

## EXPERT AND NOVICE TEACHERS' APPROACHES TO PROBLEMATIC PEDAGOGICAL CLASSROOM SITUATIONS

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### Abstract

Earlier psychology and pedagogy studies pointed out that there are important differences between novices' and expertise's problem solving process also in the field of teacher profession. A Hungarian research team carried out a national survey in 2014 involving beginning and experienced teachers.

Using stratified random sampling 120 beginner and 102 experienced teachers were selected to take part in this survey according to four subgroups from preschool to secondary school teachers and representing every region of the country and different type of schools. Beside more topics the survey examined teachers' opinion about initial teacher training concerning problematic classroom situation and their attitude towards pedagogical problems.

This paper examines three hypotheses of the survey, working with questionnaire method:

1. Experienced teachers look at problematic pedagogical situation from a deeper view while beginning teachers have less sophisticated strategies to solve a pedagogical problem.

2. Preservice teacher training does not give enough support for future teachers to handle class situations.

3. Novice teachers require support for handling classroom problems while experts do not.

The study highlights the most important results of the survey comparing novice and experienced teachers' reaction to the same classroom situation. Furthermore the aim of this study is to give suggestion for the development of preservice teacher training focusing on the improvement of prospective teachers' problem solving skill.

**Keywords:** experienced and novice teacher, classroom management, problem solving, initial teacher, training

## 1. INTRODUCTION

A pilot project of supporting beginning teachers carried out by mentors took place in Hungary between 2013 December and 2014 July. The project was followed by an extensive Hungarian survey. The purpose of this article is to present those parts of the survey that deal with the approaches of classroom problem from different angles. The study focuses two angles: novice - expert and teacher's subgroups according to the educational levels. The intention of the article is to point out the main tendencies of each view and make conclusion for further development of initial teacher training.

## 2. DIFFERENCES BETWEEN EXPERTS AND NOVICES

### 2.1 . General differences

Because the theoretical roots of teacher expertise are in the cognitive psychology it is well-worth to have quick look at the most important statements of research into novice vs. expert teachers.

The differences were examined mainly domain-specifically from the 1970's and 1980's years. Researches on different field like chess playing (see De Groot, 1966, pp. 19-50; Chase and Simon, 1973, pp. 55-61; Simon and Gilmartin 1973, pp. 29-46), physics (Chi, Glaser and Rees 1983, pp. 7-76; Larkin, Dermot, Simon and Simon 1980, pp. 1335-1342) and other subject have supported and completed each other's findings. By the conclusion of these findings the main characters of experts were described. The main attributes of experts are the following (Bransford, Brown, Cocking 2000):

- Experts are able to structure information by underlying functions (called chunking).
- Experts can perceive meaningful patterns of information's.

- Experts categorize problems according their deep structures while novices focus on their superficial features.
- Experts have a high level of content knowledge in a specific domain.
- Experts are able to organize their knowledge around key principles and concepts.
- Experts are able to retrieve efficiently suitable knowledge for the current situation.
- Experts spend more time on understanding and analysing problems but then solve it more quickly while novices start to solve problems immediately.
- Experts have forward thinking process (to the goal) while novices use backward thinking process (from the goal).
- Experts are more flexible during approaching a problem.
- Experts have strong connection between metacognition and self-regulation process.
  - Experts are generating more complex and sophisticated representation of problem situation.

## 2.2 . Differences between novice and experienced teachers

Similarly the above mentioned findings of psychology, researches pointed out that there are significant differences between expert and novice teachers in their cognition process and behaving. However there is huge amount of difference in how researchers understand the word “expert” when they do their study with teachers. First of all it needs to be clear who count expert among teachers. Therefore I found important to define the word of *expert* within teaching profession. The tendency is that researchers pick up one or more of the following categories when speaking about teacher expertise (Palmer, Stough, Burdenski and Gonzales 2005, pp. 13-25):

- a) years of experience (in most studies the number of years of experience is usually between 5 and 10 years),
- b) social recognition or nomination (teacher certification),
- c) professional or social group membership (status as a cooperating or mentor teacher),
- d) performance-based criteria (student achievement such as knowledge and love of subject).

Because of the wide variety in teacher’s attribution that count, in this study I am going to use “experienced” and “expert” in the same way.

