriate choice of content to be conveyed, and in case of this paper the reflection on appropriateness of adapting it to pupils' expectations.

When selecting appropriate educational content, it is necessary to pay attention to the fact that the level of digital competence of young Poles is high compared to other countries of the world. The International Computer and Information Literacy Study, carried out by the Educational Research Institute in cooperation with the International Association for the Evaluation of Scientific Achievements,

[1] *The Well-Being of Nations* THE ROLE OF HUMAN AND SOCIAL CAPITAL Organisation for Economic Co-operation and Development (2001).

measures "readiness to live in digital reality." Polish junior high school students achieved very good results in the research. Their level of computer literacy is equal to that of the surveyed youth from Australia, Denmark or Norway (Sijko K., Biedrzycki K., Jasiewicz J. et al, 2014, p. 42). Experience in working with mobile devices or computers has been shaped in Poland from an early age. More than half of the respondents declare that they have been using a computer for seven years or more, and more than 30% for at least five years but less than seven. This means that they have started digital activity at the age of about 10 and that the computer has been accompanying them since the beginning of school education.

ICT skills are an essential element of lifelong development and full social participation. The skill level of young Poles in this area is relatively high. An important question is: what to teach children and youth in the field of information technologies.

When considering the nature of contents, those which should be taught, it is important to separate basic digital competences from the extended and specialized teaching of information technology. The subject of the author's research is limited to these first, basic skills, it is in this area that students' expectations may become the subject of attention for teachers implementing an issue generally included in the curriculum/syllabus of the subject.

The starting point for the author's research should be to determine what kind of digital competences are the basis for the proper functioning of an individual in contemporary society. This knowledge, as well as the ability to transmit it in an attractive way, is essential for teachers who teach IT subjects. In the light of deliberations on the legitimacy of students' expectations regarding the content of information technology and computer science subjects, it is essential to relate what is necessary to what is desirable.

Basic computer skills – ICT (Information and Communication Technology) Literacy – is a set of basic IT skills that allow for efficient functioning in the modern computerized world. A person having such skills is able to properly use a computer as a tool for social media communication. This person is able to create information from the network, manage and evaluate it, as well as communicate through the network in a conscious and responsible manner (Thammasaeng P., Pupat P., Petchaboon S., 2016, p. 9). Another characteristic of basic digital competences assumes the creation of a model allowing to describe the level of IT skills based on subcompetences:

- **Identification** – ability to use ICT tools to identify, define and present information needs.
- **Access** – ability to find and retrieve necessary information in the digital environment.
- **Implementation** – ability to apply an existing organization scheme or classification of information. The ability to reorganize existing information according to existing data organization formats. Application of the most appropriate information scheme relevant to the situation.

- **Integration** – ability to interpret and present data – synthesizing, analysing and comparing data from different digital sources.
- **Evaluation** – assessment of the extent to which the collected data is sufficient for the implementation of undertaken task. Evaluation of data in terms of its adequacy, reliability, bias, timeliness, scope and accuracy.
- **Creation** – ability to generate information by adapting, designing and creating information/data in the ICT environment.
- **Communication** – ability to communicate, appropriate to the context of ICT environment. Including directing information to the right audience and in the right place(Katz I.R., Williamson D.M., Nadelman H.L., Kirsch I., Almond R.G., Cooper P.L., Redman M.L., Zapata D., 2004, p. 6) (The Association of College and Research Libraries, 2000, p. 8).

The IT skills cited above indicate the fundamental role of those related to data collection, broadly defined analysis and use. Information overload, selection and information reception problems, as well as participation in the creation of content and responsibility associated with it, are a fundamental challenge in the process of preparation for life in the modern world. The spectrum of cognitive skills related to the use of new technologies is sometimes referred to as computing thinking (Wing J.M, 2006) (Sysło M.M., 2014).

The school has teaching and care and educational functions "...the school is to prepare students for active and independent participation in their lives." "Preparation for individual life is another important function of the school" (Augustyniak J., 2017, pp. 143–144). In this context, the development of ICT-skills, the provision of knowledge about technologies is set to prepare for a life filled with digital technologies. Importantly, in addition to the pragmatic dimension, the aim is also to develop sensitivity to the use of new technologies, impact assessment and content evaluation. "As an institution preparing for life, the school, apart from introducing its students to the world of science, cannot neglect to introduce them to culture" (Augustyniak J., 2017, p. 144). Fulfilling this role requires making students aware of how media channels can be used to develop both their own talents and to create a culture that can be created by anyone thanks to new technologies, and the quality of these products depends on the sensitivity of creators, which is also built in the school environment. Such features can and should be developed in parallel with the hard IT skills described in the basic paper.

