Teaching Practice from the Perspective of ICT Student Teachers at the Faculty of Education, Charles University in Prague

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Abstract. The author worked for some years as a coordinator, methodology consultant and supervisor of teaching practice of ICT student teachers at the Faculty of Education in Prague. In her paper she summarizes experiences and data collected by questionnaires during years 2004-2008 by student teachers within their teaching practice on subjects related to Computer Science, Informatics and ICT Education in Czech Basic and Secondary Schools. The results came out of evaluative questionnaires and comments published in on-line support. A video-record will form a part of the paper presentation.

Keywords: Teaching practice, ICT teacher, information education, Informatics, computer technology, teacher education, lesson plan, Primary/Secondary school, Moodle.

1 Introduction

The paper is dedicated to a teaching practice of student teachers implemented into a study program of a Master's Degree study of Information and Technical Education at the Faculty of Education in Prague.

During five years of their study ICT student teachers have to successfully get through two periods of teaching practice in basic or secondary schools in subjects dedicated to ICT, Informatics or Computer Science.

After graduation they are fully qualified basic or secondary school teachers. They would work as primary or secondary school teachers of ICT, Informatics or Computer Science. They would work at schools also as a computer nets supervisor and they might be employed as ICT coordinators and consultants. They would provide advice how to apply ICT in school practice to teachers or head teachers.

1.1 Teaching Practice of ICT Student Teachers in Primary or Secondary Schools

Generally, the teaching practice of student teachers of the Faculty of Education in Prague is organized in the Year 4 and Year 5. Each of them takes four weeks.

N. Reynolds and M. Turcsányi-Szabó (Eds.): KCKS 2010, IFIP AICT 324, pp. 44–55, 2010.

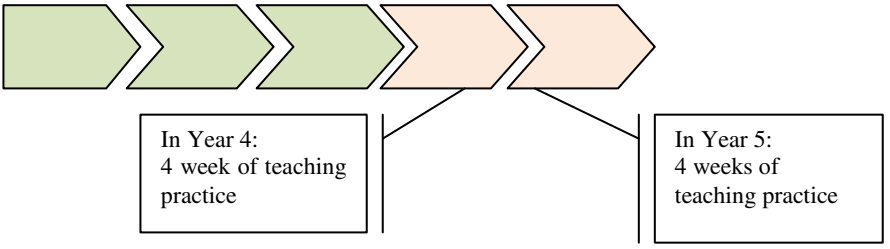

Fig. 1. A position of teaching practice in a study program of student teachers at the Faculty of Education

Within each of four weeks of an obligatory teaching practice the ICT student teachers assist or stand-by teachers in classrooms. During this period they design their own lesson plans and teach a minimum of 12 lessons in the classroom environment. (I.e. during the university study, students teach at least 24 lessons in Basic or Secondary schools). They analyze and evaluate their teaching experience together with their mentors who work in a close collaboration with a didactic consultant from the Faculty of Education.

For each lesson ICT student teachers design their lesson plans while using an identical template (see Appendix 1). They can ask a mentor for advice to tailor lesson plans or they can consult with a didactics consultant or their peers from the Faculty of Education on-line. Via the on-line support organized in Moodle, ICT student teachers deliver a set of lesson plans, a questionnaire, reports and news about their teaching practice. Together they can discuss some technological problems or pedagogical situations in forums then.

ICT teacher students can complete their four-week teaching practice in Basic or Secondary schools not only in Prague, but also whenever in the Czech Republic. Some students prefer conducting their teaching practice at schools they attended as a child. Their former teachers can become their mentors and colleagues and can monitor their first professional achievements. In such cases ICT student teachers find good relationships with their mentors as very important for their teaching practice.

In 2002 we introduced in Moodle on-line support in order to improve coordination and management of teaching practice for our ICT student teachers. The on-line support is very useful and helpful for all, student teachers and mentors, who should visit, monitor and supervise each student teacher in their schools.

From 2007 onwards we also started recording our student teachers by a digital camera in schools. After teaching practice in schools all video-recordings are analyzed in a seminar together with all ICT student teachers. Video-records allow them to see the real situation in the classroom of various schools, the equipment of their computer-labs, the interactions between ICT students and pupils etc.