Teachers’ work is divided into two main parts: an interactive phase (during lesson) and planning phase with evaluating the last lesson (see Jackson 1968; Sutcliffe and Whitfield 1979; Clark and Peterson 1986).

In the preparation phase there are considerable difference between novices and experts. These differences manifest especially in planning flexibility and in type of planning (Calderhead 1984, Housner and Griffey 1985, pp. 45-53; Carter and Doyle,1987; Strahan, 1989 pp. 53-67; Borko and Livingstone 1989, pp. 473-498; Westerman 1991, pp. 292-305; Kagan and Tippins 1992, pp. 149-158; Brown and McIntyre 1992, Rabinowitz and Craven 2003, pp. 235–247; Hogen and Rabinowitz 2009 pp. 153-169; Tsui 2009 pp. 22-41).

*The main differences in planning flexibility:*

- novices less flexible and tend to follow closely the official curricula without having an eye on the special needs of the group, students,
- experienced teachers have a wide variety of well-established routines of situations that they can use during the planning process,
- during planning expert teachers pay attention to more specific and current information of learning environments concerning students skill, former knowledge, the features and interest of the group etc.

*The main differences in the types of planning:*

- novices are usually plan for short-term (for a couple of lessons) while experienced teachers prefer long-term planning,
- in short-term planning beginners have more detailed but less flexible lesson plan.

Connecting to interactive phase of teachers’ work former researches also pointed out some differences between beginner and expert. These were the attention of classroom situation and reaction to the unusual events. The differences manifest themselves in the teacher’s knowledge, perception, reaction, and recalling of classroom events. (Doyle 1977, pp. 51-55; Peterson and Comeaux’s 1987, pp. 319-331; Borko and Livingstone 1989, pp. 473-498; Cartes, Cushing, Sabers, Stein, and Berliner 1988, pp. 147-157; Sabers, Chusing and Berliner 1991, pp. 63-88; Corno 1981, pp. 360-366; Westerman 1991, pp. 292-305; Tsui 2009, pp. 22-41).

*Differences in teachers’ knowledge:*

- expert teachers possess more knowledge about learning and teaching process, learning environment etc.,
- experts have well-integrated and organized knowledge of subject, curriculum, students, methods etc.

*Differences in teachers' perception of classroom events:*

- the perception of experienced teachers is more analytical and interpretive than beginner's,
- experts are able to select between the information and pick up the important ones,
- expert teachers see classroom as a moving organization of work-related actions of students.

*Differences in teachers' recalling of classroom events:*

- expert teachers are able to explain classroom events by recognizing familiar patterns while beginning teachers try to notice the phenomenones,
- experts recall on students behaviour and understanding while novices focus more on their own behaviour,
- novice recall the physical appearance of students rather than their work-related actions,
- experienced have more and greater recall of classroom events after the lesson than novices.

*Differences in teachers' reaction to classroom events:*

- experts have more complex, connected and easy accessed schemata about classroom events, students' behaviour, curriculum etc.
- experienced teachers are much more prepared to differ from the lesson plan and improvise according to the current circumstances and needs.

## 2.3 . The integration of content knowledge and problem solving skill

There is a table below to summarize the special integration of content knowledge and problem solving skill in teaching profession.

<b>Cognitive aspects</b>	<b>Expert' characteristic in general</b>	<b>Expert teacher's characteristic</b>
<b>Content knowledge</b>	<i>High level of content knowledge</i>	<i>High level of general pedagogical knowledge, subject matter knowledge, pedagogical content knowledge, curriculum knowledge</i>
<b>Organization of knowledge</b>	<i>Well-organized content knowledge and "conditionalized" knowledge</i>	<i>Well-integrated and richly elaborates knowledge about subject, methods, classroom mechanism, students' behaviour, curriculum etc.</i>
<b>Problem perception</b>	<i>Pattern recognition: Structuring information by underlying functions Categorizing problems according their deep structures</i>	<i>Selecting between the information of classroom event Complex, connected, well-established and easy accessed schemata for classroom events Explaining classroom events by recognizing familiar patterns</i>
<b>Problem representation</b>	<i>Complex and sophisticated representation of problem situation</i>	<i>Seeing classroom as an organization of work-related actions of students</i>
<b>Problem solving strategy</b>	<i>Forward thinking process Spending more time on understanding and analysing problem</i>	<i>Having more analytical and interpretive perception of classroom events</i>
<b>Self-regulation</b>	<i>Having strong connection between metacognition and self-regulation process</i>	<i>Being engaged in long-term planning Making own judgement (by evaluating and reflecting previous lessons) while planning</i>
<b>Attitude</b>	<i>High level of flexibility approaching novel problem</i>	<i>Being prepared and having the flexibility to differ from the lesson plan and improvise according to the current needs</i>

