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How Kindergarten Teachers Assess Their Own Professional Competencies

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Abstract: One of the requirements of Education 4.0 is that students and practitioners should be involved in the creation of the content of study plans. Therefore, in the present research we focused on identifying the further educational needs of kindergarten teachers. Teachers' educational needs were divided into four dimensions: 'content knowledge', 'diagnostic knowledge', 'didactical knowledge', and 'classroom management knowledge'. In parallel, we discovered how teachers assess the level of their own teaching competencies. Based on the obtained data, we identified that teachers have the greatest need for further education in the dimension of 'diagnostic knowledge' and that the need for their further education in this dimension did not depend on the length of practice. In the other three dimensions, a declining trend in teachers' educational needs has been recorded with an increasing length of practice, declining significantly in three of the four dimensions examined. The study points to the need to create in-service courses for kindergarten teachers to deepen their 'diagnostic knowledge' and thus ensure the sustainability of the quality of pre-school education for children. Teachers' self-assessment of their own teaching competencies corresponds to their educational needs, which supports the relevance of the findings on the further educational needs of kindergarten teachers. This study aimed to obtain relevant data on which the improvement of the higher education of future kindergarten teachers might be based. At the same time, this would allow the analysis and tailoring of the content of professional development courses to the needs of in-service kindergarten teachers.

Keywords: pre-primary education; self-assessment; teacher competencies; educational needs; diagnostic competence

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1. Introduction

The term education appears in almost all program documents on sustainable development at the international and national levels. This is because education and the school as an institution play a leading role in implementing sustainable development in practice [1]. The link between education and sustainability is also indicated by the fact that sustainable development is the basis of Education for Sustainable Development (ESD) and at the same time sustainable development is the ultimate goal of ESD [2]. The ESD is a dynamic concept and a concept that incorporates a new vision of the type of education that aims to enable people of all ages to take responsibility for creating a sustainable future [3–5]. The ESD requires the integration of key concepts of sustainable development into all forms and levels of education; however, studies show that the implementation of sustainable development is very challenging for teachers and requires specific knowledge and skills [6,7]. The necessary specific knowledge and skills can be

acquired by future teachers in higher education. In practice, teachers can expand their knowledge and skills in their in-service training. Therefore, universities can serve as an engine and innovation hub through teaching focused on sustainable development [8]. The relevant role of higher education for the ESD was already formally recognized at the UN conference in 1972 [9]. In higher education, adequate attention needs to be paid to the education of kindergarten teachers, as the quality of pre-school and pre-primary education is considered to be one of the very important factors in sustainable education [10]. According to [11], it is important to develop a "positive emotional relation to nature, diversity, and beauty, and teach them to use and protect them at the same time. Particular educational areas are developed later" (p. 2) in the children of pre-school age. Under the 2030 Agenda (https://sdgs.un.org/2030agenda, accessed on 25 September 2015), every boy and girl should have access to high-quality pre-primary education and the teacher is a decisive factor in the educational process. Therefore, it is natural that within the Agenda 2030, great attention is paid to the teacher and his/her higher education as a means of preparation for the profession and professional development. Within the Agenda 2030, specifically in the UN's Sustainable Development Goal 4, it is recommended to review, analyze and improve the quality of higher education of future teachers and to create conditions for their continuous professional development. These requirements included in Sustainable Development Goal 4 are consistent with many research studies that have highlighted the role of the teacher as one of the critical factors in relation to children's and students' achievement (e.g., [12–14]). The quality of education depends to a large extent on the quality of the teacher [13,15]. In order to be able to effectively fulfill their tasks (educate and develop the child's personality), the teachers must, in addition to professional requirements, also meet high demands on personal character traits. The shortage of qualified teachers is often resolved in schools by employing professionals without pedagogical education.

In order to be able to answer the questions of what (learning settings) and how (approach to competence development), it is necessary to carry out an analysis of what is needed and thus clarify which competencies should be focused on in higher education [1]. One of objectives of this study was to obtain relevant data that will form the basis for improvement of the university education of future kindergarten teachers. At the same time, it will be possible to analyze and revise the content of professional development courses of in-service kindergarten teachers.

