EDUCATION OF FUTURE TEACHERS: THEORY AND PRACTICE

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Abstract

Preparing the students for the teaching profession requires a combination of theory and practice. It thus seems advisable to present examples of good practice during classes conducted at universities, but also to prepare students for the clash with the school reality, explain the discrepancies. Authors stated a question: To what extent school reality is compatible with the theory presented during the pre-service teacher training? The answers to the research questions were sought by analysing university students' reports from their teaching practice and narrative interviews conducted during the first class after the end of the practice. 77 teaching practice reports were analysed, and they concerned the practice performed in lower and upper secondary schools located in Krakow and southern Poland. The preliminary analysis of students' reports and interviews with university students indicated that the greatest discrepancies between what pre-service students read in textbooks on teaching chemistry or what they came across while doing school practice. Out of the lesson elements examined, recapitulation is the most neglected one. In all the cases examined, homework was assigned very often, almost after each lesson. No examples of homework serving the purpose of investigating the knowledge related to the new lesson, i.e. the so-called flipped learning, have been observed.

Keywords: *pre-service teachers training, recapitulation, homework, school internship*.

Introduction

Preparation for the Teaching Profession - Overall Structure

The students of the Jagiellonian University Faculty of Chemistry have an opportunity to become qualified to teach chemistry, simultaneously with their main study programme. For this purpose, before obtaining a master's degree, they need to complete a number of courses in the Teacher Training Centre at the Jagiellonian University and the Department of Chemical Education. The programme of preparation for work at school is consistent with the current standards of teacher education (Regulation of the Minister of Science and Higher Education dated 17 January 2012 on the standards of education in preparation for the teaching profession). Implementing appropriate legal provisions, the JU Teacher Training Unit offers courses of 150 hours in the field of pedagogy and psychology. The classes conducted at the Faculty of Chemistry include the basics of teaching, subject (chemistry) teaching and learning, and other elements approved by the Faculty Council (Table 1).

Table 1. Teaching courses carried out at the Faculty of Chemistry of the Jagiellonian University.

Course name	Type of classes and number of hours	Brief course description
Principles of General Education	Seminar 30 h	The course covers the issues of general didactics, e.g. the rules of school organization, the process of teaching and learning, educational system, classroom, designing learning activities, diagnosis, monitoring and evaluation of learning outcomes, language as teachers' working tool. (Principles of General Education)
Chemical Education A	Class 30 h Teaching practice at school (within the school year, implemented in a group) 15 h	It covers the following groups of topics: chemistry as a school subject, lesson, teaching methods and principles, designing lesson material environment, control and evaluation of students' learning outcomes. (Chemical education A)
Chemical Education B	Class 30 h Teaching practice at school 15 h	It covers the following groups of topics: the project method and students' research work, experiment as a method typical of chemistry teaching, enhancing student's motivation and curiosity, using various sources of knowledge. (Chemical education B)

Specialization course (one to select) 1. Biochemistry in School Curricula 2. Active Methods of Chemistry Education 3. Didactic Assessment 4. The Technic of Didactic Experiment 5. ICT in Chemistry Education	15 h each laboratory class class laboratory class laboratory class laboratory class	The classes are conducted as part of the courses that equip students with additional knowledge needed to conduct lessons with a focus on: 1. After the course the student should be familiar with the historic development of biochemistry, the scope of biochemistry issues covered in the core curriculum (biology, chemistry), know how to conduct simple test to identify natural organic compounds, design a lesson involving the issues of biochemistry. (Biochemistry in School Curricula); 2. Conducting chemistry education using the activation methods (Active Methods of Chemistry Education); 3. Independent construction of various tools for monitoring students' knowledge and skills and their correct evaluation (Didactic Assessment); 4. The course equips students with practical skills of planning and implementation of chemical laboratory classes and using problem-based and inquiry-based methods at various stages of education. (The Technic of Didactic Experiment) 5. Using selected elements of information and communication technology in science education (ICT in Chemistry Education).
Basics of Chemistry for Teachers	Lecture 30 h	Discussion of the basic and also the most problematic chemical content covered by the core curriculum for the third and fourth educational level. (Basics of Chemistry for Teachers).

An integral part of the preparation for teaching a given subject is teaching and pedagogical practice (internship). According to the Regulation of the Minister of National Education of 12 March 2009 on the detailed qualification requirements for teachers (Journal of Laws No. 50, Item 400), students gaining the right to teach chemistry are required to: "... *undergo positively assessed teaching practice of not less than 150 hours...;*

Organization of Practice

The method of the organization of teaching practice in Poland is very diverse. (Maciejowska & Maciejowski 2004). At the Faculty of Chemistry of the Jagiellonian University, the 150 hours of teaching practice is divided into 3 parts (Figure 1).