Table 1

*Expert characteristic overview in general and in the teaching profession*

## 3. A HUNGARIAN SURVEY OF TEACHERS' PROBLEM SOLVING APPROACHES

### 3.1. Sampling

The aim of this study was to uncover the hiatus in the field of beginning's problem solving process in order to make suggestion for further development of preservice teacher training.

The participant selection was made by stratified random sampling method according to four subgroups of teachers: preschool teachers (dealing with 3-6 years old children), low primary teachers (dealing with 7-10 years old pupils), upper primary teachers (dealing with 11-14 years old students) and secondary school teachers (dealing with 14-18 years old students). As a result of the selection 120 beginning and 102 experienced teachers took part in this survey representing all parts of the country and different types of

schools as well as subjects.

	<b>Preschool teachers</b>	<b>Low primary teachers</b>	<b>Upper primary teachers</b>	<b>Secondary teachers</b>	<b>Overall</b>
<b>Novices</b>	29	27	28	36	120
<b>Experts</b>	19	12	33	38	102

Table 2  
 Repartition of the sample by subgroups

In this research **beginning (or novice) teachers** mean that *they have 0-2 years teaching experience*. **Experienced (expert) teachers** in this survey *have minimum 5 years' teaching experience* and they have a role in common as all of them are mentor teachers too.

### 3.2 . Hypotheses and methods

The hypotheses were strongly connected these questions we would like to answer:

- How much and in what way do teachers' reactions to a problematic pedagogical situation differ from each other?
- Is there any tendency of teachers' reactions according to the level of education that teachers give to the same pedagogical situation?
- Do novices teacher require more support for handling classroom situation?
- How did novice teachers find the preparation of initial teacher training concerning classroom problems?

The three main hypotheses were:

1. Experienced teachers look at problematic pedagogical situation from a deeper view while beginning teachers have less sophisticated strategies strategy to solve a pedagogical problem.
2. Preservice teacher training does not give enough support for future teachers to handle class situations.
3. Novice teachers require support for handling classroom problems while experts do not.

The hypotheses were measured by questionnaire method. There were two kind of question. Unfinished sentences were used examining given reactions for a situation. The measure of the agreement with certain statement was examined by Likert scales. The analysis of the result had two main aspects. One examination aspect is according to the teaching experience (expert or novice teacher) and the other is according to the teaching level (preschool, low primary, upper primary, secondary school teacher).

### 3.3 . Results

- 3.3.1** Hypotheses 1.: Experienced teachers look at problematic pedagogical situation from a deeper view while beginner teachers have less sophisticated strategies strategy to solve a pedagogical problem.

This hypothesis was examined by giving every participant the same situation and asking for their reaction. In the questionnaire teachers were asked to finish two sentences:

*"In that case when despite my repeating request a student doesn't seem willing to do the exercise I... (table 3.1)". "If this solution doesn't work I... (table 3.2)"*

After categorization of the given answers the following groups were formed:

- *Reasoning*: those answers were put in this category where teacher looking for information, causes, explanation of the situation.
- *Helpful*: this category contains those supporting answer where teachers try to have positive effect on their student by gesture, eye contact or helpful behaviour like doing the exercise together with the student.
- *Threatening*: it contains every kind of threats from verbal to behavioural (giving bad mark etc.).
- *Motivating*: those answers count here when the teacher tries a new way to motivate the passive student to start working such as offering other task, change the form of work (preferring group or pair work).
- *Ignoring*: this category contains those answers where teachers let the passive student out of attention either in order to pay more attention to the others or in order to give time to the student and see what happen.
- *Calling for help*: reaction when teacher decided to involve other adults (college, parent, psychologist etc).
- *Depending situation*: when teachers answers were that "it depends on the situation".