Some ICT student teachers, during their university study, are employed in basic or secondary schools as non-qualified teachers of informatics or computer science subjects. In such cases their work is validated as teaching practice; it means they complete their teaching practice in the schools where they work. The ICT students who work as non-qualified teachers, unlike their student colleagues who are not employed in schools, have been prepared not only to teach children, but also in other fields and responsibilities of the teacher profession, primarily in:

- assessment of pupils learning outcomes,
- a legal agenda related to schooling,
- communication with parents, etc.

These ICT student teachers who already work in schools are very active in seminars at the Faculty of Education. They ask questions that distinguish them from their university school-mates, exploit their experience from teaching in schools and present interesting ideas on how to implement ICT into education. Additionally, they usually design high-quality teaching or study materials.

1.2 How ICT Student Teachers Develop Lesson Plans

During a teaching practice in schools ICT student teachers must develop lesson plans in identical templates (see Appendix 1).

The items of the template don't correspond with a structure of lesson plans that (teachers) students usually prepare. The template serves not only to describe a scenario of their teaching lesson, but also as a didactic exercise to develop some of student teachers' skills and to support their own thinking about teaching and learning from different perspectives: most of the student teachers have a problem formulating clever questions or suggesting an interesting problem to be solved. Most of student teachers don't consider a terminology and lexis of their subjects. And it is difficult for them to develop a concept structure of ICT subjects in minds of their pupils.

Most of the ICT student teachers (66%) design their teaching without any help of their mentors. The question of how to design a lesson is more complicated. The reason is that in most schools[1] ICT teachers do not use any textbook. Most of teachers (about 79%) develop their own study materials for pupils. For making lesson plans ICT students mainly use the Internet (90% of students – see Fig.2).

In the lesson planning process the ICT student teachers pay great attention to these aspects:

- Time table of teachers and pupils activities and a structure of lesson
- Educational content of lesson
- Proposal of activities and assignments for pupils.

The ICT students found out that designing timetables for lessons and motivating pupils to take active participation (see Fig. 3) are the biggest problems. Sometimes activities they prepare for pupils are either too easy or not stimulating tasks without any respect to personal priorities, interests or preferences of their students. Another problem that ICT student teachers met with was how to motivate children for ICT activities.

Among Czech schools there are a lot of differences in approaches to teaching ICT subjects. Most of them concentrate on development of fundamental ICT skills of pupils. They mainly focus on training in MS Office software. In some schools children produce animations or multimedia applications using digital cameras and special SW. Rarely the Czech Basic or Secondary schools implement basis of programming into compulsory ICT subjects (see Fig. 4). Some Czech schools organize for children

[1] In 2004 - 2007 only 13% ICT teachers in Primary or Secondary schools used text-books in their teaching with children.

facultative courses in programming. ICT student teachers found out that in basic schools some teachers[2] are dedicated to programming in Karel and in secondary schools mainly in HTML or Pascal. Most of ICT student teachers would prefer to teach programming than to train fundamental ICT skills with editors or spreadsheets.

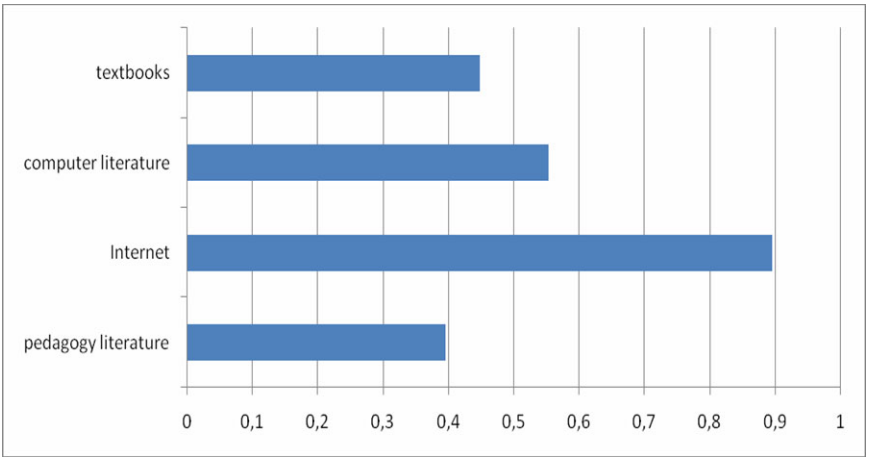

Fig. 2. Types of resources used by ICT student teachers for lesson plan development