Basic IT skills are the minimum to allow proper development of an individual, full participation in socio-cultural life. The programme in this respect should be implemented regardless of students' expectations. This area should not be negotiated with the student. The postulated fulfilment of students' expectations should only constitute a supplement to the whole IT education without affecting the realization of basic IT competences. However, declared needs of students should be considered in the process of selection of implemented issues.

The scope of educational content concerning IT knowledge in Poland has been defined in the core curriculum[2]. The issues covered there are implemented for students from the 1st grade of primary school, initially as integrated teaching, then as computer science and information technology. In the next stage of education as computer science in upper secondary schools and again as information technology in university curricula. The number of hours devoted to ICT is: usually primary education: in primary school – 8 years of 1 hour per week, secondary school – 1 hour per week and additional hours in extended education. It offers a wide range of opportunities to properly prepare young people to live in a world filled with digital technologies. The core curriculum is formulated in a fairly general way, giving the teacher the opportunity to implement it in a manner adapted to the school' s capabilities and educational context. The general formulation of the curriculum allows for the inclusion in education of issues that are desired by students, thus giving them the tools and skills they need, not only for learning but also for everyday tasks. Such action, apart from new skills, could increase the level of students' motivation to learn information technology and the general content of this subject, encouraging them to other, less popular issues such as learning programming. The subject of deliberations was not the basic content giving the students' knowledge and IT skills, as they are defined in the above mentioned curriculum base, but those that are worth noting as expected by students. Cognitive self-awareness among students in particular has increased significantly, the transformation from being taught to being learned has taken place. Therefore, it is advisable to listen to the students' opinions in the implementation of information technology issues, especially because the dynamics of change in this area favors the omission of new phenomena by teachers or authors of syllabuses and the failure to convey knowledge related to them. Reading the needs of students, all levels of teaching.

Concluding the reflection on the scope of content that should become the subject of ICT teaching, abstracting from the students' expectations in this respect, three issues were indicated that are important in the process of their teaching.

Firstly, related to the selection of content, it is necessary to anticipate the changes and needs resulting from these changes.

In March 2015, a survey was conducted on a sample of over 800 people (experts and managers) related to the field of communication technology. The results of this survey show which areas of technology, in the respondents' opinion, will become a turning point in social development.

Majority of respondents over 91% indicated mass use of clothes connected to the Internet. The next most numerous indications are the use of pharmacists' robots, creation of products including cars and artificial kidneys with the help of 3d printers,

[2] THE REGULATION OF THE MINISTER OF NATIONAL EDUCATION of 27 August 2012 on the core curriculum of pre-school education and general education in particular types of schools (Journal of Laws 2012, item 977 and of 2014, item 803).

and the prediction that 90% of the earth's population will have access to the Internet and half of the network traffic will concern devices from the smart home circle. The respondents also pointed to two phenomena that are important in their assessment: widespread use of autonomous cars (10% in the U.S.) and the share of artificial intelligence in teams managing corporations (Global Agenda Council on the Future of Software & Society, 2015, p. 7). Most of the potential turning points in technology development indicated above are not covered by general ICT education in Polish schools. If the anticipated breakthroughs take place, there will not be much time to modify curricula, which, as mentioned in the introduction, are characterized by high inertia in the implementation process.

Secondly, the issues implemented within the curriculum content of subjects covering information technologies should in a certain, significant part refer to mobile devices as this type of Internet use becomes increasingly common. Data from January 2019 show that the number of mobile phone subscriptions exceeded 8.8 billion, which is 115% of the world's population, in Poland it is over 50.5 million, which is 133% of our country's population – 70% of which are smartphones. 27% of the surveyed population of adult Poles use a tablet (DIGITAL 2019: GLOBAL DIGITAL YEARBOOK, 2019). The number of Internet users is also growing, and in Poland it exceeds 30 million, which constitutes 79% of the country's population. The number of mobile phone subscriptions increased by 0.4% (DIGITAL 2019: GLOBAL DIGITAL YEARBOOK, 2019). The Internet has become a medium used for all ages. The number of people not using the Internet, including adults, is decreasing worldwide. This is confirmed by a British study from 2011 to 2018, according to which the number of people not using the Internet has decreased from nearly 10 million to 5.3 (in this study, a person not using the Internet is one who has not used it for more than 3 months) (Office for National Statistrics, 2019, p. 3).

