

GONDA, ZSUZSA¹**The ICT competence and development perspectives of teacher trainees during teaching practice**

For the sake of the use of ICT in public education, teacher trainees must experience the functional application of ICT during teaching practice. This study focuses mainly on the teaching practice, where the students can map their own ICT competence and reflect on their strengths and weaknesses. The aim of this research is to examine to what extent the teacher trainees consider themselves competent in the use of ICT tools by the end of their teaching practice. The research used the method of an online questionnaire, whose aim was to examine the ICT-competence of teacher trainees based on teacher competences. The results reflect that teacher trainees use ICT appropriately for teacher-centred activities, but they are not able to make effective, interactive materials for their students. A key factor to progress the students' ICT competence could be a mentor, a practising teacher at the teaching practice.

1. Introduction

It is an important goal of the 2020 European Union education strategy to provide young teachers entering the labour market with a new set of skills and capacities by the end of their studies which will enable them to find jobs. Among these skills and capacities digital competence plays an important role that is the ability to use ICT (information and communication technology) tools². It is crucial to develop the digital competence of students participating in teacher training as for them ICT does not only come up as a means but also as content, a method and the aim. If teacher trainees are competent in the pedagogical use of ICT, it can also be profitable for their future students, later they can enter the world of work in a more prepared state – as far as their digital competence is concerned.

For the sake of the use of ICT in public education, teacher trainees must experience the functional application of ICT at the university, which they can later try in the classroom during their teaching practice. The three modules of teacher training (disciplinary training, teacher preparation and teaching practice must prepare teacher trainees together in relation to the use of IT tools to the following:

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² *New Skills for New Job*. <http://ec.europa.eu/social/main.jsp?catId=822&langId=en> [2016. március 25.]

- the professional use of ICT,
- the role of ICT in the social integration of the students,
- ICT as teaching technology,
- the use of ICT in management and school development,
- the analysis of personal, organizational and institutional conditions of effective ICT use (Kárpáti–Hunya 2009).

This study focuses mainly on the third module of teacher training, the use of ICT in the teaching practice, since teacher trainees work in real-life classrooms during this training module, so they have an opportunity to test the content and methodological capacities of ICT with their students, they can map their own competence and reflect on their strengths and weaknesses.

Upon starting the teaching practice a teacher trainee is supposed to have the theoretical knowledge necessary to establish and develop teacher competences: this level of competence development is called level 0. The evaluation criteria of the level 0 standard contain only one element directly connected to ICT: at the competence of *professional tasks and related scientific, curricular knowledge*, which indicates a teacher trainee is characterized by a basic ability to use ICT (Kotschy, 2011: pp. 49–51). By describing the teacher competences belonging to level 0, a set of indicators can be listed which contain the elements of competences related to ICT (*s. table 1*).

Teacher competences	Element related to ICT
Professional tasks, scientific, subject-specific and curricular knowledge.	Teacher knows the available digital teaching materials and tools and receives, elaborates and passes on online information in an ethical way.
Planning of pedagogical processes and activities and self-reflection about their realisation.	T uses digital and online tools appropriately for planning pedagogical processes.
Learning support	T provides students with proper guidelines and tools necessary for independent learning, such as operating an online interface which offers guidelines and downloadable materials for individual tasks.
Supporting the forming and developing of learner groups and communities, creating opportunities, openness to socio-cultural diversity, integration activity, form teacher's activity	To encourage co-operation and communication T creates online communities, where T sets an example to students by creating value and being active in terms of the functional use of digital tools.

Teacher competences	Element related to ICT
Communication and professional co-operation, problem solving	T uses ICT tools and various online channels for contacts and co-operation
Commitment and responsibility for professional development	T. makes regular enquires about digital teaching materials, tools and the latest achievements in digital technology supporting education.