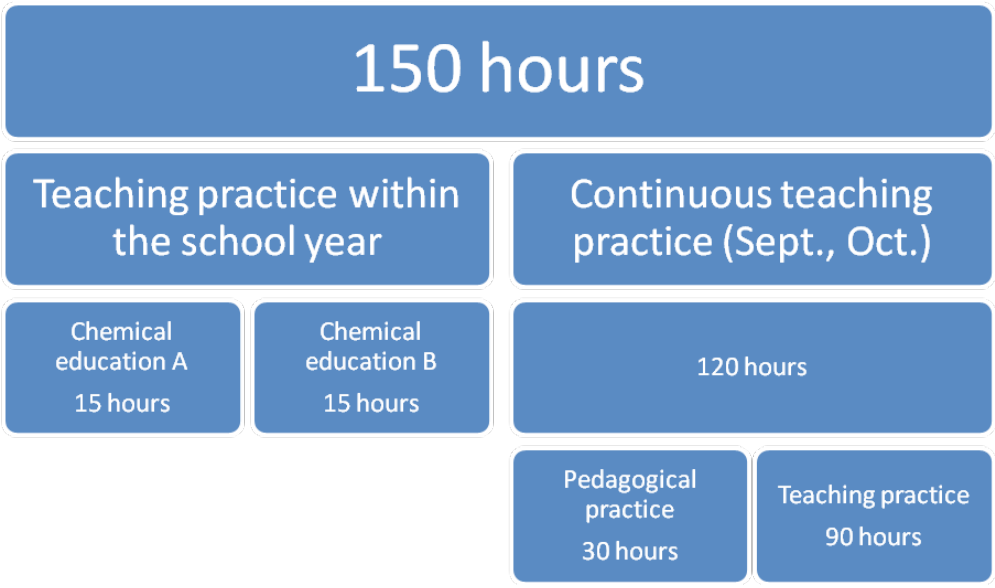

Figure 1: Structure of teaching practice implemented at the JU Faculty of Chemistry.

The teaching practice being a part of Chemical Education A takes place in lower secondary schools in Krakow, while Chemical Education B practice is carried out in upper secondary schools, by the groups of 8 persons, under the supervision of a university teacher. Initially, university students (pre-service teachers) observe the classes conducted by a school teacher, they become familiar with the operation and typical features of a given school and its classes, and watch the school pupils. Then each of the students conducts one lesson independently and observes the lessons conducted by other pre-service teachers doing the practice. The preparation process for those lessons is controlled mainly by the school teacher, but the students, if necessary, may consult their university teacher too. The lessons conducted are thoroughly discussed in the pre-service teachers' group based on the observation sheets, in which their comments on: class organization, contact/relation with pupils, time management, substantive (chemistry) correctness, teaching aids/materials used and individual parts of the lesson are noted. The students draw attention to the elements that they particularly liked or were innovative and worth imitating. During the discussion, the pre-service teacher conducting a given lesson should refer to the lesson objectives, provide his/her colleagues with information on whether s/he managed to achieve them, explain why s/he chose such a way of conducting the lessons, as well as answer other teachers' possible questions.

As arises from the observations of the school teachers (Kluz & Orska 2003) who for many years were carers of student's practices of the Jagiellonian University, such a method of preparation for the teaching profession allows the pre-service teachers

to become acquainted with the reality of school work, shows them how important and time-consuming it is to prepare for each lesson, and how great the impact of the pupils' knowledge is on the way of conducting lessons. In 2008, there was a survey on school lessons carried out among the students of the Faculty of Chemistry (Kluz et al., 2008). 54.5% of the students surveyed felt that the number of hours dedicated to school lessons should be increased, despite the fact that everyone acknowledged that conducting the first lesson is very stressful. The students were also asked which items of the lesson preparation process and conducting the first lesson they found the most difficult. It turned out that the most difficult elements include:

a. Explaining the material properly, but at the level of lower secondary school pupils (48% of the students);
b. Developing the lesson outline (42% of the students);
c. Managing stress before the start of the lesson (40% of the students).

The continuous teaching practice is accomplished by the pre-service teachers in a lower or upper secondary school of their choice, in the location of their university – in this case in Krakow or in the teachers' city of residence. 120 hours of practice is divided into 30 hours of pedagogical practice and 90 hours of teaching practice (Figure 1).