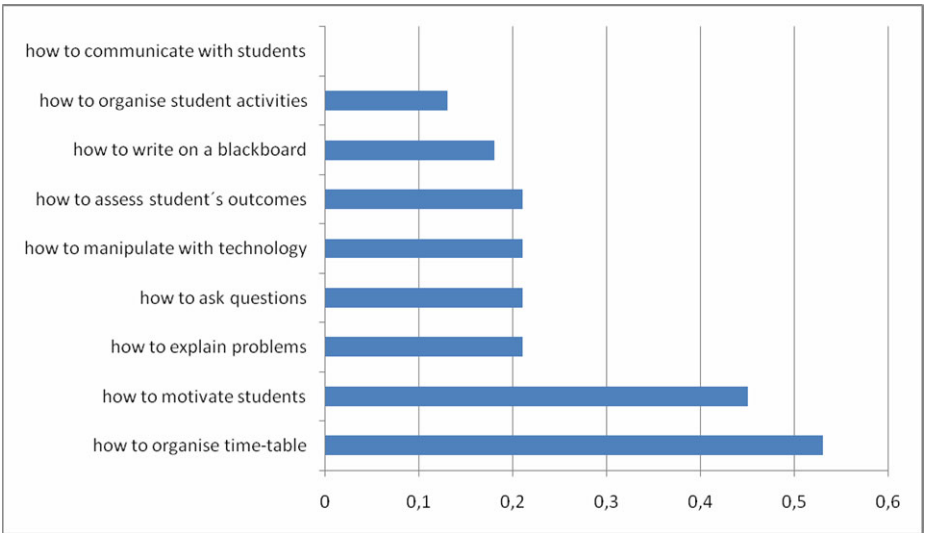

Fig. 3. The main problems the ICT student teachers have met during their teaching practice (% student teachers)

[2] Imagine and Baltik have become a favorite SW for pupils' development of programming thinking and algorithm skills in Czech primary schools.

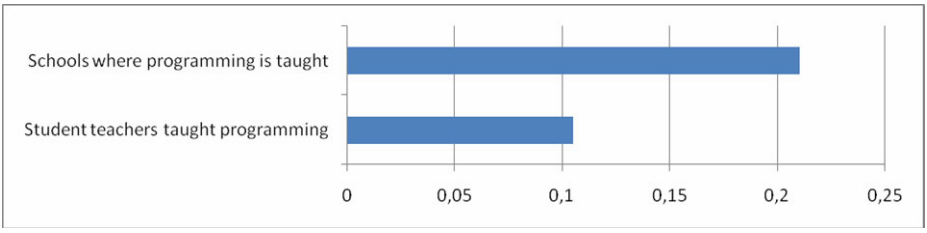

Fig. 4. Teaching of programming in Czech Basic and Secondary schools

From September 2007 Czech schools apply a new curriculum concept defined by the Framework Educational Program where ICT is in a totally new position. According to this curriculum document, ICT has become a new compulsory educational domain with a similar position as Math, Languages, Art or Science Education traditionally have. Lessons about ICT are integrated into Primary Education in Grades 4 and 5 (for children of age 9- 11). Therefore some ICT teacher students during their practice also taught courses with children of age 11-12. There they could experience how children of that age like activities with computers.

During their teaching practice ICT student teachers could see how schools have been applying new curriculum policy, how ICT has been integrated into project works at schools, which topics of Informatics are being taught to children in Grade 4, etc.

1.3 A Situation in Schools Where ICT Student Teachers Complete Teaching Practice

Most of the ICT student teachers did their practice in schools involved in the "Governmental Information Policy in Education" (GIPE). In 2002-2006 the GIPE equipped Czech schools with computer technology and SW to integrate ICT into education, to train teachers in ICT skills and to organize educational projects within ICT. But since 2007 the Czech Republic hasn't had any financial support of that sort and further ICT development at schools doesn't exist. The ICT student teachers could see the impact of this fact and experience how schools differ in ICT equipment, SW and services for teachers and pupils. Nevertheless, step-by-step most Czech schools have succeeded in getting interactive whiteboards that caused a boom in motivation of Czech teachers to work with computers and Internet. In the last two years most of the ICT student teachers could use interactive whiteboard in schools, too.

