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Teacher – Lecturer, or Supporting tutor? Do and How do Teachers Check their Students' Initial Knowledge?

Introduction

The teaching profession is one of the oldest professions in the history of human culture and civilization (Ascenzi, Patrizi, 2016; SEIP, 1992; KAPP, 1983; Nodzyńska, 2012a–2012d; Bojarski). It has a special symbolism and rank. Theorists and practitioners of various scientific disciplines have been interested in the person of the teacher since the beginning (Savina, 2018). Teacher qualifications, competences, and personality traits have a decisive impact on the didactic and educational achievements of students, the effectiveness of contemporary school activities, as well as the quality of education (Goset Poblete, Navarrete Ponce, 2017; Anders, Kunter, Brunner, 2010). The teacher's role is often invaluable and his responsibility underestimated, because it is the teacher who shapes the minds of subsequent generations of students.

Background

We live in a time when change is the only constant, and learning and acquiring new skills throughout life is crucial at all levels. Therefore, the role of the teacher is evolving, because – in contrast to dying professions – in the 21st century, the teacher will be needed in a new, intense, and constantly redefining role. In connection with these changes, eSchoolNews asked its readers the question on the desired qualifications of the 21st century teacher. The most frequent voices were that: the teacher stopped being an "actor on the stage" and started to act as a supporting tutor (Kowalczuk, 2011). To change from the role of a teacher-lecturer to the role of a supporting tutor one needs to change the approach to education. From teacher-centered education, i.e. transmission of knowledge, one should move to student-centered education, i.e. pedagogical constructivism. In this case, we assume that the student's knowledge arises as a result of his activity, is constructed in his mind and the acquisition of knowledge is a process that takes place in interaction with the educational environment. Therefore, the teacher cannot pass on theoretical concepts to the child by explaining them, even clear and very accurate, even if he illustrates them with specific examples. For, contrary to popular belief, effective teaching is not about the teacher giving ready knowledge, and the student is to learn it, remember

it, and then recreate it. The learner should discover knowledge as much as possible. For knowledge is not only facts and information, but also the ability to put them into practice.

The schematic plan of such a constructivist lesson includes 5 stages:

1. organizational activities, discussion of the topic of the lesson, discussion of the objectives of the lesson,
2. orientation and recognition of colloquial knowledge of students, disclosure of initial ideas or knowledge, ideas and experiences of the student and possible misconceptions,
3. restructuring or reconstruction of knowledge,
4. ability to apply new knowledge, new information, skills and apply them in various situations and contexts,
5. summary of the lesson, the student noticing changes in his/her previous knowledge and comparing it with previous knowledge.

The most important from the point of view of creating new knowledge are points 3 and 4. However, it is difficult to build new knowledge without knowing the initial knowledge of students including their misconceptions. The teacher, knowing his students, should be able to use their previous knowledge and experience in building meaning, the relationship between the known and the unknown. That is why point 2 is so important – the teacher's acquaintance with the students' initial knowledge. Equally important is the last element – checking the correctness of the acquired content.

Research

It was decided to investigate how secondary school teachers in the Małopolskie voivodeship are able to use the students' previous knowledge and experience in building meaning and connections between the known and the unknown.

Main hypothesis: High school teachers are able to use the previous knowledge and experience of students in the process of constructing new knowledge.

Specific hypotheses: The ability to use students' previous knowledge and experience depends on:

1. teacher's seniority (a teacher's longer seniority should positively affect his ability to check students' initial knowledge),
2. teacher's level of education (a higher level of teacher's education should positively affect his ability to check students' initial knowledge),
3. applied methods/techniques of checking knowledge (modern methods/techniques of checking knowledge should allow the teacher to check the initial knowledge of students more accurately),
4. length of time for checking previous knowledge (longer time for checking knowledge should allow the teacher to check the students' initial knowledge more accurately).

To be able to use students' knowledge, one must first study it. Therefore, the initial indicators of the ability to use students' initial knowledge were considered the

length of time to check the initial knowledge, selection of tools, and own teachers' opinions.