At the Faculty of Chemistry of the University of Wroclaw (Chmieleńska & Mrozińska, 2006) a survey was conducted, comparing the continuous teaching practice and teaching practice within the school year. Most of the respondents claimed the equivalence of those two forms of practice, but some thought the continuous practice is the one that better prepares for the profession, as it allows pre-service teachers to gain more diverse experience and analyse and improve the mistakes made, as well as it delivers a greater sense of independence.

Objectives of Pedagogical and Teaching Practice and their Implementation

Internship (practice) programmes in general are supposed to facilitate 'the transition from student status in a profession's pre-service education programme to the status of a full- fledged member of the profession' (Ratsoy et al. 1987, p. 8).

First, pre-service teachers are educated to assume roles of leadership and service in classroom practice, and second, pre-service teachers are taught to become reflective practitioners.

In accordance with the requirements of the Ministry, after the completion of education preparing for the teaching profession, a graduate should be practically prepared to carry out professional tasks (concerning teaching, education and care) that arise from the teacher profession (Regulation of the Minister of Science and Higher Education dated 17 January 2012 on the standards of education in preparation for the teaching profession). This general learning outcome and the detailed outcomes listed in the Regulation in question make it possible to specify the purpose of school teaching practice. The above mentioned practical skills needed to exercise the teaching profession include: planning and controlling educational processes, shaping the creative attitude and evaluating one's own actions.

Shaping the educational, care and teaching competence takes place mainly by (Regulation of the Minister of National Education of 12 March 2009 on the detailed qualification requirements for teachers):

1. Becoming familiar with the characteristic features of the school where the teaching practice is carried out, in particular becoming acquainted with its educational and care tasks, its way of functioning, organization of work, employees, participants of the teaching and learning processes and the documentation developed;
2. Observing the activity of individual pupils and entire class teams, teacher-pupil interaction, actions taken by the teacher - practice supervisor and lessons conducted by him/her, including the methods and forms of work and educational resources applied, activities undertaken by the practice supervisor to ensure safety and discipline in the group;
3. Cooperating with the practice supervisor;
4. Performing the duties of a teacher, in particular: planning lessons, formulating objectives, selecting methods and forms of work and educational resources, organizing and conducting lessons based on independently developed outlines, diagnosing the level of school pupils' knowledge and skills, taking up educational activities following the problems that emerge;
5. Analysing and interpreting the observed or experienced situations and educational events.

G. Miłkowska (2012) also notes that the main objectives of the practice include developing university students' self-reliance, improving their interpersonal skills and introducing students to the labour market by establishing direct contact with educational institutions, including: making the students aware of the employment opportunities and creating an opportunity for them to present their qualifications to a potential employer.

During the practice, a clash of theoretical knowledge, delivered through various activities at the university, and specific situations in the school environment takes place. Research conducted at the Jan Kochanowski University (Zbróg 2012) evidenced that 85% of the students surveyed admit that they have difficulty using the psycho-pedagogical knowledge gained at the university in practice. It turns out that students, when conducting lessons, focus primarily on the delivery of content – implementation of the tasks planned, one by one. They do not pay attention to the pupils, they do not respond to their questions, they do not take into account the personal knowledge resources, they are stressed, "attached" to the teacher's desk and to the lesson outline prepared. The author of the study believes one of the reasons of that is the fact that the vast majority of practice supervisors instructed the pre-service teachers about what they need to do, what they have to achieve, what notes to make, what conclusions should be reached. Also J. Zbróg (2012) states that "mastering the mechanical behaviour, poor reflection on one's own behaviour or the lack of the interpretation of their decisions' outcomes results in the fact that pre-service teachers do not perform well in the practical area of school reality." It is not meant here that the practice supervisor should not provide any help to the pre-service teachers, as comprehensive assistance is appreciated by a number of them (Chmieleńska and Mrozińska, 2006), but it is about allowing those teachers to implement their own ideas and then discuss the lessons content thoroughly.

According to legal regulations, universities are required to provide their students with the opportunities for the implementation of educational, care and teaching tasks, as well as the care and supervision of a tutor, together with developing rules of practice and ensuring opportunities for discussing the practice during classes at the university.

At various universities in Poland, there are high requirements concerning the manner of gaining credits for teaching practice. The terms and conditions of pedagogical practice at the Jagiellonian University have been developed by the Teacher Training Centre, and they include for example:

- meetings with the school authorities, guidance counsellor, representatives of the pupil board,
- becoming familiar with key school documents,
- participating in the meeting of the teaching staff and meeting with parents,
- observing the pupils in the school during after-school activities,
- preparing and conducting a form period.