2. Review of the Literature

According to Darling-Hammond (Darling-Hammond, 2000) [16], teachers with pedagogical education achieve better educational results than teachers without pedagogical education. For more than fifty years, significant attempts have been made to develop models of teaching quality (e.g., [17,18]), on which an optimal form of training of future teachers for the individual levels of school education would be designed.

Ref. [19] identified four aspects determining the quality of teacher education standards. Properly set standards for the education of future teachers should address the skills that are theoretically sound, considering research results, critically evaluated, and based on real practice [19]. Since the end of the 20th century, emphasis has been placed on the training of future teachers based on competencies (competency-based curriculum) [20]. In 2018, the fifth UNESCO's Education on the Move series, which reviews trends in education today and challenges for tomorrow, *Issues and trends in ESD*, was published [21]. This publication addresses, inter alia, key competences within the ESD. The validity of the competency-based curriculum was also confirmed by [22], who was looking for criteria for quality teaching that would also be empirically provable. From various studies (TIMSS, PISA, SCHOLASTIK, VERA, Münchner Studies) and meta-studies [23–28] he derived ten criteria for quality teaching. One of the criteria is a focus on competencies. The aim of the training of a future teacher is to produce a teacher who has acquired basic professional competencies.

Van Merriënboer and Kirschner [29] define competence as "a combination of complex cognitive and higher abilities, highly integrated knowledge structures, interpersonal and social skills and attitudes and values". The acquired competencies can be applied in different situations and for an unlimited period [29]. There are several models that set standards for competence-oriented education. In Europe there is the model developed by Oser [30] the most widely accepted. Oser described 88 standards (competencies) of quality education that were further divided into 12 groups [30]. During the undergraduate preparation for the profession, the preservice teacher acquires the necessary competencies and develops the necessary self-efficacy. Self-efficacy is defined by Bandura [31] as a person's belief in the ability to succeed in a particular situation. According to Bandura [31], individuals with well-developed self-efficacy may see tasks as a challenge and try to handle them, not to avoid them. Although people can have the same knowledge and skills, they may perform differently, depending on their own ability to use the acquired knowledge and skills [31]. The teachers' belief in their own ability to handle pupils' learning means that the teachers are considering themselves as competent to carry out their profession. The high assessment of the moral role of teachers also suggests that a narrow view of competencies as technical achievements is not adequate [32,33]. According to Bertschy [1], the competencies needed to support sustainable development also concern the sphere of the personal and social behavior of the teacher, i.e., the whole personality of the teacher, not only their professional side. Similarly, Robina-Ramírez et al. [34] point to the fact that the teacher's knowledge alone is not enough to evoke a positive attitude towards nature protection. To achieve this goal, the teacher needs to have developed environmental competencies.

Acceptance of the social nature of competencies means that it is the actor (in the case of education this is a pupil) and his/her expectations who determines and shapes the content of the competencies needed to succeed in specific professional contexts [35,36]. As a result, the social aspect of competences means that today's schools need teachers who can constantly acquire new competencies. In this respect, socio-emotional competencies and reliable classroom management are crucial. Thanks to feedback from teachers, Zaragoza et al. [37] found that teachers have partial competencies, but that further training is required to increase the level of socio-emotional competencies and the competence for reliable classroom management. As stated by Blömeke, Gustafsson, and Shavelson [38], it is necessary to look for new tools for measuring teachers' competencies. At the same time, it is necessary to take into account individual differences in teachers' practice as well as the opportunities to learn offered during the higher education of future teachers of all types of schools [39,40]. When investigating the impact of teacher competencies on the quality of education, competencies acquired during higher education [41] as well as competencies deepened through professional development courses [42] are taken into account.