Results and discussion

The study involved 110 high school teachers from the Małopolska region who previously participated in training in the use of new communication technologies (ICT) in school education. The research was carried out about 6 months after the teachers completed the ICT course, so they had time for practical use of newly learned ICT techniques in their schools. In the sample examined, 78.2% were women and 21.8% were men. This corresponds to the average statistical gender distribution in the teacher population since in total women constitute about 80% of teachers of general subjects in schools for children and youth ("Raport o stanie edukacji – Liczą się nauczyciele", Instytut Badań Edukacyjnych). Teachers were of different age (cf. Table 1) – most teachers were in the group from 40 to 50 years old, which also corresponds to statistical data because according to "Raport o stanie edukacji – Liczą się nauczyciele" the average age of a teacher in Poland in 2013 was 42 years. The seniority of the teaching profession (Table 2) was strongly correlated with the age of teachers (the correlation coefficient rho Shapiro is r = 0.91). There was no correlation between gender in age (r = 0.03) and gender and seniority (r = -0.01).

Table 1. The age of the teachers surveyed (own study)

Age of teachers	up to 30 years	between 30 and 35	between 35 and 40	between 40 and 45	between 45 and 50	between 50 and 55	more than 55 years
percent	10%	12.7%	11.8%	22.7%	22.7%	14.5%	5.5%

Table 2. Teachers' seniority (own study)

Teachers' seniority	up to 5 years	between 5 and 10	between 10 and 15	between 15 and 20	between 20 and 25	between 25 and 30	more than 30 years
percent	16.4%	10.0%	11.8%	21.8%	21.8%	10.9%	0%

All surveyed teachers had an appropriate subject and pedagogical education (completed master's studies), in addition 19.1% completed post-graduate studies and 9.1% had a doctoral degree. There was no correlation between the education of teachers and their sex (r = 0.00), age (r = 0.09) or seniority (r = -0.00).

Teachers worked in various size centers: in the countryside (11.8%), in a small city – up to 20,000 inhabitants (19.1%), in a medium city – from 20,000 to 100,000 inhabitants (41.8%), a large city over 100,000 residents (27.3%). Also, no correlation was found between the place of residence of teachers and their education (r = 0.12), gender (r = 0.08), age (r = -0.15) or seniority (r = -0.12).

The survey questionnaire contained 22 questions, of which six were related to methods, techniques and tools that teachers use to study students' initial knowledge.

The first question concerned the frequency of individual methods to check students' initial knowledge. Teachers had 5 methods to check the initial knowledge:

– two traditional:

- The rhetorical question "What do you already know about this topic?",
- The question "What do you already know about this topic?" along with the discussion,

– two modern (for which ICT can be used, these methods were learned by teachers during training on the use of ICT in education):
- Quiz/test from new material,
- Concept maps,

– and tasks aimed at capturing students' misconceptions.

The teachers' task was to indicate how often they use a given method: they had 4 answers to choose from: never, sporadically (less than 25% of lessons), sometimes (for about 25–45% of lessons), every second lesson (for 50% of lessons), very often (over 50% of lessons). The collected results are presented in Table 3.

Table 3. Percentage of teachers' answers to question 1: *Please indicate how often you use individual elements of researching the students' initial knowledge in teaching* (own study)

	The rhetorical question "What do you already know about this topic?"	**The question "What do you already know about this topic?" and discussion**	**Quiz/test at the beginning of the lesson from NEW material**	**Tasks to check students' misconceptions**	**Concept maps**
never	13	*1*	**65**	21	29
sporadically (less than 25% of lessons)	26	*15*	26	**47**	43
sometimes (for about 25–45% of lessons)	20	26	*15*	24	**28**
every second lesson (for 50% of lessons)	27	**46**	*4*	13	8
very often (over 50% of lessons)	**24**	22	*0*	5	2

The collected data shows that the most commonly used method of checking the initial knowledge of students by teachers is the question "What do you already know about this topic?" along with the discussion – every second lesson or more often is used by up to 68% of teachers surveyed. The rhetorical question "What do you already know about this subject?" is often used – as much as 51% use this absolutely ineffective solution (see Figure 1). It may be worrying that as many as 65% of the respondents do not check the initial knowledge of students using quizzes/tests, despite the fact that in the earlier ICT course for teachers they were presented with these techniques. Equally, 21% and 29% of teachers never examine student misconceptions or use concept maps to check students' initial knowledge.