The tasks aim at making pre-service teachers familiar with the method of school functioning in terms of implementing the care and educational tasks.

The 90 hours of teaching practice, the terms and conditions of which have been developed by the employees of the Department of Chemical Education of the Jagiellonian University, include the following elements:

- observing the lessons conducted by the teacher- practice supervisor (35 h),
- preparing and conducting lessons independently (25 lessons),
- performing the tasks related to the teaching process and suggested by the practice supervisor.

An important element of the practice is visits to the classes conducted by the teacher – practice supervisor, including the observation and following discussion of the activities/ actions of both the teacher and the pupils. For the observation to deliver the desired results, i.e. "learning from the models," a student needs to carefully watch the lesson, ask the teacher questions and be willing to reflect. In order to motivate the pre-service teachers to perform those activities, and at the same time indicate what is worth special attention, the students are given a list of topics/questions to reflect upon the completion of all the observations planned.

The list includes the following topics:

a) Health and safety rules during chemistry lessons – which elements of the rules are paid special attention to by the teacher; how the health and safety rules were introduced in the classroom;
b) Description of a chemical experiment performed during one chemistry lesson – objective, who performed it (demonstration or experiment carried out by the pupils), who delivered observations and conclusions;
c) Teaching methods used by the teacher, together with the objectives for which they were used – up to three observed lessons;
d) Ways to motivate pupils to work – based on the example of at least two lessons;
e) Group work: educational purpose of work and whether it has been achieved; the manner of dividing pupils into groups, etc. – based on 2 examples;
f) Individualization of learning – individual approach to weak and talented pupils – was it feasible, and if so, how; what the school's proposals for both groups of pupils are;

g) Two interesting examples of recapitulation;
h) Difficult situations in the classroom – how the teacher responded, and what the result was. Did s/he manage to deal with the problem in such a way?;
i) The method for introducing new material: from detail to general or vice versa – two lessons;
j) The characteristics of a selected class – group of pupils, number of girls and boys, how they work, are they interested in the subject, etc.) based on the lessons observed and conducted;
k) The ways, methods used by the teacher in order to explain/bring pupils closer to abstract concepts most effectively (e.g. through analogies) – for selected 3 concepts difficult to pupils;
l) Homework – an example of interesting homework and the method of checking homework by the teacher;
m) Teaching aids used by the teacher (other than chalk/pen and board) – for three lessons;
n) Two examples of reference to knowledge in other subjects;
o) What you particularly liked, what was interesting to you, what encouraged you to work in school?

Written reports with the answers to these questions and tasks are submitted by the pre-service teachers at the end of their practice. In order to be in compliance with the Regulation (Regulation of the Minister of National Education of 12 March 2009 on the detailed qualification requirements for teachers) stipulating that "universities provide an opportunity to discuss the practice during classes at the university", at the JU Faculty of Chemistry a web framework (e-learning environment) of continuous practice has been introduced. In September and early October, students are grouped again into 8 teams working on a distance learning platform, on which they exchange experience concerning their school work, ask for and provide advice and guidance, and discuss online pedagogical and teaching issues interesting to them. Students are required to be active on the course forum on the PEGAZ platform at least once a week. Answers to the questions, comments, suggestions for solutions to problems can be offered by group-mates and a university teacher who conducted theoretical classes with the group in the previous semester. In addition, the entire first class in the next academic year (3 contact hours) is dedicated to the discussion of the recently completed continuous students' teaching practice. Students have an opportunity to share school work experience with other students, but above all it is time to attempt to explain possible differences between the theory discussed during university classes and school reality. The educational platform enabling the communication between students and school practice supervisors is also used at the Faculty of Chemistry of the Adam Mickiewicz University (Jagodziński & Wolski 2012). Students, in addition to communicating on the platform, may use a variety of teaching materials as well as training sessions, during which issues related to the teaching profession are discussed.

Practice Supervisor and His Role

For many teachers, their desire to become a teacher and the pedagogy they adopt are often embedded in the story of their life and therefore it is important to situate the practice of teaching in the broader context of the vision of the role of the teacher. Personal accounts of teacher development offers a chance to invite engagement and reflection and

can identify patterns of thought characteristic of teachers' work within particular contexts (Bullough & Baughman, 1996).