Table 1. The indicators of teacher trainees' ICT-related competences

The competences of experienced teachers also include abilities related to particular classroom activities (*the methodological competence necessary for the development of students' personality, the realisation of individual treatment, the successful teaching of children with disadvantages, special educational needs, integration-, learning- and behaviour difficulties together with the other learners; the continuous assessment and analysis of pedagogical processes and personality development of learners*), which teacher trainees can acquire during the teaching practice. That is why the teaching practice plays an important part in the development of ICT competence, since teacher trainees mainly experience the pedagogical application of ICT tools during the lessons of their mentors. The mentor's attitude to the use of ICT tools will to a great extent influence the teacher trainee's attitude thereof (Cox–Marshall, 2007; Lévai, 2014).

2. The aim of the research and its hypotheses

The aim of this research is to examine to what extent the teacher trainees consider themselves competent in the use of ICT tools by the end of their teaching practice that is to what extent they meet the requirements of ICT-related teacher competences. In this research a special emphasis has been laid on the kinds of tools teacher trainees use in their teaching practice, and on what activities they use them for.

The study presents the results of an empiric research, in which 53 teacher trainee majors of literature and grammar were asked about their competence in the use of ICT tools in their teaching practice and about the types and functions of those tools. I formulated the following hypotheses about the research:

Hypothesis 1: The more ICT tools come up during the lesson, the more varied functions are realised in the teaching-learning process.

Hypothesis 2: The majority of ICT-supported classroom activities is constituted by those that include teachers using some tools.

Hypothesis 3: By the end of their teaching practice teacher trainees tend to have developed competences which support their professional preparedness, that is they use digital tools mostly outside the classroom and less during the teaching-learning process taking place in the classroom.

The results of the research refer to the ICT-competence quality of the literature teacher trainees in question, so they also define which competence elements require more development during the teaching practice. During teaching practice it is mostly the mentors who can shape the trainees' attitude towards and competence in the use of ICT, so they play an important part in the involvement and integration of ICT tools in teaching. The last section of the study presents the role of mentors in the development of the trainees' ICT-competence.

3. Research method and subjects

The research used the method of an online questionnaire, whose aim was to examine the ICT-competence of teacher trainees based on teacher competences. The questionnaire was filled in by literature teacher trainees who did their teaching practice between 2014 and 2016 and, with the help of the questionnaire, reflected on their experience related to ICT. The questionnaire was filled in by 53 literature students and young graduates.

I set up the questionnaire together with Ida Dringó-Horváth, this study will only focus on items relevant for the topic. One item of the questionnaire enquires about the frequency of the use of ICT tools in the classroom. The list of ICT tools was drawn up based on a study about the teachers' attitude towards ICT by Mária Hercz and her colleagues (Hercz et al., 2010). The tools listed are: *CD/DVD player, loudspeaker, interactive board, computer, OH projector, smart phone, tablet, digital camera, scanner, printer and others*. The next section of the questionnaire presents the ICT functions applied in the classroom, so we listed activities which subordinate ICT tools to subject-related and pedagogical purposes. One part of the listed activities include communication outside the classroom (communication with the mentor, fellow students, parents and the school), while the other one includes communication inside the classroom (teacher-centred methods, student-centred methods, cooperative techniques). The subjects of the research can also indicate how competent they consider themselves in using

those tools. The questions in that item were drawn up on the basis of teacher competences. The statements can be found in *Appendix 1*.

3. Results

3.1. The connection of ICT tools and the activities carried out with them in the teaching practice of literature teacher trainees

Due to the appearance of various ICT tools in education there have been a number of researches in Hungary since the late 2000's aimed at measuring the facility sharing of teachers (cf. Gonda, 2011; Hercz 2010). The online survey of 2011 examined a representative sample of the regional and urban distribution of ICT technologies in classrooms with and without computers. As classrooms with computers are mainly for IT lessons, for the subject matter of this study it is better to focus on the results about classrooms with no computers, which are mainly where literature lessons take place. According to the research results in 69% of the schools classrooms not equipped with computers have on average one computer, which is mainly used by the teacher. The survey also recognizes that 61% of the classrooms in question have access to the Internet, which facilitates presentation and multimedia demonstration. The most frequent tools are computers, laptops and OH projectors, which are present in approximately 40% of the schools, while other ICT tools (such as microphones, headphones, webcams, voting units, etc.) are present in a mere 5% of the schools (Tóth et al., 2011).