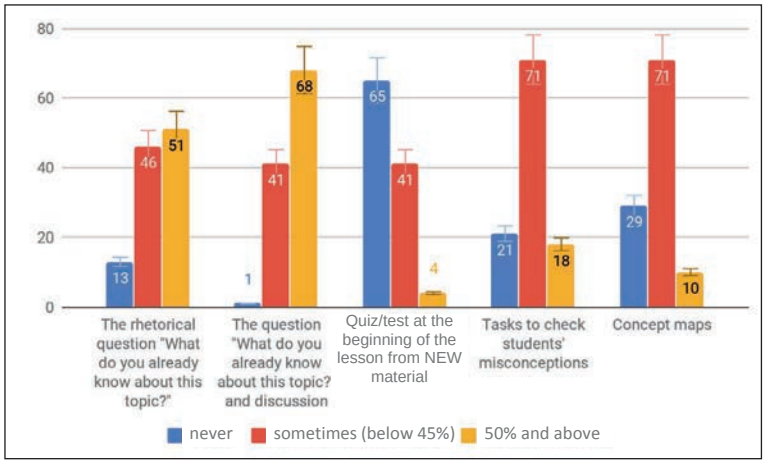

Fig. 1. Answers grouped into three categories (own study)

The second question was an open question and was: Do you use any other methods to check the students' initial knowledge? (if the answer is YES, please specify which ones). 99 teachers chose the answer NO to this question. The remaining 11 people listed different methods (some people two or more). Four people mentioned exercises, three problem questions, one discussion, games, educational project, exchange of information. 10 teachers also mentioned quiz – although it was mentioned in the first question.

It can therefore be concluded that teachers do not use a variety of methods to check students' initial knowledge. And the main source of their knowledge of what information their students have is the traditional question, "What do you already know about it?"

It was decided to check whether there is a correlation between gender and the way of checking initial knowledge. Only in the case of the question "What do you already know about this topic?" along with the discussion a weak correlation was found ($r = 0.20$), women more often than men chose this way of checking knowledge. It was also decided to check whether there is a correlation between the age/seniority of the teacher's work and the method of checking the students' initial knowledge. Only in the case of the question "What do you already know about this topic?" along with the discussion, a weak correlation was found ($r = -0.28$; $r = 0.21$), older teachers and teachers with longer experience less frequently than younger chose this method of checking knowledge. Correlations between the teacher's level of education and the method of checking initial knowledge were also examined. Weak correlation ($r = 0.28$) occurs when using the Quiz/test from new material, i.e. the more educated the teacher, the more often he uses this method to check the students' initial knowledge. No correlation was found between the size of the city in which the teacher teaches and the way of checking initial knowledge.

Therefore, it can be said that women more often than men supplement the question "What do you already know about this topic?" with a discussion, while older

teachers and teachers with longer experience less frequently than younger choose this type of knowledge checking. And the more educated the teacher, the more often he uses the Quiz/test from new material as a check of the students' initial knowledge.

The third question was about the time teachers spend checking their students' initial knowledge. The vast majority of teachers (48.2%) spend 3 to 6 minutes to check their initial knowledge. Fewer teachers (29.1%) spend 1 to 3 minutes to check their initial knowledge, and 19.1% spend a little more time checking their students' initial knowledge – from 7 to 10 minutes. Only 2.7% of teachers check students' initial knowledge for more than 10 minutes and 0.9% of teachers do not check this knowledge at all.

There was no correlation between the time to check the students' initial knowledge when using the Rhetorical question "What do you already know about this topic?", Questions "What do you already know about this topic?" – along with the discussion and use of Concept Maps. There was a weak correlation (r = 0.28) between the time of checking the students' initial knowledge when using Tasks aimed at capturing students' misconceptions – this means that teachers who use this method more often also check the students' initial knowledge longer. An even stronger correlation (r = 0.45) can be observed in the time of checking the initial knowledge of students and the use of Quiz/test from a new material – the more often teachers use this method to check students' initial knowledge, the longer it takes to check their knowledge. There was no correlation between the amount of time spent on checking knowledge and gender (r = 0.01), age (r = -0.03), seniority (r = -0.16), size of the city (r = 0.16). Only a weak correlation (r = 0.26) was found between the amount of time spent on checking knowledge and the level of teacher's education – teachers with a higher degree of education longer check the students' initial knowledge.

It seems that the time spent checking the students' initial knowledge is insufficient, especially in the context of how to check this knowledge (3–6 minutes in a well-designed initial test may be sufficient, while a 3–6 minute discussion will not give the teacher a complete picture of his students' knowledge). This is confirmed by the teachers 'answers to the **fourth question**: Do you think that after checking the students' initial knowledge, you are well versed in what your students already know and can? A five-point Likert scale was used, with answers: 1 No – it seems to me that I have only random information about the knowledge of individual students, and 5 – Yes, I am sure that I know perfectly well what my students know and can. The answers of the teachers are shown in the chart below (Fig. 2). It can be said that almost half (44.5%) of teachers declare that on average they know what their students know. 25.5% of teachers are not oriented (summed up answers 1 and 2) and only 30% of teachers are familiar with the knowledge already possessed by their students (summed up answers 4 and 5). It seems that this level of recognition of the students' initial knowledge is absolutely insufficient to build new knowledge on it. When we do not know the basics of students' knowledge but we also do not know what misconceptions they have in their minds, it is difficult for us to construct the building of knowledge on such uncertain and perhaps erroneous foundations.