One needs to agree with Grażyna Miłkowska (2012), the author of the studies quoted above, that the role of a pedagogical practice supervisor is of vital importance. It is important for university students to be supervised by a teacher who ensures that the main objectives of the teaching practice are achieved. Beata Walkiewicz (2008) believes that "practice supervisors delegated by schools should introduce the university students to the school and non-school pupils' environment, help them in planning their own professional development." Research conducted at the Faculty of Chemistry of the University of Wroclaw (Chmieleńska & Mrozińska, 2006) showed that the majority of the university students surveyed assess positively the cooperation with their school practice supervisor. They especially highly appreciate the opportunity to be offered substantive and methodological consultations, assistance in finding suitable literature and help in the development of lesson outlines. As far as negative aspects are concerned, cursory check of outlines, avoiding discussions on the lessons and the necessity to carry out the lessons in the manner proposed by the supervising teacher have been listed.

University teachers also present certain observations concerning their students' teaching practice. They believe that on the basis of contact with the representatives of the younger generation, pre-service teachers may verify the previously applied methods and gain inspiration to seek changes in the methods of the work used (Wasielewska, 2012), and that the benefits from the cooperation between school and university are also there for the school teachers, as the debates during the preparation stage and discussions of the students' lessons allow them to avoid routine, so dangerous in the teaching profession (Kluz & Orska, 2003).

Already at the beginning of the nineteenth century, the vital role of the so-called "School of Practice" was understood, in which outstanding experienced teachers supported the process of educating future teachers – their successors. The ideas and goals of such schools have evolved over the centuries (Dereń, 2011). In 2014, the Polish Ministry of National Education planned to designate in each voivodeship schools that are successful in teaching specific subjects, in which future teachers would be supposed to conduct their teaching practice and learn practical professional skills (Programme of the Ministry of National Education entitled "School of Practice"). It would be worthwhile "for students to have a nominated or certified teacher appointed as their practice supervisor, i.e. an experienced one and yet open to changes, introducing his or her own innovations in teaching, and especially fond of his or her work" (Maciejowska & Maciejowski, 2004). However, with the current massification of higher education and a large number of students gaining a teaching certificate (for example, at the Faculty of Chemistry it is 40-50 people per year), it is not possible for all students to find a place for teaching practice in those selected, tested educational institutions. Therefore educators, showing great trust towards local schools, agree with the necessity of their students' teaching practice taking part outside the school of practice. Is this trust justified?

Lesson Structure

According to W. Okoń (1968), "a lesson is, in this sense, the basic form of teaching, that a teacher is to achieve precisely during the lesson and thanks to the lesson the basic teaching and educational objectives." Such elements include, among other things, a

recapitulation treated as a summary and arrangement of new knowledge and linking it to the one gained before. This part of the lesson (Bereźnicki, 2015) is to gather together and organize the knowledge acquired by the pupils, draw their attention to relevant matters and facilitate their memorizing (plenary). Henryk Mrowiec (2002) draws attention to the fact that the teacher, dealing with a large group of pupils, highly diverse, must strive to achieve and consolidate unified knowledge in the group. Also Kupisiewicz (2005) claims that regardless of the type of a lesson, each should proceed according to a plan including the final part, i.e. the revision and consolidation of the new material. In the recently promoted by the EU strategy for teaching science through inquiry (IBSE), a typical element is the lesson structure described by the 5E acronym. In this scheme, after the period of pupils' engagement (Engage), research conduct (Explore), introducing scientific explanations of the measured or observed phenomena (Explain), two final elements are present – development (Extend) and assessment (Evaluate) – understood as a recapitulation (Bernard et al. 2012). In the course of the evaluation phase, teacher poses more complex and open-ended questions, and encourages the pupils to self-assess their own learning.

The last lesson element is homework and its discussion. Homework is one of the forms of education. A number of voices arguing against homework have recently appeared. Especially Internet forums are full of discussions on that topic. Educationalist Katarzyna Wajszczyk, when asked in her online blog whether homework is legal, replies that "The Act on the Education System does not regulate the rules on compulsory homework. However, the issue may be regulated by internal rules of a school." The opponents of homework emphasize that children and young people are exhausted, that they spend a lot of time doing homework, and often the level of difficulty of the tasks does not allow the pupils to do homework independently. There are also situations when homework assignments are put off until late evening and done mechanically without any reflection or, unfortunately, thoughtlessly copied from other pupils during school breaks (Bereźnicki, 2015). Meanwhile, for homework to be meaningful, it must be done independently, or possibly as group work if it is intended to be done so. According to Bereźnicki (2015), independent performance of homework is fostered by individualisation and differentiation of tasks. The same author proposes to use the term "home learning" instead of "homework" as more appropriate to this form of learning, closely linked to the lesson. Wincenty Okoń (2003) also stresses that homework fulfils its role only if it is an integral part of the lesson, and at the same time it corresponds to the interests of young people and does not exceed their physical and mental capabilities.