The summarized answers of the two unfinished sentences can be seen below.

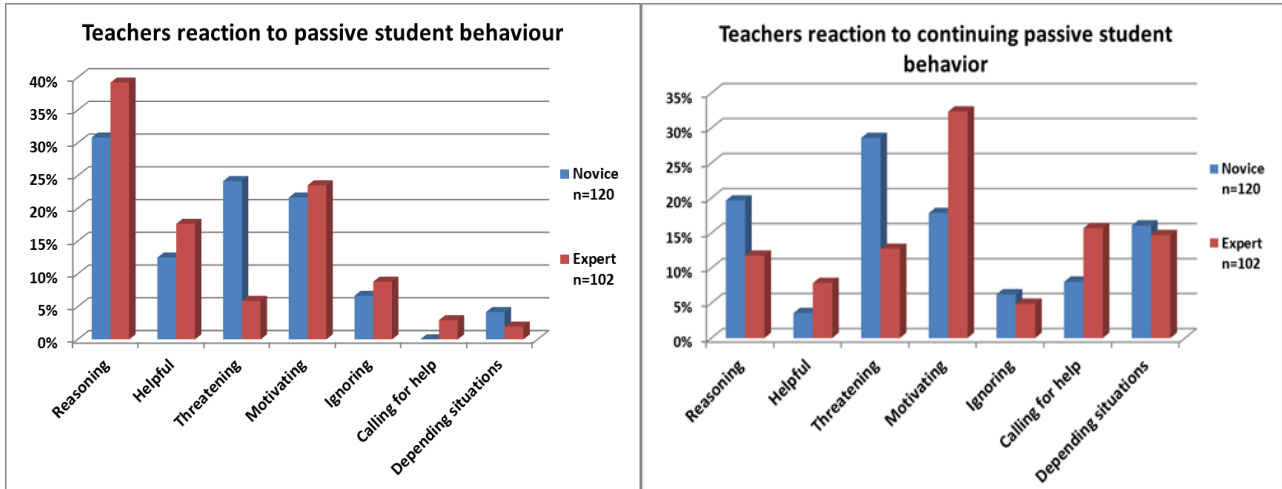


Table 3.1 and 3.2

*“In that case when despite my repeating request a student doesn’t seem willing to do the exercise I...” on the left ; “If this solution doesn’t work I...” on the right.*

Looking at the table 3.1 it can be agreed that the most typical reaction category in both novice and expert group contained reasoning answers (novice 31%, expert 39%). There is a difference of the second and the third place between beginning and experienced ones. At novices the second place is tied between threatening and motivating reaction as they got nearly the same percent (24%, 22%). However at experts, motivating (24%) and other helpful reaction (18%) got the second and the third place. The most prominent and interesting distinction between novices and experts is the measure of threatening answers: 24% of novices chose threatening as a solution of this situation while only 6% of experts think the same. (I am going to touch the possible causes of it while analysing table 4.). Finding another tool of motivation as a possible solution of the situation got nearly the same percent in each group (novice 22%, expert 24%).

Looking at the table 3.2 we can see that answering ongoing passive behaviour threatening become the most dominant attitude among novices (29%). In the contrast, new motivation form is the mostly preferred tool by experts (32%). Comparing the percent of threatening and motivating reaction we can see the same measure of percent in the groups but the other way around. It can be also claimed that experts more tend to involve other person (college, parent or specialist) to find the explanation of the unusual behaviour as this reaction had the second place (16%) before threatening (13%) and reasoning (12%) in this turn.

Comparing table 3.1 and 3.2 some tendency can be drawn. The percent of the threatening answer increased in both group however at novices the percent of the threatening answer reach 1/3 of all reaction in the second turn. At experts it is about 10%, however it is double measure than in the first round. The high rates of reasoning (20%) in the second turn indicate that most novice start this reaction if other tools (motivating, threatening) don’t work or the former attribution was false. However experts behave the other way around. First they try to find the cause of the given situation and then look for solution depending on the result of their attributing. The decreasing result of reasoning (from 39% to 12%) shows that they are more successful in attributing.