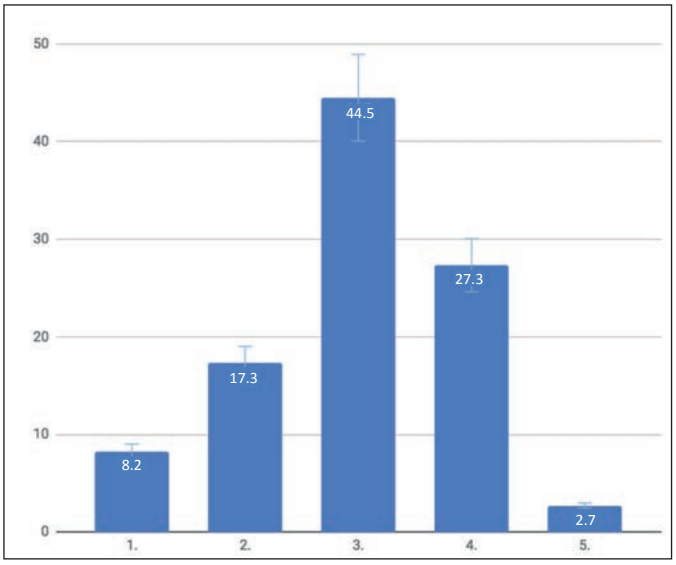

Fig. 2. Teachers' answers to the fourth question: Do you think that after checking the students' initial knowledge, you are well versed in what your students already know and can? 1 – No – it seems to me that I only have random information about the knowledge of individual students 5 – Yes, I'm sure I know perfectly well what my students know and can (own study).

No correlation was found between the teachers' belief in the knowledge of their students' knowledge and the methods used to check this knowledge (correlation coefficients for individual methods in Table 4).

Table 4. Correlation coefficients for individual methods of checking the initial knowledge of students (own study)

Thetorical question „What do you already know about this topic?"	The question „What do you already know about this topic?" and discussion	Tests at the beginning of the lesson (from NEW material)	Tasks aimed at capturing students' misconceptions	Concept maps
0.15	0.10	0.11	0.15	-0.06

Interestingly, only a weak correlation (0.02) was found between the time allocated to checking the students' initial knowledge and the teacher's belief that he actually knows what his students already know. So, not always, the teacher checking the students' initial knowledge for a longer period of time made him more convinced that he knew the facts. There was also no correlation between the teachers 'belief in the knowledge of their students' knowledge and gender, age, seniority as a teacher, education level, or city size (correlation coefficients for individual methods in Table 5).

Table 5. Correlation coefficients between teachers 'beliefs in their students' knowledge and gender, age, seniority as a teacher, level of education or size of the city (own study)

sex	age (in years)	work experience as a teacher	level of education	size of the city
-0.09	-0.17	-0.17	-0.08	0.00

The fifth question was about teacher motivation and it was: What motivates you to check the students' initial knowledge in the teaching process. Teachers could choose any number of answers from 9 or enter their own. The answers used in the questionnaire come from previous consultations with teachers.

Table 6. Teachers' answers to the fifth question. What motivates you to check the students' initial knowledge in the teaching process (own study)

I need to know what students already know	70.9%
students are activated during classes	63.6%
motivates students to learn the subject	38.2%
increases interest in the subject	37.3%
makes students absorb information faster	36.4%
I think that this is an essential element of the lesson	35.5%
positively orientates students to the subject being taught	29.1%
I need to know their misconception	13.6%
ensures peace during classes	5.5%
other	2.4%

In most cases (over 70%), teachers declared that they needed to know what their students already knew. However, this declaration contradicts the answer to question 4 – because, after checking the students 'initial knowledge, most teachers still do not know their students' initial knowledge (25.5%) or are not sure of their knowledge on this topic (44.5%). Many teachers (over 63%) point to the activating role of knowledge checking – however, in the light of previous findings, this point can also be challenged. Teachers check the students' initial knowledge briefly (about 3–6 minutes), usually by asking them only general questions, so it is hard to expect them to activate the majority of students. Many teachers say that checking initial knowledge motivates students, increases their interest in the subject, or positively orientates students to a given subject – however, no relevant evidence has been found in the literature on the subject.