The results of the questionnaire are similar. During the teaching practice the majority of the respondents used computers and OH projectors regularly in their lessons, as Figure 1 also shows. Respondents also often used printers and loudspeakers during their teaching practice, the former one is considered a conventional tool for the preparation of worksheets, while the latter one facilitates multimedia demonstration. Most respondents have never used or had no access to a digital board, a digital camera, a scanner or a tablet in the school. This result does not only draw attention to the fact that many schools are not equipped with the latest technology, but also, that teacher trainees do not prefer tools, which facilitate the interactivity and co-operation of students. One reason for that could be that they are afraid they may not be able to control the facility sharing and that students may browse different contents on the Internet.

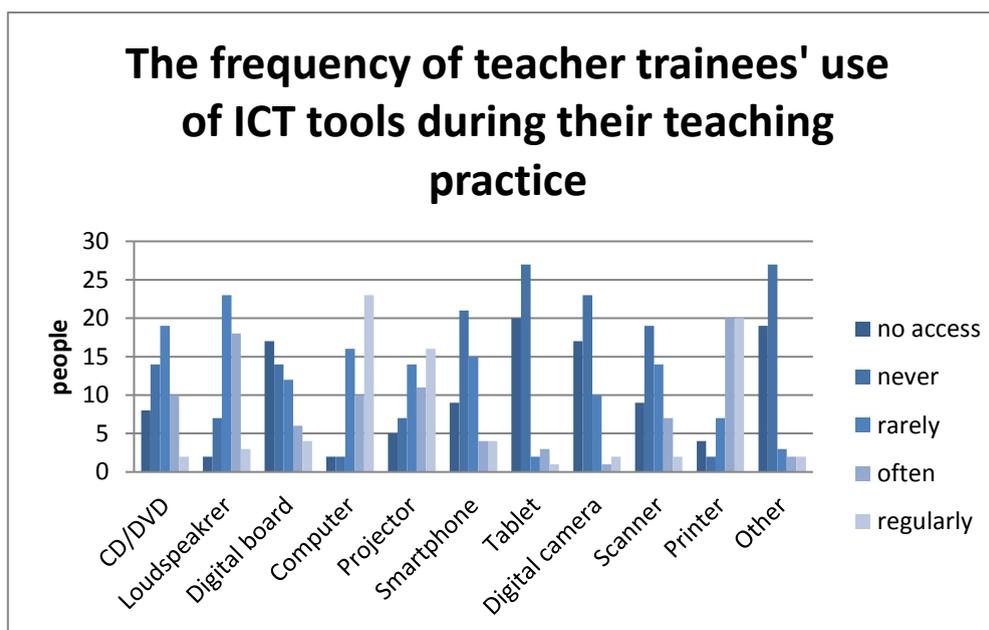


Figure 1. The frequency of teacher trainees' use of ICT tools during their teaching practice (N = 53 people)

In parallel with this survey, another research based on lesson shadowing has brought similar results about teacher trainees' use of ICT tools. In that research I analysed 30 literature lessons held by teacher trainees, which also showcased a predominant use of computers and OH projectors. With the help of computers and OH projectors the teacher trainees projected teaching materials made by themselves. These teaching materials mainly substitute sketches written on the blackboard. Their advantage is that they are usually clearer and more logically organized than semi-planned blackboard sketches, but they are less flexible, more difficult to enhance or alter according to classroom discussions. In more than a third of the lessons these tools were also used for demonstrating materials, images or videos from the Internet. The advantage of that kind of demonstration is that numerous current, real-life linguistic examples are available to the teacher, and so are literary texts, although one must always check the credibility of the sources. The frequency of the materials and media contents used in the shadowed lessons also proves that the use of ICT tools is mostly connected to frontal teaching and teacher presentations (Gonda, 2016).