Because of the huge differences of threatening answer between the two groups it is well worth to pick out only those answers from table 3.1 that consist of threatening reactions. It can give us the possibility to have a look at the division according to the four subgroups (preschool, law primary, upper primary, secondary).

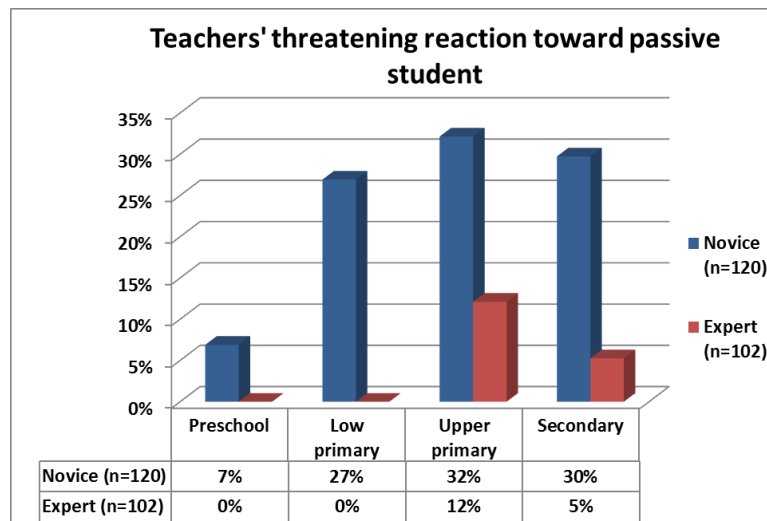


Table 4  
 The division of threatening answers from Table 2.1

It should be noticed that threatening reaction is much more popular among novice school teachers than among experts. Except preschool teacher the negative given reaction was around 30% among novices on each educational level. According to the teaching experience the biggest distinction is in low primary level where 27% of novices used threatening as a solution tool, as opposed to experts, who didn't give this reaction at all. It can be seen as well that this kind of negative reaction is avoided by novice and expert preschool (kindergarten) teachers. It is normal on this level because directed activity is only a possibility but kids are not forced to take part in. The highest percent of threatening answer was on the upper primary level in each group.

Searching the cause of the pattern showed in table 4 we can draw some parallel with the expert-novice establishments that were detailed in the second part of the paper.

The cause of the considerably higher rate of threatening reaction among beginning teacher can be:

- Beginning teachers are novice problem solver and tend more to start with the solution instead of reasoning.
- Experts tend much more to change motivation tools according to the student's need.
- Beginning teachers notice rather the surface feature of the problem and react on this surface level.
- Beginning teachers concentrate rather on the behaviour of the passive student than the causes of it.
- Novices have a lack of schemas in certain situation.
- Novices have a low level of content knowledge especially about student behaviour, classroom management, problem solving strategies.

However, there also can be more explanation behind the high rate, such as: they may want to establish their directing role and save their prestige. It is also worth considering that the given situation of the questionnaire may mean different situation for the two groups. As far as beginning teachers are concerned they have just started to meet experiences of classroom events. That means most events are new for them so they need to establish they rule first. Experienced teachers have already formed their rules for the main types of possible events and also have an eye to prevent the disturbing situations. When despite the preventions a student shows unexpected behaviour experienced teachers are entitled to say that it could have a hidden reason.

As the tables (table 3.1, table 3.2) show, the findings supported the first hypothesis. Expert teachers try more to look at a pedagogical problem from inside by searching the causes and missing information. Beginning teachers either because of their poor content knowledge and strategy or because of their simple perception, tend to solve pedagogic problem on a surface level.

### 3.3.2 Hypotheses 2.: Preservice teacher training does not give enough support for future teachers to handle class situations.

In this part of the questionnaire teachers were asked to indicate their agreement of this given statement presented to them: "Preservice teacher training provides enough preparation for handling pedagogical problems." The participants could choose between four categories: *not at all*, *slightly*, *significantly*, *absolutely*.

The statement was asked only from beginners, because they were so close to the end of the training. The result can be seen below (table 5) in categorization by subgroups.