In 2006 some schools, that facilitate teaching practice to our ICT student teachers, have participated in many EU Projects (eTwinning, CALIBRATE, etc.). Some ICT student teachers could participate in these EU projects activities.

SCHOOLS FROM THE ICT STUDENT TEACHERS' PERSPECTIVE

Most of the ICT student teachers appreciate:

a) **high-tech equipment at schools** (data-projector, interactive whiteboard, wireless mouse and keyboards, etc.). Computer labs in schools are arranged as multifunctional classrooms with very modern furniture, where they could be given not only Informatics lessons, but also lessons of Music or Art Education.

In the last two years student teachers had the opportunity to use an interactive whiteboard in most schools.

"I really liked the computer labs; there are three computer labs in the school that are all arranged in non-traditional ways. A teacher in my school designed the furniture. I also liked the Internet cafe and library in the school."

b) **a good "climate" and partnership among teachers** in schools. Their open approaches to pupils enable them to find more flexible solutions for unknown problems. Teachers teach pupils skills of teamwork. From ICT student teachers' point of view there are a lot of kind people at schools.

c) **teachers' effort to upgrade HW and SW** in schools. ICT student teachers were surprised by how much effort teachers had to make if they wanted to upgrade the equipment and SW applications at the schools. During their university study, the ICT student teachers had no reason to think about it because the Faculty offered them the use of professional SW and high-quality HW. However, at schools today ICT teachers can't only teach their subjects, but they also have to take care of SW and HW. In many schools there is also a lot of "old fashion" technology; schools don't have enough money to buy new technology. For maintaining old computers it is necessary to have enough spares and components. ICT student teachers were surprised by *"teachers' active attempts to get needed components and spare parts for old fashioned computers and hardware"*. ICT student teachers could get experience with some SW that has not been applied at the Faculty of Education – for example Master Eye that helps teachers to organize work on PC with children and that could be very useful in computer labs without data-projects.

d) **a chance to use an interactive whiteboard.** Till 2007 ICT student teachers haven't been able to use an interactive whiteboard at the Faculty of Education. However, most of the schools where they do teaching practice are equipped with them. ICT student teachers appreciated the possibility to work with this new type of whiteboard.

e) **ways how in some primary schools** children from age 7 to 10 are being encouraged to work with ICT. These schools decided to find a space in their school timetable to allow teachers to work with young children in computer labs.

"I was surprised by a strong-willed effort by my supervisor teacher who was not only an ICT and Art Education teacher, but also a principal of the school. His pupils master graphic techniques and Art thinking – you can see the pupils' pictures and presentations in school halls, classrooms and teachers rooms – the school looks like a Gallery of Art."

f) the high interest of children in computers

g) a fact that in few schools all teachers could use ICT in all classrooms.

In some schools ICT student teachers could see how schools utilize Moodle.

Some ICT student teachers had some critical comments to:

a) conditions for ICT Education

"In my school there were limited technical conditions for ICT education. It is a pity that children couldn't learn more about WWW."... "In the computer lab there was clutter and very often some teachers came in to speak with my supervisor teacher. I expected that it would be possible to use a data projector for my teaching as I was accustomed at the Faculty of Education, but the school didn't have it. It threw me into confusion. Therefore I decided to create my Web pages where I could publish all study and teaching materials and instructions for my pupils (www.vyukarudna.wz.cz)."

b) and to approaches to teaching of ICT subjects:

"*In my school, children prefer to play computer games what isn´t so difficult and boring according them therefore they regard ICT lessons as not very important. …Teachers didn't give special professional attention to gifted pupils who knew a lot about technology and more than their teachers. In the school there dominates a practical orientation of ICT education to develop only fundamental user's skills and to achieve a general "computer literacy"…. "I don't agree children cannot learn programming and haven't any textbooks."*

TECHNOLOGICAL CONDITIONS IN SCHOOLS

Teaching practice in schools is a good opportunity for ICT student teachers to see a real situation in schools with all problems that schools have with ICT services and ICT in education:

"In my school where I did teaching practice there were three supervisors for administration of computer labs. But I know some schools without any qualified supervisors where supervision of the computer lab is done by a teacher without any qualification in ICT." … "My supervisor- ICT teacher was very busy; he is the only specialist for ICT subjects in the school and also a supervisor of computer classrooms. He also helps his colleagues with their computers to solve their user problems – this hectic schedule sometimes influences the quality of his teaching."