Although homework is not used in all countries, in the literature on the teaching profession a significant role of home learning in stimulating multilateral pupils' activity is emphasized (Bereźnicki, 2015). According to Czesław Kupisiewicz (2000), the following functions of homework can be listed, with appropriate examples:

1. Consolidating, deepening or expanding the knowledge acquired in the classroom, as well as practicing skills, including the use of knowledge in practice.
2. Preparation for the next lesson:

a) mastering the knowledge related to the new lesson (the so-called flipped learning)
b) revising the material, e.g. in other school subjects or from the earlier stages of education,
c) collecting teaching aids, e.g. newspaper cuttings, information from the Internet, interviews with parents, everyday life substances.

3. Developing certain habits, for example systematic work, independence of thought and action.
4. Developing skills that reach beyond the scope of school subjects, e.g. critical assessment of information, creative thinking, modelling.
5. Stimulating and developing new interests.

Flipped learning strategies (cf. http://flippedlearning.org/wp-content/uploads/2016/07/FLIP_handout_FNL_Web.pdf) have been discussed extensively in Poland by Stanisław Dylak (2013), who provides the following definition: "The essence of flipped learning is active organization and assimilation of knowledge by pupils before the lesson in the process of independent gathering of information, as well as through the search for references in their own prior knowledge associated with the topic that is to be finally discussed in the classroom." Therefore, homework assigned to pupils before the lesson forces them to independently collect and organize information, or perform mental processing of the knowledge mastered.

To fulfil its functions, homework needs to meet several conditions:

1. Pupils know the purpose of homework and accept the necessity of its completion; It is primarily the teacher who, when planning homework, should consider its purpose. It will prevent assigning pupils homework without any specific objective, or even senseless, consisting e.g. in rewriting certain parts of the handbook content (Poźniczek, 2002);
2. The tasks should be diverse, and their number and degree of difficulty should be adapted to the pupils' capabilities (Bereźnicki, 2015);
   Teachers frequently assign the same task to the whole class, which may lead to a situation in which for some people it will be too difficult, but for pupils interested in the subject it may be too easy. The individualization of teaching, which is currently emphasized significantly, should be present as well in this aspect of education. But how to differentiate homework? This question is answered by Bereźnicki (2015), saying that "able pupils may perform additional tasks, more difficult ones, while others, with certain gaps in their knowledge or skills, should receive tasks the performance of which would enable them to address those shortcomings." In addition to the tasks of different levels of difficulty, homework assignments may be differentiated in terms of quality and form.
3. Homework should be systematically controlled (Bereźnicki, 2015; Okoń, 2003). Systematic control of homework makes pupils learn to work systematically, but at the same time it provides the teacher with valuable information about the pupils. Obviously the mode of the control may be different depending on the type of homework. In order for homework to be meaningful, any errors noticed or difficulties reported by the pupils should be explained and discussed.

Methodology of Research

Research Questions

To what extent school reality is compatible with the theory presented during the teaching preparation process? Is school practice different from theory, and if so, in what way?

Research Methods

The answers to the research questions were sought by analyzing university students' reports from their teaching practice and narrative interviews conducted during the first class after the end of the practice.

77 teaching practice reports were analyzed, and they concerned the practice performed in lower and upper secondary schools in the years 2013/2014 and 2014/2015. Twenty six schools were located in Krakow, and the remaining ones were mainly the schools of southern Poland, situated both in large cities and small towns.

Research Results

A. Recapitulation (summary)

The preliminary analysis of students' reports and interviews with university students indicated that the greatest discrepancies between what students read in textbooks on teaching or what they came across while doing university studies and school practice are present in the lessons element referred to as recapitulation. The students' task was to describe, on the basis of class observations, interesting solutions proposed by the teachers in the final phase of the lesson. The descriptions of recapitulation were classified according to the following criteria: *frequency, originality, form/method applied*.

It can be presumed that recapitulation was used often by not more than 50% of the teachers (if we assume that presenting an interesting example may be classified as "good frequency" (Figure 2).