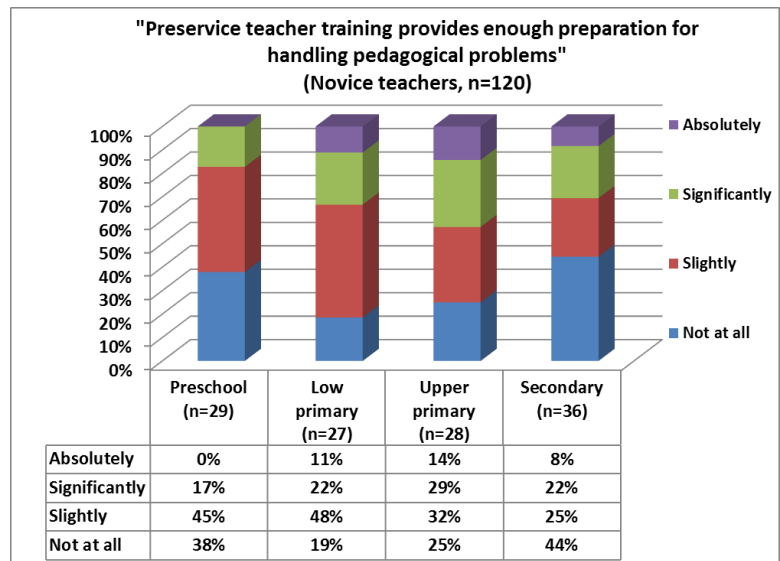


Table 5.  
 How do you agree with the statement?(Novice teachers)

Around 70% of novice teachers found that preservice teacher training had provided a poor preparation for classroom problems.

It is considerable that according to 44% of secondary school teachers' opinion, initial teacher training didn't give any preparation for handling pedagogical problems. Only 30% of this subgroup is satisfied. On preschool level the measure of dissatisfaction is over 80%, the highest of any. The most satisfied group of the four is the upper primary teachers, however, 60% of them still do not agree with the statement. All in all, it can be established that the findings definitely supported our hypothesis.

**3.3.3 Hypothesis 3.:** Novice teachers require support for handling classroom problems while experts do not.

In this part, teachers were asked to indicate their agreement with the following statement presented to them: "I need support for handling pedagogical problems" The participants could also choose between four categories: *not at all*, *slightly*, *significantly*, *absolutely*. The statement was asked beginning and experienced teachers too. The result of the given answers is shown in table 6.1 and 6.2.

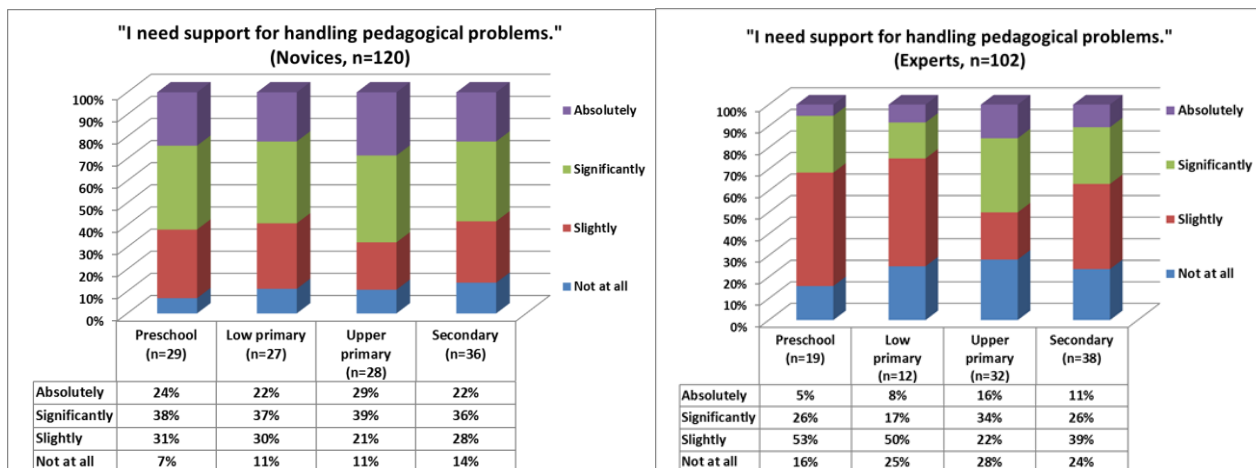


Table 6.1 and 6.2  
 How do you agree with the statement?  
 (Novice and experienced teachers)

The pattern of the novices' answers (table 6.1) is quite similar in every subgroup. Only less than 10% of novices don't think about receiving support. The cause can be either that they can do it by themselves or

that they usually don't encounter a pedagogical problem. Over 20% of them find that help is definitely needed, as they significantly or absolutely agreed with the statement, but on upper primary level this ratio reaches 30%.