An interesting solution, in the context of conducting classes on mobile devices, is often used to conduct classes on tablets, smartphones, notebooks brought by students – BYOD (Bring Your Own Device) "This method allows you to use the user's devices, which allows to work on their own notebook or tablet configured for their needs. The immersion into the virtual world takes place through a device that is part of everyday activities. Work can continue in the same way in different places and be part of other activities carried out through the same device. A personal mobile device is a part of the owner's "tamed" everyday life. Learning on such a device means working in a familiar environment, arranged according to your needs and taste, regardless of where you work" (Kuruliszwili S., 2016, p. 133).

Thirdly: An important technical aspect in the implementation of information technology classes is the proper division of students according to their digital competence. Especially at higher education levels, at universities the quality of students' IT skills varies. This depends on their interests, their own cognitive activities in this field, the quality of teaching in previous classes and individual abilities. The division of students by their competence level, as in the case of foreign language

teaching, seems justified. Such a division is extremely rare. The dominant practice is to equate to the weakest student, or to conduct classes according to the course and content selection assumed at the beginning, regardless of the students' level. Failure to adjust the pace and issues to the students' level may cause discomfort for the weakest students and boredom for those who already know the discussed issues.

Noteworthy is the role of ICT-supported education, a model creating a way of self-education with the use of ICT.

Most Polish students use the computer at home. At school they usually use the computer once a week and the activities undertaken with the help of this tool in the learning process are most often writing, creating presentations and communicating with other students (Sijko K., Biedrzycki K., Jasiewicz J. et al, 2014). Research indicates that the use of ICT has become a part of the whole educational process, but still needs to be addressed and cared for. This is confirmed by studies carried out in Belgium. In most cases, ICT is used in the educational process only to activate students, overlooking a whole range of other possible stimuli. In this context it is important to develop teachers' skills in using ICT tools in the teaching process (Technological Pedagogical Knowledge) (Heitink M., Voogt J., Fisser P., Verplanken L., Van Braak J., 2017, p. 96 and 105). How to support learning (self-learning) with the use of ICT tools should be an important part of basic IT education for children and young people. Based on appropriate multi-dimensional ICT-supported learning, pupils make effective use of ICT tools in the self-learning process – accompanying them throughout their lives. ICT-assisted classroom learning will provide a model, a reference, for self-learning. Therefore, ICT in school should be multidimensional. Proper full implementation of information technology in school requires specific actions in the right sequence. These actions have been defined by M. Sysło "... educational preparation for technology, preparation of school space for new technology, including the organization of classes, preparation of teachers to feel full confidence in the tools they receive; preparation of students for new technology in the sense of using new technology for educational purposes" (Sysło N., 2013, p. 46)

Students' educational expectations – research results

The introduction, a reflection on the educational expectations of students related to the field of information technology, will be the exceptions from two studies conducted in Poland. The first one is to answer the question concerning what is most important for students as Internet users. The results are as follows – the most important is access to films and music – 86.4% of the respondents, current information of 80% of the respondents; having e-mail 71.2% of the respondents, access to communicators and social media 30–60% of the respondents (depending on the social service/communicator) (Bochenek M., Tanaś M., Wrońska A., Lange R., Fila M., Loba B., V F., 2017, p. 50). The answers indicate young people's expectations towards this medium – they are shaped around information and communication

needs and entertainment, which may indirectly become a clue for the diagnosis of their expectations regarding education in the field of ICT.

In another study from 2017, general expectations towards schools and teachers were formulated as a substitute:

Expectations towards the teacher – indicated as the most important: The teacher should clearly and comprehensibly explain new issues during the classes; The teacher should assess students' knowledge and skills fairly; The teacher should be tolerant of students; The teacher should be patient.