Among the activities listed in the questionnaire teacher trainees apply ICT tools evenly in the communication in- and outside the classroom, as it is shown in *Figure 2*. This proportion is considered to be good compared to the use of ICT tools by teachers in Cyprus. While 72% of them use ICT in their daily work, only 35% use it in classroom situations (Charalambos, 2013). Regarding communication outside the classroom they communicate predominantly about subject-related topics: a relatively high number (23%) of the respondents indicated

communication with their mentor, which probably means a frequent exchange of emails, where mentors help their trainees prepare for their lessons. As for communication outside the classroom, a relatively high number (16%) of teacher trainees use it for communicating with their students, which means the teacher is also available online for their students. Teacher trainees often report having created learner groups with the help of the Internet, where they often place supplementary materials beyond the current questions (Főző, 2006). Among these activities communication with the school is also fairly highly represented (11%), which mostly means administrative activities in connection with the teaching practice. Communication with the parents is not at all represented among the ICT activities, probably because most schools and mentors consider contacts with the parents their own competence and not that of teacher trainees.

Among communication activities inside the classroom, respondents indicated teacher-centred methods to the highest degree (e.g. teacher lectures, explanations, etc.) so ICT tools are mostly used for demonstrating in connection with teacher talk (23%), which means there is no interaction between the student and the tool. 15% of the teacher trainees used ICT tools for the realisation of student-centred methods (such as doing tasks, student presentations etc.), while 15% of the respondents carried out cooperative work processes (such as student-to-student teaching, projects, etc.) with ICT tools. In these two groups the students use the ICT tools, the difference is that in the case of cooperative work processes the students do not work individually (in controlled interactions) but they use the tool in pairs or small groups (Beauchamp–Kennewell, 2010).

My research based on shadowing lessons has brought similar results, where frontal teaching, teacher talk-centred methods, such as teacher lectures, explanations and discussions were predominant. The teacher trainees mostly used ICT tools for these activities, so their work mainly supports two kinds of learners (auditive and visual), despite the fact that the tools could enable them to help other types of learners, which would develop the methodological awareness (Gonda, 2016).

The reason for using frontal teaching is not necessarily the teacher trainees' lack of experience. On examining more experienced teachers, I also found that it is mainly the teachers who use ICT tools, as the majority of teachers have incorporated the use of these tools into their existing methodological practice (Lewin et al., 2008). According to several British researches on the use of interactive boards in the classroom results, teachers mostly use them for demonstrating multimedia materials, which overshadows classroom interaction and

communication with the students (Beauchamp–Kennewell, 2010; Smith et al. 2006). In a research I did in 2010 I also found that teachers predominantly use the interactive board for presenting multimedia contents, and that frontal work form was dominant in the classes I examined (Gonda, 2011). On the other hand, the result of a research carried out in 2007/2008 on 350 Hungarian students showed that students participated more actively in lessons showcasing ICT tools. While in conventional classroom situations a mere 19% responded to a question, the proportion increased to 36% in mixed and interactive lessons (Námesztovszki, 2013). This finding is also backed by an Australian project, where students had to prepare multimedia materials in a lesson, thus supporting their own learning process (Jones–Reynolds 2012).