That is why the Agenda 2030 includes a requirement for the implementation of feedback, where data obtained from teachers in practice would be a basis for improving the training of teachers and their further professional development. The data obtained in this way from teachers in practice would be the basis for the innovation of curricula for the education of future teachers and in-service teacher education. According to Pieters and Voogt [43], the involvement of teachers in the creation of curricula can lead to the effective professional development of teachers in their education. In the Netherlands, for example, efforts have been made to substantially involve teachers in the standard-setting process based on a set of competencies relevant to interpersonal communication, social and moral values, subjects and methods, and organizational skills [44]. In our research, we focused on the self-assessment of the professional competencies of kindergarten teachers (pre-primary education) and their educational needs. For example, when Walan and Rundgren [45] analyzed the educational needs of kindergarten teachers in Sweden they focused on the analysis of their professional competencies. Similarly, we focused on the professional concepts of kindergarten teachers, but from the perspective of teachers' self-assessment.

The very question of competencies, together with the question of the approach to the development of teachers' competencies and the related question of the appropriate setting of learning, is one of the most basic pedagogical problems [46].

Methodologically, our study is based on Oser's professional standards (Figure 1), as well as on the four dimensions of 'content knowledge', 'diagnostic knowledge', 'didactical knowledge', and 'classroom management knowledge' which have been framed as teachers' crucial competencies [47]. In the 'content knowledge' dimension we included the professional competencies needed to choose a suitable topic for children or to justify why a teacher has chosen a topic. This is closely linked to professional self-reflection and the ability to plan one's own professional growth. In the 'diagnostic knowledge' dimension we included competencies that enable the teacher to get to know the child's personality: to find out the child's previous knowledge acquired outside of school, to find out the child's interests, to find out the child's learning style and way of thinking, formulated in his/her own words. Proper knowledge of a child's personality is an important factor that helps the teacher to motivate individual children to learn. As for the 'didactical knowledge', we understood this to represent competencies related to the planning of the teaching process and 'classroom management knowledge' we understood as the competencies related to the management of educational activities in the classroom.

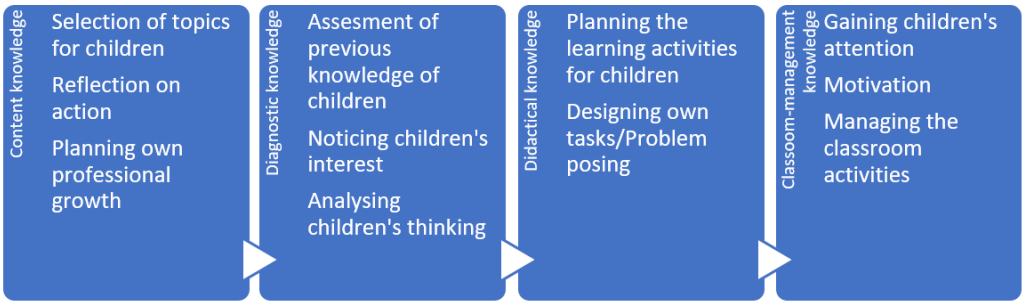

Figure 1. Dimensions of professional standards as defined by Oser (adapted from Baer et al., 2011).

Objective of This Study

The study aimed at identifying the educational needs of kindergarten teachers. Furthermore, we wanted to identify to what extent their educational needs correspond to the level of their perceived teaching competencies. Verloop et al. [48] suggest that certain competencies and related learning needs are perceived equally by all teachers, while others may be perceived differently. Therefore, we also wanted to explore the possible differences in the perceptions of younger and less experienced teachers who had recently completed teacher education programs [49] and older, more experienced teachers who rely on their rich experience. The results of the research can then be implemented in the university training of future kindergarten teachers as well as in the professional development of in-service kindergarten teachers.

While conducting the research, we first looked for whether there were differences between teachers with different lengths of teaching practice in self-assessment regarding their own competencies and educational needs. At the same time, we wanted to identify how the length of pedagogical practice of the participants affected their self-assessment regarding their own competencies and educational needs. Based on this, two research hypotheses were formulated:

Hypothesis 1. *How do the perceived self-assessment and educational needs differ among the four dimensions of professional standards*?