Expectations towards the school: indicated as most important

The school should organize entertainment events (discos, trips, etc.). The school should provide a pleasant atmosphere. The school should be richly equipped with IT equipment (computers, Internet). The school should provide a sense of security (Augustyniak J., 2017, pp. 147–150; Augustyniak J., 2017). According to the results of quoted research, the expectations of students are mainly focused on functions that are supposed to ensure a safe and pleasant learning process. These expectations are a natural expression of hedonism inherent in adolescence, which is not in conflict with the cognitive aspirations of this period in the life of an individual. However, there is a risk of limiting cognitive tendencies in favour of consumptionizm regarding generally available, commercial and low value content available on the Internet. Stimulating the willingness to cognit, indicating cognitively interesting areas of the network are tasks for teachers, as is the case in the education of other school subjects.

Own research

Research was conducted in 2018/2019 in a group of 698 people: primary school students, junior high school students, high school students and humanities students. The group of surveyed junior high school students is less numerous due to the educational reform and extinction of junior high school classes. The number of respondents reflects the relation to the size of this population.

The research results were formulated in a form of four blocks, defining: declarative level of their own digital competence; catalogue of digital skills that the students would like to gain/develop, preferences concerning participation in additional IT activities and satisfaction with the current education in the field of ICT.

The results quoted in the paper answer the questions:

- What content – from the ICT field would the surveyed students like to learn, what skills would they like to gain?
- Would they like to participate in additional ICT classes?
- What form of classes would they like to participate in (traditional, electronic, blended)?

and

- To what extent are they satisfied with ICT temporary education and what form of education: self-education, school teaching or peer learning was the most effective form of ICT learning.

Declarative knowledge level

In the surveyed group, just over 3% declare the level of their knowledge as low – at 1 point. 25% of the surveyed persons on 3 points – as basic. Nearly 47% – out of 5 points (I can do everything I need on the computer), and 20% – out of 7 points – expert. Over 5% indicate that they operate the computer in a fully professional manner.

The rating distribution was similar in all age groups/levels of teaching. Students were most critical of their knowledge. Junior high school students were the most critical of their knowledge. Most of the choices were placed in the middle of a scale – 5 points – i.e. declarations that the subjects are able to do whatever they need to do on the computer.

What IT skills they would like to have

The answers to the closed question concerning the desire to acquire skills and knowledge in selected IT fields were as follows:

What would you like to learn?	YES	NO	No, because I already know
Programming	58%	33%	9%
Operation/use of applications and services	51%	21%	28%
Creation of network services	46%	49%	5%
Operation of office programmes	44%	42%	14%
Operation of graphics programs	65%	22%	13%
Operation of film processing programs	70%	16%	14%
Creation of animations	64%	24%	12%
Configuration of network devices	45%	41%	14%
Security issues	35%	46%	19%
Robotics	41%	54%	5%

The most desirable skills in the study group are those related to the improvement of visual communication skills. Film processing, graphics and animation creation. This is justified by the wide activity of young people and students on social networking sites and other Web 2.0 services where the ability to present visual materials is important.

The lowest number of choices was for learning robotics, office programs and configuration of network devices.

The respondents could justify a negative answer if the lack of willingness to learn is a result of already having skills in this field (I do not want to learn it because I already know it). Most often, this justification was given in the case of declarations of lack of interest in learning to use applications and (Internet) services – 28% of respondents and security issues. The lowest percentage of such justification concerned robotics and creation of network services. The lack of willingness to learn robotics and to configure network devices was not justified by the fact that people already know it. They simply do not want to learn it.

Distribution of answers, by gender, to the above question was as follows:

What would you like to learn?	Women			Men		
	YES	NO	I already know	YES	NO	JU*
Programming	51%	38%	11%	64%	28%	8%
applications and services	52%	18%	30%	50%	22%	28%
creation of network services	43%	53%	4%	49%	45%	6%
operation of office programmes	57%	33%	10%	33%	50%	17%
operation of graphics programs	67%	21%	12%	63%	22%	15%
operation of film processing programs	75%	13%	12%	66%	19%	15%
creation of animations	65%	24%	11%	63%	24%	13%
configuration of network devices	44%	46%	10%	46%	37%	17%
security issues	35%	46%	19%	35%	46%	19%
robotics	32%	63%	5%	48%	48%	4%

Gender differences in the choices were observed in questions regarding robotics, programming, and operation of office applications. In the first two cases, more choices for YES were given by boys/men. In case of declarations concerning willingness to learn how to use office applications, girls/women were more willing.