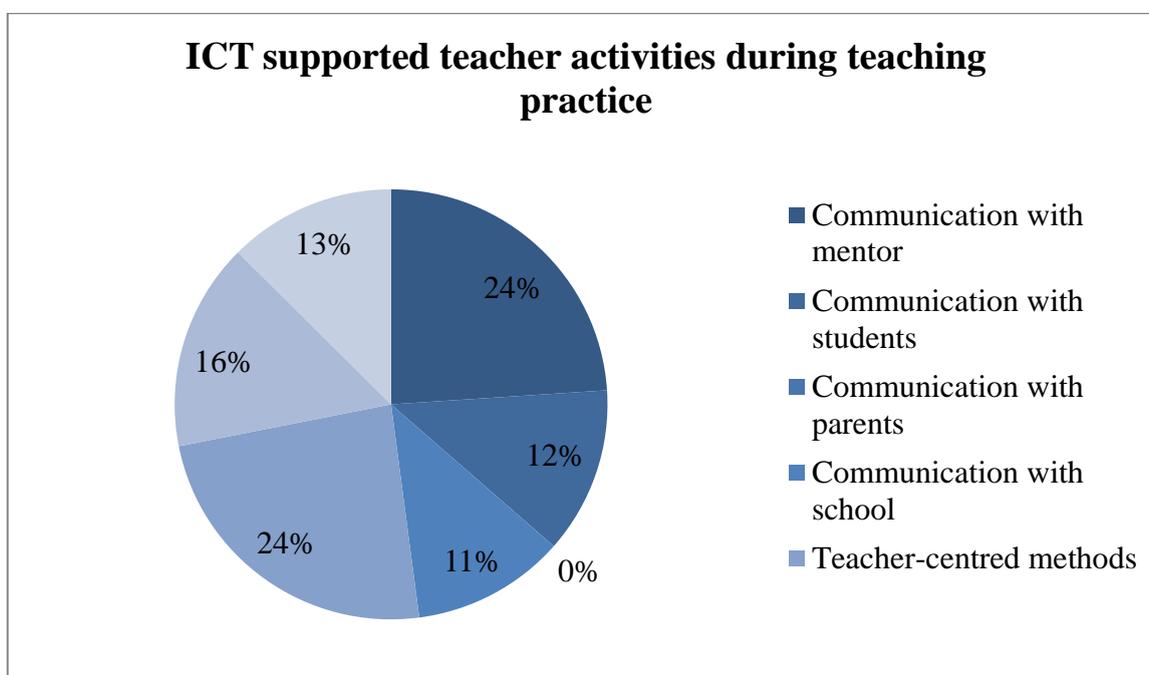


Figure 2. ICT supported teacher activities during teaching practice (N = 53 people)

On examining the connection between facilities and communication activities during the teaching practice, one can state that a diversity of facilities also means a diversity of activities. ICT tools used in the teaching-learning process show a weakly positive correlation with ICT supported activities ($p = 0,01$, $r = 0,140$). This means that ICT supported activities are also influenced by other factors including teacher-student communication, work forms and methods used in the lesson (Gonda, 2016).

3.2. Competence in using ICT tools

In parallel with surveys about facility sharing, researches are carried out about the ICT competence of teachers, more specifically about their attitude and experience (Lakatosné, 2010; Fehér, 2008). The results of these surveys show that the majority of practicing teachers use various ICT tools on an everyday basis, but they do not consider themselves trained well enough to incorporate them in their lessons. They would be happy to take part in trainings which would enable them to do so. Foreign studies have also proved that nearly all teachers think it is important to integrate ICT in their own teaching practice, which is restrained by lack of time, facilities and training (Charalambos, 2013, Dakich, 2005). Provided that teachers have an opportunity to participate in methodological ICT trainings, they are capable of developing in a number of areas. Due to the Delphi project in Australia the teachers have become more competent in ICT usage in several ways. Let me highlight those where the development was the greatest:

- they became more skilled in the daily facility sharing;
- in their classroom activity they preferred co-operation based, ICT-supported tasks;
- within communication competence they elaborated individual development plans for ICT usage;
- and as for the learning environment they became more familiar with young people's Internet-culture (Dakich, 2005).

These positive results also show that it is worth starting the development of ICT competence during teacher training and providing the trainees with opportunities to gain experience about the use of ICT in teaching, since that will enable them to integrate it in other areas of the learning-teaching process (Cox–Marshall, 2007).

Teacher trainees' competence of ICT use and the quality of their ICT competence is shown in *Figure 3*. The trainees have the highest results in the 1st (*professional tasks, scientific, subject-related and curricular knowledge*) and 2nd (*pedagogical processes, planning of activities and self-reflections about their realisation*) competences: statements 1b), 1c) and 1d) were marked 'always' or 'often' by 38 trainees. This means they are competent in the contents subject related websites in areas such as professional tasks, scientific, subject-related and curricular knowledge, they are able to contemplate on digital materials and tools critically, and to use various office software regularly for making their own digital teaching materials. So they do not only elaborate and evaluate online information on an everyday basis but also use various