Hypothesis 2. *How do the perceived self-assessment and educational needs differ according to the length of teachers' practice*?

3. Material and Methods

3.1. Research Tool

The broadest and most common definition of a teacher's professional competence is a complex construct that includes professional knowledge, didactic skills and the ability to motivate students [50]. According to Bandura, self-assessment is the belief in one's own ability to organize and perform an activity that leads to given results [51]. Bandura distinguishes two aspects of human belief. On the one hand, it is the perception of one's own abilities (efficacy expectation), and on the other hand, the expectation of a certain result (outcome expectancy). As a research tool, we used a questionnaire of our own construction (Appendix A). The questionnaire was constructed based on the questionnaire used by Dellinger et al. [52], which used the TEBS-Self tool (Teachers' Efficacy Beliefs System-Self Form) to guide the teacher's self-assessment according to predetermined criteria, and actual teacher activities. From the original questionnaire, we selected items relevant to the pedagogical practice of kindergarten teachers. Using the questionnaire, we examined to what extent teachers perceive themselves self-efficacious in different professional competencies (part A) and what topic they would prefer for their professional development (part B). In this way we wanted to reduce the degree of influence of the answers of individual respondents in part B by the answers in part A. The individual items of the questionnaire were designed in order to get a complex picture of the level of teachers' self-assessment regarding the defined professional competencies and their preferences for further education in the above-mentioned dimensions.

We first administered part A of the questionnaire to the respondents and two hours later we administered part B. For each competence, the task of teachers was to use scaling to indicate the extent to which they assess their professional competence, and how they perceive themselves self-efficacious in a certain competence. For each competence, the respondents could mark the answer from a four-point Likert scale: *part A (weak belief—1; mild belief—2; strong belief—3; very strong belief—4); part B (weak need—1; mild need—2; strong need—3; very strong need—4)*. The validity of the test was assessed by three experts in the field (professors in the field of preschool pedagogy). Their comments were subsequently incorporated before the distribution of the questionnaires. The correlations between responses for the self-assessment and items "I have enough experience with ... ", for convergent validation, and "I feel a need for professional development focused on ... ", for discriminant validation, were estimated (Table 1). The correlation between the self-assessment and discriminatory items were not significant and the coefficients were lower than 0.10, that can, according to Campbell and Fiske [53]), suggest an invariance between the constructs.

Table 1. Correlation coefficients for similar and different items.

Dimensions of Professional Standards		Convergent Items		Discriminatory Items	
		Pearson's *R*	*p*	Pearson's *R*	*p*
Self-assessment	Content knowledge	0.167	<0.001	−0.062	0.182
	Diagnostic knowledge	0.233	<0.001	−0.011	0.882
	Didactical knowledge	0.156	<0.001	0.006	0.218
	Classroom management knowledge	0.164	<0.001	−0.055	0.309

The reliability of the test was measured with Cronbach's alpha, and it was 0.95912. Based on this value, we can state the high reliability of the research tool [54].

3.2. Participants

The participants of the research were 561 kindergarten teachers from all over Slovakia. A total of 780 questionnaires was distributed. The number of returned questionnaires was 585, that implies a return rate of the questionnaire of 75%. After the initial analysis, the

final number of questionnaires was adjusted to 561, which represents a 72% return rate. Participants were divided into five groups according to the length of their practice. The first group comprised novice teachers with up to 5 years of experience representing all the participants in the turbulent period when their knowledge and beliefs are shaped [55,56]. The other categories were teachers with 6–10 years of experience, 11–15 years of experience, 16–20 years of experience and over 21 years of experience.

4. Data Analysis

We first verified the validity of the research hypothesis, "Do teachers perceive self-assessment and educational needs differently in individual dimensions?". This means that our aim was to discover whether the differences in the achieved average score in the self-assessment (variable S) and in the educational needs (variable N) of the respondents in each of the four examined dimensions were statistically significant. We expressed the following null hypothesis: H_0, the distributions of the characters S, and N are the same compared to the alternative hypothesis H_1, that they are not the same.