According to comments by ICT student teachers in 2005, student teachers were faced with teachers who had very low computer literacy. Therefore teachers who mastered work with ICT were very busy and overloaded by activities with ICT. *"In my school some teachers even rejected installing computers in their working room."*

Some ICT student teachers struggled with a lot of technical problems. In 2007 some of them had to use very old computer machines without any data projectors and with low speed connectivity to the Internet. For instance, in 2007 one basic school didn't have a computer-net, there were only 10 isolated computers in a classroom.

Generally, some schools have no data projector or have very low speed connectivity to the Internet. Other problems that influenced the teaching practice of ICT student teachers were a lack of scanners, printers or multimedia workstations. Some problems originated in a bad conception of network administration and in setting users´ rights.

"In my school non suitable user data security could protect against abuse or their complete discarding by other pupils." … "For teachers who don't teach ICT subjects it was very difficult to use a computer lab. The lab could be used only for ICT lessons." … "I didn't like the school had two computer labs, but only one of them was connected to the Internet." … "Computers were situated in the computer lab in a manner that pupils were sitting with their backs to a teacher and to a data-projector."

WHAT SHOULD BE IMPROVED AND CHANGED IN SCHOOLS?

ICT student teachers were asked to propose what could be improved in a school where they did their teaching practice. Most of their recommendations on how to change a situation in their school related to a technological improvement of schools:

"I recommend to install a bigger monitor for teachers (in labs for Biology Education and Foreign Language Education) and for students, too." … "I would reduce a path to a common directory on a server where children can save their work. It was a problem for children." "I would install Total Commander that could be for children more practical and understandable." … "I would move the teacher workstation to another place in the computer lab." … "I would change how the computers are arranged in a net; I would change the administration of user's profile."

"I would support more the Internet activities of students, but it would be necessary also to have better security for the computer network." … "I would like to recommend to a computer-net administrator to equip schools with advanced technology" ... "and to upgrade SW."

"It would be very useful for teachers to install dataprojectors in all classrooms with computers."

"I would prefer to install in all computer labs of school the same operating system (for example Windows XP)."

"I would like to install more educational SW."

"In my school in a computer lab where I had lessons with children there wasn't a dataprojector, so I always had to borrow it from another classroom and after my lesson I had to put it back. It was not very practical. The security setting did not allow me to open an e-mail account on a public portal and children didn't have any e-mail accounts in the school server either. No existing e-mail accounts forced the school to break collaboration with other schools."

In 2005 the ICT student teachers recommended

to school ICT administrators and ICT coordinators:

To get rid of blackboard and to install a new one in a better place in the classroom. To re-arrange workstations in a classroom. To buy a dataprojector or to install Master Eye. To have computer labs accessible to all teachers and students. To integrate Moodle into school work. To buy more computers. To install other e-mail system (not GroupWise). To use also another graphic editor that could be used also at home by students. To employ more ICT administrators and ICT coordinators.

to ICT teachers:

To introduce textbooks for students. To teach programming.

to head teachers:

To recruit qualified ICT teachers for ICT subjects.

In 2006 ICT student teachers recommended

to school ICT administrators and ICT coordinators:

To allow pupils to work in computer labs after their school activities and during breaks. To darken computer labs. To install another computer lab. To buy another SW – also for a teaching basis of database and programming. To change arrangement of computers and furniture in computer labs.

to teachers:

To extend ICT courses to others grades. To involve pupils (school) into an international or national project activity. To motivate pupils to apply ICT in practice and in life.