facilities for teaching, which means their competence does not only reach but exceeds level 0. Statements a) and c) dealing with competence area 2 have also brought high level results. According to statement a) teacher trainees can subordinate different tools to their teaching purposes. Statement c) refers to an activity outside the classroom, as more than half of the trainees can also apply ICT tools for schools administration. The development of their students' personality with ICT tools was marked as 'often' by respondents, more specifically, they usually consider themselves to be available for their students online as well, if they turn to them with subject-related questions. So, due to ICT tools, the teaching-learning process does not end within the classroom walls. At least 23 respondents marked the use of ICT tools for supporting learning as 'often', which means they send downloadable materials and links to their students. These results show that continuous search for digital contents and teaching facilities constitutes an important part of teacher trainees' professional commitment.

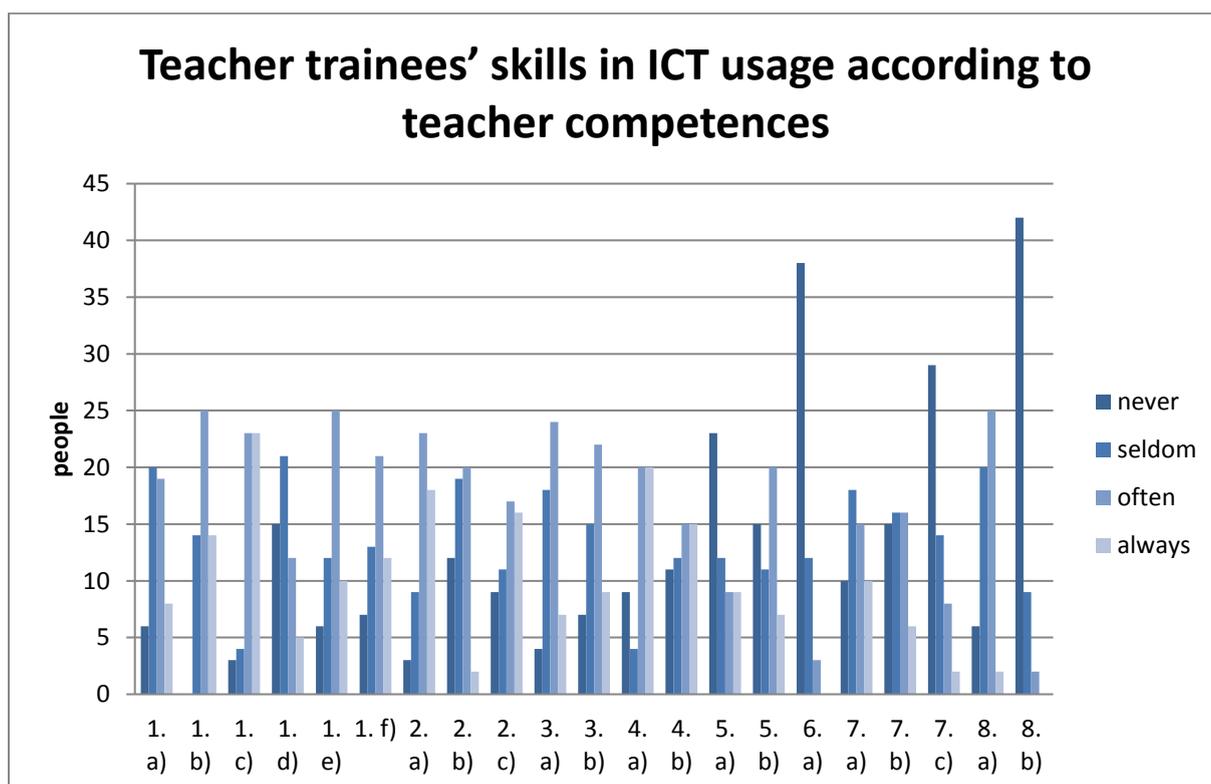


Figure 3. Teacher trainees' skills in ICT usage according to teacher competences (N = 53 people)

Respondents marked 'seldom' for certain statements of competences 1,2 and 8 (*commitment, professional responsibility for subject-related development*). While it is characteristic for competence areas related to subject-related tasks that respondents know subject-related websites made for teachers, they are less well-informed about digital teaching materials and

programmes suitable for making such materials. This result reflects that they use ICT appropriately for teacher-centred activities, but they are not able to make effective, interactive materials for their students. Respondents are also less well-informed about how they could use ICT tools in an online environment, co-operating with the students.