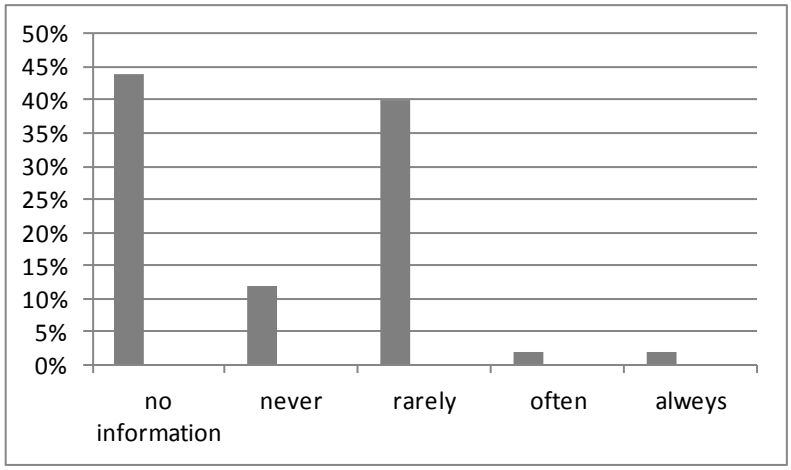

Figure 2: Frequency of recapitulation according to students' observations during their teaching practice in schools.

44% of the students in their written reports did not state how often that element of the lessons was present, providing only an example and the method of the recapitulation execution; 12% claimed that within the 5-week teaching practice they had never seen

any recapitulation; 40% considered recapitulation as a rare element; and only 4% of the students noticed recapitulation on each lesson or frequently. The described examples of recapitulation were divided into four groups defining its form. The most common way to conduct recapitulation was asking questions addressed to the entire class (Figure 3).

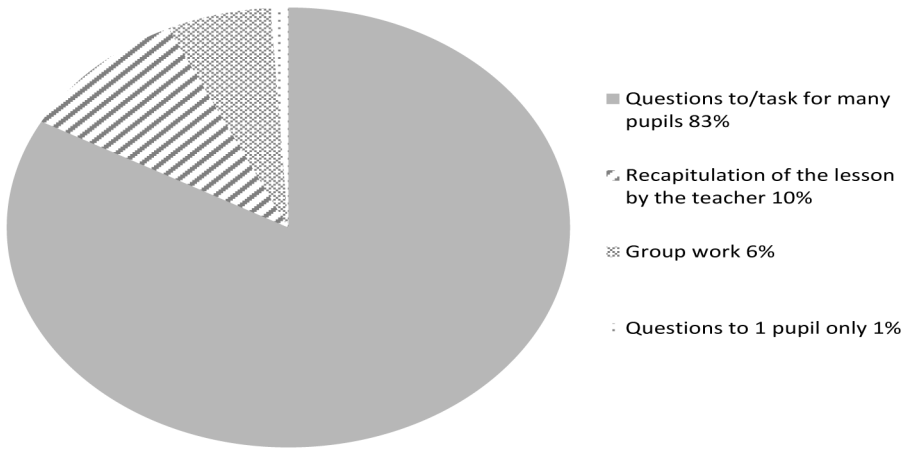

Figure 3: Forms of conducting recapitulation.

The teachers-practice supervisors prefer questions/tasks addressed to all the pupils in the class (83% of examples), choosing the ones who volunteer to provide the answer, or they select pupils themselves. 10% of cases are those in which recapitulation was carried out in the form of a lesson summary done by the teacher. There were also isolated examples of group work and asking individual students questions observed.

The third criterion of the analysis of the students' reports in terms of recapitulation was "originality." The examples of recapitulation provided by the students were classified into three groups according to the following criteria:

a) Typical recapitulation is the one during which questions regarding the material discussed during the lesson are asked;
b) Closed-ended tasks summarizing the lesson, e.g. true or false activities, matching, etc., were assessed as "moderately interesting".
c) Interesting recapitulation is the one in which in addition to revision and organization of the new material references to prior knowledge are made, but at the same time it involves different senses and develops the skills the scope of which goes beyond the school subject itself, as well as includes the elements of IBSE.

80% of the students who mentioned the existence of some form of recapitulation, i.e. of the group of 68 students, provided the examples determined as typical recapitulation (Figure 4).

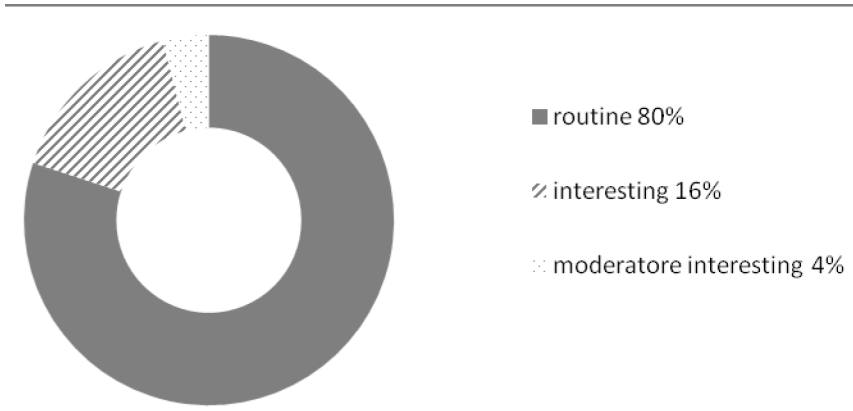

Figure 4: "Originality" of recapitulation.