The table of experts (table 6.2) shows that around 30% of them still call for support. The most support is demanded by upper primary teachers, however, this group also showed the highest rate of the "not at all" category. The least need for help is required on low primary level. It is worth mentioning that this is also the group that uses threatening tools the least often (table 4).

Comparing the result of the tables (tables 6.1 and 6.2) shows that around 60% of novices definitely require some considerable measure of support for handling pedagogical problems, much more than experts do (around 30%). It is surprising that there is not much difference in the given answers between novices and experts on the upper primary level.

Taking a glimpse at the previous tables (table 4 and 5), it can be seen that the upper primary group is everywhere a bit out of the pattern. They (experts and novices also) gave the highest rates of threatening reactions. The novice teachers of this group are the most satisfied with the initial teacher training (table 5). Upper primary teachers need the most help (around 50%) among experts (table 6.2).

Summarizing these results we can claim that the hypothesis was supported. Nevertheless, it should be noted that beside novices, some of the experts also require help for pedagogic problems.

#### **4. CONCLUSION FOR FURTHER DEVELOPMENT OF PRESERVICE TEACHER TRAINING**

Analysing the results of the survey, our study came to important conclusions detailed below. The findings of the study supported our hypotheses.

The first was that beginning teachers tend to react to the surface level of the classroom problems. Novices don't have much practical experience, so they have poor schemata systems. It follows that their pattern recognition is not really working. Also, they don't have enough experience, confidence and flexibility to change their original plan according to the current situation. Therefore their solution technique focused strongly their goal: to stop disturbing events, and not to the reason of the disturbing events. That is why their decision usually stopped on a surface level that affects only the symptoms of the situation. Because of the symptom solution, the problem repeats itself again and again. In this case, they would need long-term planning, using problem solving models that they are not prepared for. This relates to our second justified hypothesis: according to their opinion, teacher candidates would need more preparing to handle problems in preservice teacher training. Our third hypothesis supported by the results follow from the previous two: beginning teachers require a considerable measure of support concerning pedagogical problems.

As it was shown in the first part of the paper, to become an expert teacher one needs to possess high level of content knowledge as well as a high level of general problem solving skill. In the teaching profession, content knowledge is widely diversified. Summarising Shulman (1987) categories it includes:

- general pedagogical knowledge (general psychology and pedagogy knowledge such as learning and teaching, learning environment, classroom management, student assessment etc.)
- subject matter knowledge
- pedagogical content knowledge (teachers' interpretations and transformations of subject-matter knowledge for facilitating students' learning)
- curriculum knowledge (planning, curriculum development, evaluation of curriculum)

Beside content knowledge, general problem solving skill is also an important part of expert teachers' competencies. Problem solving skill is the link between knowledge and action, declarative and procedural knowledge, and thus, it has an important knowledge transfer role. It includes divergent (creative or lateral) and convergent (critical) thinking processes, as well as systems thinking (De Bono 1966; Treffinger, D.J. and Isaksen, S.G 2004). It is strongly connected to our cognitive and metacognitive skills (perception and representation of the problem, reasoning, gathering information, analysing, creating solutions, decision making, planning, reflecting and evaluating), as cognitive scientists pointed out (Eysenck, M. and Keane M. T 2010).

As we analyse the result of the study, we can make an assumption that problem solving is a key element of teachers' thinking in both the interactive and the planning phase (Calderhead 1993). Because of this significant role of the problem solving skill, more attention should be paid to it during preservice teacher training.

In summary, the authors provide some suggestions for improving preservice teacher training. In order to prepare handling pedagogic problems, preservice training should develop the candidates' problem solving skill by

- case-based learning,



- forming mental structures of problem solving
- giving techniques for metacognition of problem solving process
- examining classroom situations with complex approaches.

The author's future study will elaborate on some models and techniques and how they can be used in teacher training courses.

## 5. ACKNOWLEDGEMENT

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