To select an appropriate statistical method to verify the validity of the null hypothesis, it was first necessary to verify whether the assumption of a normal distribution was met. We verified the assumption of a normal distribution for all files by the means of a Shapiro–Wilk test. Since the hypothesis of a normal distribution of data based on the result of the Shapiro–Wilk test was rejected, we used a nonparametric analogy, the Wilcoxon paired signed rank test to verify the validity of the hypothesis H_0. We performed the test in the STATISTICA 9.0 Standard Plus CZ software (StatSoft Inc., Tulsa, OK, USA).

To answer the research hypothesis H2, we also used a nonparametric analog of the one-way analysis of variance—the Kruskal–Wallis test. The Kruskal–Wallis test makes it possible to test the hypothesis H_0, that k ($k \geq 3$) independent sample sets come from the same distribution. It is a direct generalization of Wilcoxon's two-sample test for the case of k independent sample sets ($k \geq 3$) [57]. In all four examined dimensions, D1–D4, we expressed the following null hypothesis: H_0, between the considered five groups of teachers, based on the length of their practice, there is no statistically significant difference in the perception of individual pedagogical competencies (dimensions D1–D4) in *self-assessment* or in *educational needs* compared to the alternative hypothesis H_1, that the difference is statistically significant. In this case, too, the calculations were performed using the STATISTICA software. In cases where the significance of the difference between the groups was confirmed by the Kruskal–Wallis test, the post-hoc Dunn test was used to compare the statistical significance of pairwise differences between groups.

4.1. Results

Based on the results obtained using the Wilcoxon paired signed rank test, we conclude that the differences between self-assessment and educational need were statistically significant in each of the four examined dimensions (Figure 2). We also observed that while for content knowledge, didactical knowledge and classroom management knowledge, self-assessment was significantly higher than the need to learn in the field, the opposite relationship applies to diagnostic knowledge. Teachers did not feel self-efficacious, and it is possible, therefore, that they felt the highest educational needs in this area.

Based on the results obtained by analyzing the research using statistical methods, we can state that the validity of the hypothesis was confirmed. Teachers perceive self-assessment and educational needs differently in individual dimensions.

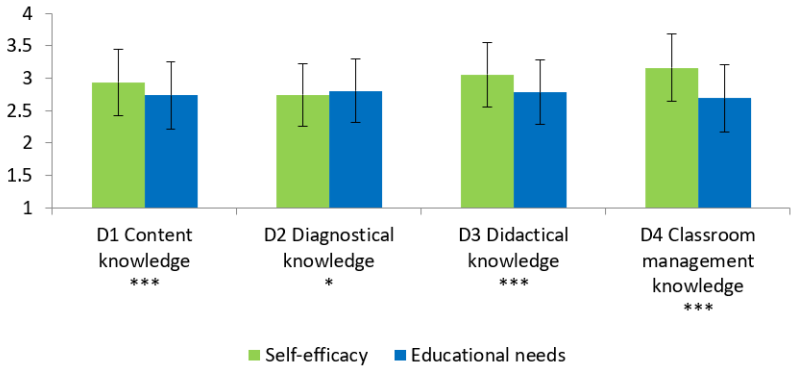

Figure 2. Average scores of self-assessment and educational needs of pre-primary teachers in dimensions D1–D4 (Mean ± SD). Note: items marked with * differ statistically significantly at the 0.05 significance level, items marked with *** differ statistically significantly at the 0.001 significance level.

4.2. The Influence of the Length of Teachers' Practice on the Self-Assessment and Perception of Educational Needs in Dimension D1—'Content Knowledge'

In the first step, in the dimension 'content knowledge' for each group of teachers (according to the length of practice), we calculated the descriptive statistical characteristics, namely, arithmetic mean, number of respondents in the group (N) and standard deviation (SD) (Table 2).