The sixth question was about the teachers' lack of motivation to check the students' initial knowledge and it was: What doesn't motivate you to check the students' initial knowledge in the teaching process? Also in this case, the answers used in the questionnaire come from previous consultations with teachers. The most common answer of teachers to this question was the statement "it takes too much time" – as many as 58% of the surveyed teachers answered. However, as statistical calculations showed, there is no correlation ($r = -0.05$) between the teachers' opinion

regarding the time of checking the knowledge and the actual time of the teacher checking the student's initial knowledge (compare Fig. 3).

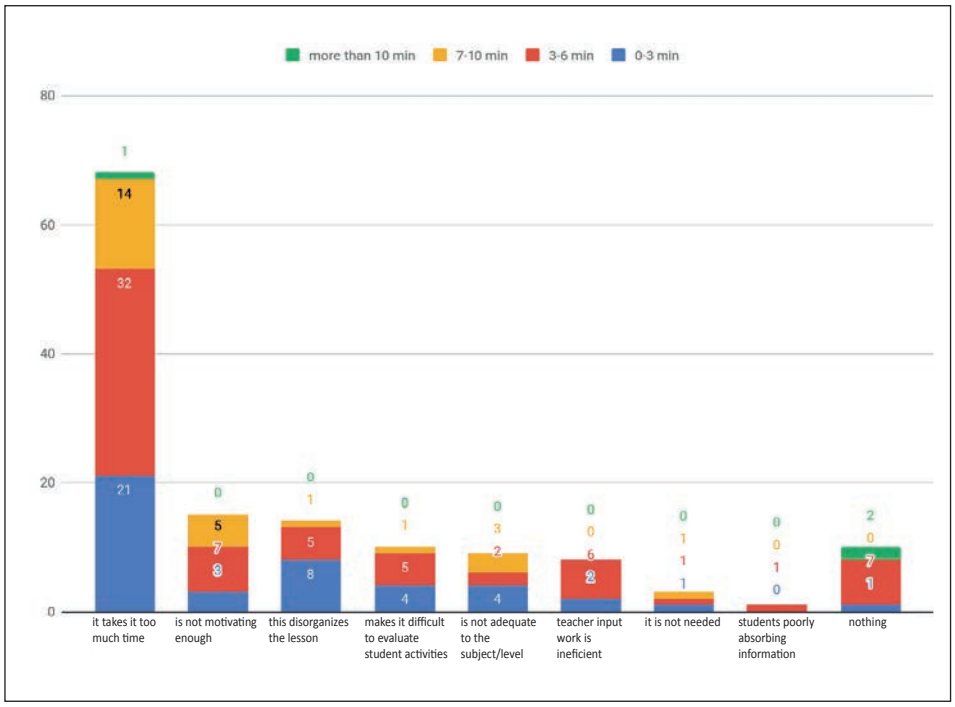

Fig. 3. Teachers' answers to question six: What doesn't motivates you to check the students' initial knowledge in the teaching process? – the chart also indicates the time declared by teachers to check the initial knowledge (own study)

Summary

The research conducted by secondary school teachers in the Małopolskie Voivodeship shows that in most cases teachers are not able to use the previous knowledge and experience of students in the process of constructing new knowledge. Lack of this skill is not strongly correlated with the length of work, degree of education, methods or techniques of checking knowledge or the length of this process. Although the teachers declare that they know how important this element of the lesson is, however, the time devoted to checking the initial knowledge and the methods of checking it mean that even the teachers themselves believe that their activities are insufficient. It seems, therefore, that despite the 21st century, most teachers still play the role of a traditional teacher, reluctantly moving away from the transmission teaching model. In order to change this trend, it would be necessary to introduce constructivist teaching not only to the curriculum of future teachers but as a permanent method of teaching at universities.

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Teacher – Lecturer, or Supporting tutor? Do and How do Teachers Check their Students' Initial Knowledge?

Abstract

Colloquial and initial knowledge that students have is the foundation on which the teacher builds a further building of knowledge. Therefore, before starting to teach, the teacher must know what is the scope of knowledge of his students and whether their knowledge does not contain misconceptions.

The article presents the results of research on over 100 high school teachers from the Małopolska voivodeship. It was examined whether and how teachers check the students' initial knowledge. It was checked whether the teacher's education, seniority, age, and gender have an impact on the methods used to check the students' initial knowledge. It was also examined whether the time of checking initial knowledge by teachers was sufficient.

Keywords: common and initial knowledge; constructivist teaching

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