Respondents should clearly make progress in competences 5 (*Helping and developing the formation of learning groups and communities, creating opportunities, openness to socio-cultural diversity, integration activity, form teacher's activity*) and 6 (*Continuous assessment and analysis of pedagogical processes and students' personality development*). Respondents do not form learning groups and communities online to support co-operation and communication, which would enhance learning-methodological awareness and increase motivation (Főző, 2006). A key factor to that progress could be a mentor, a practicing teacher at the teaching practice.

4. Conclusion and outlook

The first hypothesis of the research is partly confirmed, as statistically there is a positive correlation between the number of ICT tools used in the teaching practice, their functional variety and the diversity of activities. This correlation is nevertheless weak, which refers to the fact that the pedagogical application of ICT tools in the classroom is much more defined by the competence and methodological preparedness of the teacher. One can still state that it is worth using as many ICT tools as possible in the learning process, as it increases motivation, supports more learner types and influences learning success as well (Kétyi, 2009).

My second hypothesis, according to which the activities requiring teacher facility sharing are in majority, is confirmed, as teacher-centred methods are represented in the highest percentage. That may be due not only to teacher trainees' methodological culture but also to schools lacking digital facilities which students could use together.

My third hypothesis is also confirmed, as teacher trainees are the best at teacher competences related to planning and preparation. They more typically use ICT tools to unburden their own work than to support the teaching process. However, it is also purpose of the teaching practice to enable trainees to try different facilities and to experience how these facilities influence the students' classroom communication, what cognitive operations they are suitable for or how they alter students' attitudes to the given curriculum.

The development of teacher trainees' ICT competence is mainly defined by their mentor. A research carried out in the UK in 2006 examined what helped teacher trainees develop the efficiency of their subject-related ICT use. In the research the trainees pointed out the following factors:

- learning to judge various digital learning materials critically;
- getting to know easy-to-use applications;
- exploiting the advantages of ICT regarding learning methodology;
- improving ICT competence in a group;
- creating practical tasks;
- mentor's ICT use (Barton–Haydn, 2006).

During teaching practice teacher trainees take the mentor's teaching activity as an example (Johnson, 2016). During shadowing they try to learn as many good practices as possible, which they can later incorporate in their own work³. However, if the mentors do not tend to use ICT, the trainees will not have an example of efficient ICT use. The other problem with mentors is their attitude towards using ICT for teaching. If the mentor does not consider it important to support students' learning process with ICT tools, the teacher trainee will probably not be very motivated to do so. Plenty teacher trainees report they wanted to use various ICT tools in their teaching practice but they were restrained either by the poor quality of the facilities or the mentor's attitude (Lévai, 2014).

For the sake of the improvement of teacher trainees' ICT competence it would be important to see lessons of their subject where teachers use different facilities, as they can only incorporate methodology elements and organisational procedures which they have tested or at least seen them work (Lévai, 2014; Majzikné 2015: 11). To be able to test new methods and facilities, mentors should have the following characteristic features: striving for learning, need for variety, motivation, curiosity and interest⁴. These characteristics should also be featured in mentor tasks related to the development of ICT competence. As the development of ICT use does not only involve the subject lessons but the whole teaching practice, this requires a complex activity and competence on the mentor's part.

³ *A Learning Guide for Teacher Mentors*. Department of Education and Early Childhood Development. State of Victoria. Australia. 2010. <http://www.education.vic.gov.au/Documents/about/programs/partnerships/learningguide.pdf> [2016. március 25.]

⁴ *Mentoring in Teacher Education*. HM Inspectorate of Education. Scotland. 2008. https://www.educationscotland.gov.uk/Images/mite_tcm4-712851.pdf [2016. március 25.]