In 2007 ICT student teachers advised to school ICT coordinators:

To use Vision studio or similar SW for monitoring student's individual activities. To install a camera-control system (to protect technology equipment against losses). To install dataprojectors in all computer labs. To allow teachers to conncet a notebook. To install an interactive whiteboard

1.4 Student Teacher Professional Development from a Student Teacher Perspective

After teaching practice ICT student teachers have to fill evaluative questionnaires where they have to answer some questions related to conditions for information

education in schools and to the approach of teachers and school management to a new curriculum concept of ICT education. All lesson plans, video-recordings and documents developed by ICT students in their teaching practice form a part of a student portfolio that is applied in some courses oriented on methodology and didactic aspects of information and ICT education.

QUESTION: WHAT HAVE ICT STUDENT TEACHERS LEARNT IN SCHOOLS DURING THEIR TEACHING PRACTICE?

In 2004:

"I have learned very much. As a teacher I met so many problems (SW, computer net, HW, connectivity) that I didn't expect that I had to think about how to solve them." … "It was my first experience with young students as my pupils." … "Teaching practice was super. You could see that theory and practice are two totally different things! It seems a lot of my teachers at the Faculty of Education forgot this fact!" … "I was surprised how easy it was for me to teach!" … "At first I was slightly afraid to teach children a subject that I couldn't learn personally in my basic school. But at the end it was a fantastic experience for me!" … "I was teaching at a basic school – it was nice practice for me. I am curious about how it would be to teach at a secondary school."

"I completed my practice at a secondary school. I was curious about how my female colleagues would be able to teach teenagers like I had to teach." … "I designed learning activities for children by my own concept to be interesting also for me personally. I exploited my personal experiences with ICT." … "I was kindly surprised how teachers, school management and my supervisor-teacher accepted me. I was very happy to be and to teach there. It influenced me to become a teacher!"

In 2006:

"The teaching practice is very short, but for student teachers it is very exacting. During four weeks we have to get experience with teaching in two specializations. Fortunately my practice was successful – I am employed in this schools and my teaching practice was realized with my pupils. There was only one problem – my supervisor-teacher is a student of the Technical University, who is an expert in ICT and Computer Science, but he has no pedagogical background like me. He could be more convenient as a supervisor-teacher for ICT subjects with talented children."

In 2007:

"I liked my teaching practice. It was my first experience with being a teacher. At first I was afraid but after my first lesson I discovered that it is a fantastic and creative job to be a teacher. I was glad to see how my pupils collaborate and work. Step by step I have managed to motivate all pupils to do given assignments. Maybe I will succeed in it because I was a new "non-hackneyed element" in a classroom and my pupils did not know what they could expect from me."

QUESTION: WHO HAS INFLUENCE ON TEACHING STYLES OF ICT STUDENT TEACHERS?

In Fig 5 you can see who has the greatest impact on the teaching style of the ICT student teachers. Their own basic or secondary school and university teachers have had the most important influence on their approaches to pupils and teaching strategies. Some ICT students are not thinking about professional patterns and they try to tread their own path without any models or patterns.