The interesting examples of recapitulation include: the use of the tasks from the "whiteboard" application, educational games, designing experiments, quizzes or answering the question "How can you use the knowledge acquired during the lesson in practice?".

When discussing the lessons with the pre-service teachers by teaching practice supervisors, the most common reason (according to the reports) for the absence of recapitulation was the "lack of time." According to the school teachers quoted by the university students, during each teaching unit the realization of such a large amount of new material is required that there is no time left for summarizing the lesson. There were also critical statements present:

"... The teachers I talked to (both biology and chemistry teachers) claimed that additional work in groups (as recapitulation) at the end of the lesson disperse upper secondary school students and it does not deliver the desired results, just the opposite."
"... recapitulation, if any, was in the form of a lecture – the teacher repeated what had been already said during the lesson.... Unfortunately, such a way of doing recapitulation was not interesting at all to the pupils. "

However, it is worth quoting the statement of a student who, although she did not observe that lesson element in the teacher's work, tried to carry out recapitulation herself: *"Unfortunately, almost none of the observed lessons ended with recapitulation. During the lessons I conducted, I usually did recapitulation, but it was possible only thanks to the fact that the pupils did not have to note too much, because I prepared worksheets for them."*

B. Homework

The discussion on the advisability of assigning homework is not limited to Poland only (Lohmann, 2014). The issue of how those two views of homework supporters and opponents are now present in the Polish school was attempted to be discussed on the basis of the observations made by the students preparing to become teachers during their pedagogical practice.
77 students' reports were analyzed in order to answer the following questions:

A. How often homework is assigned?
B. Is homework compulsory?
C. What is its function?

A. Frequency of assigning homework.
In all the cases examined, homework was assigned very often, almost after each lesson.

B. The obligation to do homework.
All homework assigned was compulsory for all pupils. In 5 schools, in addition to the obligatory homework, there was also additional homework for volunteers. The schools were lower secondary ones, and the homework involved performing a simple experiment, finding interesting experiments for a chemical show, preparing a paper on any topic from the field of chemistry and watching the *Ten to One* quiz show. No additional homework was observed in upper secondary schools of general education.

C. Functions of homework.
Most frequently, the suggested homework originated from tasks set, workbooks or external exam sheets. In the Polish publishing market, there are in fact available numerous publications of such type, well designed and containing a variety of tasks and activities, and thus their use by teachers seems justified. Such homework surely serves to consolidate and extend the knowledge acquired during the lesson, use the knowledge in practice, as well as makes pupils accustomed to systematic work and develops specific habits. Other functions of homework were observed by the students to a much lesser extent. It should be remembered, however, that the teaching practice took place at the beginning of the school year, so we must not draw the conclusion that there would be no more interesting homework, fulfilling a variety of functions, present within the entire school year.

The following elements were listed by the students as interesting homework:

- ✓ Experiments related to density + making a video;
- ✓ A project on a selected drug or addiction;
- ✓ Finding an article about interesting applications;
- ✓ Discussing a magazine article;
- ✓ Finding information about the ozone hole.

No examples of homework serving the purpose of mastering the knowledge related to the new lesson, i.e. the so-called flipped learning, have been observed.

Conclusions

Preparing the students for the teaching profession requires a combination of theory and practice and, as demonstrated by the studies presented above, between the two elements there may be significant discrepancies. It thus seems advisable to present examples of good practice during classes conducted at universities, but also to prepare students for the clash with the school reality, explain the discrepancies and try to find their roots. Out of the lesson elements examined, recapitulation is the most neglected one. The situation reduces the effectiveness of the teaching process. The lack of ordering and summarizing the material discussed, emphasizing the most important points, make it difficult for the pupils to acquire the material in an operational form, ready to use when solving problems. On the other hand, the lack of direct evaluation of learning outcomes deprives the teachers

of an opportunity to clarify the elements that indeed turn out to be the most difficult for pupils, leaving him or her with an illusory impression that "we have gone through the material."

Based on the students' observations, it seems that in-service teacher training may not only deliver good results, but in fact it is necessary – for updating the knowledge, revising its key elements, and counteracting professional burnout and routine.

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