The mentoring plan for the development of ICT competence and the related strategies is defined by four principles outlined by mentors involved in the British research mentioned above. Their highest priority was that teacher trainees should by all means have a successful experience of using ICT tools in the classroom. To achieve this, teacher trainees must learn to use programmes and applications which students already master and know the advantages of. So teacher trainees will cope with learning to use them and can focus on their pedagogical use. The mentors placed their model role as second most important, as I mentioned above. In their opinion they can only be genuine in the development of the usage of ICT tools, if they also use them themselves. Another important principle is continuity, according to which one cannot realize ICT-supported teaching-learning in a campaign-like way for certain topics but one should embed it in as many topics as possible. It must be part of schools local syllabi and curricula. Finally, the British mentors highlighted classroom arrangement as ICT tools can only be used efficiently in an environment where students can move without obstacles and the facilities are easily accessible (Haydn–Barton, 2006).

Despite the fast development of ICT, the number of tools, materials and programmes applicable in teaching, it is clear that both teachers and teacher trainees prefer more conventional teaching models and they try to adjust the use of ICT tools to their existing methodological “toolbox”. They demonstrate with multimedia, do sketched presentations or give students homework on the Internet (Gonda, 2016; Námesztovszki, 2013; Smith et al., 2006; Tanner et al., 2005). However, according to the results of Hungarian and international surveys, we could use ICT tools efficiently if we did not only consider them as supplementary teaching tools but incorporated them in the entire teaching-learning process and if we let students actively share these tools, thus exploiting the online facilities supporting co-operation among students (Kárpáti—Hunya, 2009; Barton—Haydn, 2006). This process would help the development of skills and abilities, which would make it easier for teacher trainees and their students alike to succeed in the world of work.

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Appendix 1

Competence 1: professional tasks, scientific, subject-specific and curricular knowledge

- 1 a) I know and use the digital teaching materials available for my subject (e.g. materials for interactive board, digital textbooks, CD-ROM).
- 1 b) I know and use the available subject-related websites and portals.
- 1 c) I use the office software appropriately for preparing digital teaching materials (e.g. printable worksheets, presentations).
- 1 d) I use other programmes appropriately for preparing digital teaching materials (e.g. software for interactive board, authors' software for interactive tasks).

Competence 2: Planning of pedagogical processes, activities and self-reflections about their realisation

- 2 a) I can evaluate and rank digital teaching materials and tools critically.
- 2 b) I help my students form a critical and ethical way of receiving, elaborating and passing on digital information.
- 2 c) I can select from digital teaching materials and facilities to suit my educational purposes

Competence 3: Teaching support

- 3 a) I can support communication and co-operation appropriately in an online environment (online tutoring).
- 3 b) I can use digital tools appropriately for administrative tasks (e.g. electronic class register).

Competence 4: Methodological preparedness for developing students' personality, the realisation of individual treatment, the successful teaching of children with disadvantages, special educational needs, integration-, learning- and behaviour difficulties together with the other learners.

- 4 a) I support the students' individual learning with the help of online interfaces (link recommendations, downloadable materials).
- 4 b) I do my best to form a need in my students for ICT-supported research and obtaining information.

Competence 5: Helping and developing the formation of learning groups and communities, creating opportunities, openness to socio-cultural diversity, integration activity, form teacher's activity.

5 a) I'm also available for my students online (e-mail, chat), if they turn to me with subject-related questions.

5 b) I create online communities (e.g. websites, Facebook groups) to support co-operation and communication.

Competence 6: Continuous assessment and analysis of pedagogical processes and students' personality development.

6 a) I set an example to students by creating value and being active in terms of the functional use of digital tools.

Competence 7: Communication and professional co-operation, problem solving

7 a) I set an example to students by creating value and being active in terms of the functional use of digital tools

7 b) I also use digital tools and software (e.g. voting system) for the assessment of the students' achievement.

7 c) I use ICT tools for contacting and co-operating with colleagues (professional groups, forums).

Competence 8: Commitment and professional responsibility for subject-related development.

8 a) I make regular enquiries about digital teaching materials, tools, and the latest achievements in digital technology supporting education. I also consider their usability constructively.

8 b) I actively participate in the professional co-operation taking place online (e.g. eTwinning).