Would you participate in a training/course covering information technology or IT content free of charge?	YES	NO	N/A
	50%	49%	1%

Question about the form and time of classes in which the respondents would like to participate revealed the following results

Would you prefer to participate in a traditional training or an electronic training?

electronic	traditional	blended
34%	19%	46%

The answers to the question concerning the form of classes in which the respondents would like to participate indicated that almost half of them choose blended learning, ⅓ electronic and only ⅓ traditional learning, of which ¾ indicated that they would like additional learning to be carried out as a part of school/university classes.

When asked about the choice of learning form – between self-education and learning, nearly ⅓ indicated self-education, and ¾ with a teacher (traditional or electronic).

Are students satisfied with their previous participation in school activities in the field of ICT.

Are you satisfied with the ICT classes you have participated in so far?			
Primary school student	**YES**	**NO**	**I have not participated**
in primary school	67%	28%	5%
Junior high school student	**YES**	**NO**	**I have not participated**
in primary school	64%	32%	4%
in junior high school	44%	48%	8%
High school student	**YES**	**NO**	**I have not participated**
in primary school	50%	44%	6%
in junior high school	36%	34%	30%
in high school	56%	27%	17%
University students	**YES**	**NO**	**I have not participated**
in primary school	42%	55%	3%
in junior high school	34%	65%	1%
in high school	35%	62%	3%
in university	77%	22%	1%

Taking into account the percentage of persons not participating in classes and when averaging the ratings made by students at different educational levels, classes conducted during studies, then at primary school and at university seem most appropriate. The lowest rating was given to classes in junior high schools. Comparing the satisfaction level of ICT classes in primary, junior high and high schools, which is particularly important in the undertaken research, the level of variation is not high (SD 8%).

Rate on a scale of 1–5 how much you have learnt from this field of computer applications, information technology: *independently; at school; from colleagues*.

Scale:	1	2	3	4	5
independently	9%	14%	29%	31%	19%
at school	16%	22%	32%	23%	8%
from colleagues	19%	21%	30%	20%	11%

By multiplying the number of choices by a value on a scale from 1 to 5, the points were determined (weighted average).

The results obtained are as follows:

independently	3,40
at school	2,85
from colleagues	2,80

It follows that according to the surveyed students the most effective method of teaching ICT is self-education.

Conclusions

The research results indicate that only half of the respondents want to additionally, extracurricular, improve their qualifications in the field of ICT. Students would be most willing to improve their skills in the field of graphic design, film and animation creation. The level of a student's popularity on the Internet, especially in social media, is determined, among others, by the form and attractiveness of the published content, and the intensive and interesting activity in the field of publishing content on the Internet requires such skills. This may explain the desire to improve in this respect. The differences in choices between women/girls and boys/men are not significant.

It is noteworthy that respondents more often choose the form of learning through electronic or blended training than traditional learning (only 20%). Increasing the level of digital competence is very well adapted to this kind of electronic learning. This may be the basis for a change in the form of teaching subjects from this field, which proved to be successful during the Coronavirus pandemic. This conclusion seems complementary to the question concerning the effectiveness of educational forms in the field of ICT. Students declare that they have learned most through self-education. It is this form that is the basis of electronic learning. The Internet is full of instructions (tutorials). The Internet users are quite used to using this form of learning. It is effective especially in the case of application training. It is an important conclusion, which can be formulated on the basis of conducted research. The need to change the form of learning can be seen in the question of satisfaction with ICT.

Satisfaction with ICT teaching is not very high. Fewer than half of the surveyed students are satisfied with their previous ICT classes. This is not optimistic when nearly half of the students are dissatisfied with their schooling. The reasons for this state of affairs require further investigation. The situation of dissatisfaction with classes can also be seen in the question regarding the desired form of additional classes with ICT – only 20% prefer to participate in classes using the traditional method.

A similar conclusion comes from the interpretation of an answer to question about the environment in which (school, colleagues, independently) they gained the most "IT" knowledge. Paradoxically, the school is not indicated as the place where they learned the most in this field.

When formulating conclusions resulting from this research, it should be remembered that students, especially those of lower grades, are those who are not yet formed, and their expectations may be burdened with mistakes regarding the immaturity of choices. However, it is reasonable to analyze their needs each time the ICT curriculum is created.

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Transactional Distance – a concept describing the spectrum of relationships between the student and teacher in the process of remote education in a situation of separation of interaction – time and place. It shapes a new pattern of student-teacher behaviour. The nature of behavior, the relationship has a continuous nature. (Moore M.G, 1997).