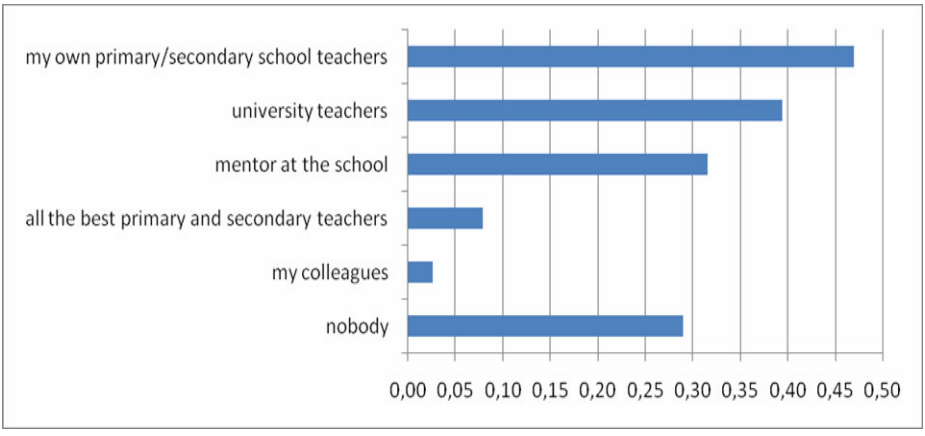

Fig. 5. Professional patterns of who has an influence on ICT student teachers

THE BIGGEST PROBLEMS FOR ICT STUDENT TEACHERS IN TEACHING PRACTICE

For most of ICT student teachers there is a problem organizing their teaching into 45 minute lessons. Another problem that they had relates to a motivation of pupils to be active. ICT student teachers did not see any problem in communication with their pupils (Fig. 3). Some ICT student teachers were faced with teaching both ICT beginners and ICT experienced pupils. They didn't know how to design lesson in class with a big differences in ICT knowledge and skills of teenager students and whom should they dedicate their teaching to in their 45 minute lessons.

"I was not ready to teach students with such big differences in ICT skills and knowledge: I hadn't time and space to develop the advanced ICT users and at the same time I couldn't teach beginners in ICT."

2 A Role of Moodle in Teaching Practice of ICT Student Teachers

A few years ago we decided to use Moodle for coordinating and managing teaching practice of ICT student teachers. In Moodle we publish instructions for students on what to do and documents (lesson plan template, templates for time-table, etc.). In Moodle ICT student teachers can ask colleagues and didactics specialists and inform them about the situation in their schools. We endeavor to answer students immediately.

"I would like to appreciate a clear structure and function of Moodle support. Thanks to very clear instructions I could see how teaching practice proceeds in other schools of my colleagues, what I have to do. Our teachers from the Faculty of Education answered us immediately. Each important question was answered." ... "I would appreciate the Moodle support which helped me very quickly understand a system on how teaching practice is organized. It is a pity, that other departments of the faculty do not use similar support."

3 Conclusions

The teaching practice has a key role in university teacher education of ICT student teachers. It is a pity at the Faculty of Education in Prague student teachers can experience their teacher profession with pupils only during 8 weeks. It is a too short time period to prepare student teachers for their profession and to demonstrate mastering key professional competences [6]. Some students who study in a full-time study program at the Faculty of Education and at the same time work at schools as part-time non-qualified ICT teachers, achieve in didactic courses and in their diploma thesis significantly better results and apply more professional approaches to given tasks and problems than students who only study in full-time study programs.

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Appendix 1 Lesson Plan

Subject: Grade: School: Topic:
Lesson plan author:
Educational program (curriculum document) applied by the school:

1. Preliminary requirements for pupil's knowledge: *Give a list of pupil's knowledge and skills to be able to understand a topic for a lesson. For example*
   - Pupils are able to..., Pupils understand..., Pupils master in ...)
2. Main aim of the lesson:
   - Particular goals:
   - ICT competencies (related to the document of the Framework Educational Program) *Give a list of competencies that you will contribute to develop in your lesson.*
3. Text-books, study materials that would be used by pupils for your lesson.
4. Aids, tools that would be used in a lesson.
5. A list of technology equipment and HW that would be used in your lesson by a teacher and by pupils. For each tool explain for which activity it will be used.
6. A list of SW that would be used in your lesson and to prepare for your lesson.
7. Draw a scheme of classroom arrangement.)
8. Teaching methods and strategies with the explanation how you will apply teaching methods and which teaching strategies you will prefer for your teaching.

9. Procedure: *Describe instructions on how to order lesson procedures. Your description ought to be formulated as a manual on how to realize your lesson plan*.
10. Questions that pupils should be able to answer at the end of the lesson.
11. Assignments and problems to be solved by students. Give also their solution and numeral account).
12. Homework. Formulate problems and activities for homework.
13. Evaluation: Explain criteria how student outcomes will be evaluated.
14. Addition and extra topics, assignments for talented pupils: Propose how you will organize a lesson with a classroom where you have found some talented pupils.
15. WWW: Give a list of WWW pages used in your teaching.
16. Learning objects: Give a list of learning objects that you will use.
17. Vocabulary of terms from ICT and Informatics related to the topic: Give a list of terms with explanations understandable and dedicated to your pupils.
18. Term and its explanation: …..

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TEACHER SELF-EVALUATION AND AUTO-REFLECTION

1. How did you succeed your lesson?
2. What didn't you manage?