Table 2. Average score of self-assessment and educational needs of teachers in dimension D1 'Content knowledge' by length of practice.

Length of Practice	*N*	Self-Assessment			Educational Needs		
(Years)		M	SD		M	SD	
0–5	125	2.794	0.664	a	2.840	0.664	a
6–10	71	2.901	0.576	ab	2.915	0.629	a
11–15	49	2.938	0.465	ab	2.820	0.565	ab
16–20	67	2.865	0.601	ab	2.678	0.703	ab
21 and more	249	3.029	0.588	b	2.625	0.649	b

Note: values marked with different letters (a, b) differ significantly based on the results of post-hoc pairwise comparison by Dunn test ($p < 0.05$).

The teachers' self-assessment in the dimension, D1 Content knowledge, differed significantly between the groups of teachers with different lengths of practice (Kruskal–Wallis test, $H = 13.331$, $p = 0.0098$). The average values in both self-assessment and in the perception of educational needs in the 'Content knowledge' dimension in the five groups of teachers were different. Beginning teachers were significantly different in terms of 'Content knowledge' than teachers with 21 or more years of experience. While the average self-assessment value of beginning teachers was 2.794, the average self-assessment value of teachers with the longest practice was 3.029.

A significant difference was also confirmed when comparing the educational needs between teachers with different lengths of practice (Kruskal–Wallis test, $H = 16.872$, $p = 0.002$). This has shown that training needs in the field of professional competence are influenced by the length of practice. The results of post-hoc analysis show that there was a significant difference between groups 1 and 5 and between groups 2 and 5. In other words, teachers with an experience of five years or less, as well as teachers with an experience of 6 to 10 years, significantly differentiate their educational needs in the field of 'Content knowledge' than teachers with an experience of more than 21 years.

4.3. Influence of the Length of Teachers' Practice on the Perception of Self-Assessment and Educational Needs in Dimension D2—Diagnostic Competence

The differences in self-assessment in the 'Diagnostic competence' dimension were confirmed as significant ($H = 53.399$, $p < 0.001$) by the means of a Kruskal–Wallis test. Based on the results of a pairwise comparison of individual groups (Table 3), we concluded that the self-assessment of teachers with experience up to 5 years was significantly different in diagnostic competence compared to all other groups of teachers except for teachers with 16 to 20 years of experience. During the first five years, self-assessment seems to have increased in this area and was no longer significantly growing. On the other hand, we can see that the educational needs did not differ significantly between the groups of teachers with different lengths of practice (Kruskal–Wallis test, $H = 10.522$, $p = 0.051$). This implies that the educational needs in the 'Diagnostic competence' dimension are not affected by the length of practice.

Table 3. Average score of self-assessment and educational needs of teachers in dimension D2 'Diagnostic knowledge' by length of practice.

Length of Practice (Years)	*N*	Self-Efficacy (M)	Self-Efficacy (SD)		Educational Needs (M)	Educational Needs (SD)	
0–5	125	2.461	0.545	a	2.973	0.579	a
6–10	71	2.770	0.509	b	2.925	0.581	a
11–15	49	2.762	0.545	b	2.888	0.469	a
16–20	67	2.691	0.527	ab	2.817	0.619	a
21 and more	249	2.886	0.468	b	2.797	0.563	a

Note: values marked with different letters (a, b) differ significantly based on the results of post-hoc pairwise comparison by Dunn test ($p < 0.05$) for self-assessment. The difference between groups was not significant in the case of educational needs.

4.4. The Influence of the Length of Teachers' Practice on the Perception of Self-Assessment and Educational Needs in Dimension D3—Didactic Competence

The average values in the dimension, 'Didactic competence', in the five groups of teachers differ both in self-assessment (Kruskal–Wallis test, $H = 64.514$, $p < 0.001$) and in the perception of educational needs (Kruskal–Wallis test, $H = 11.312$, $p = 0.023$). Thus, both the self-assessment and educational needs evolve during practice. From the results shown in Table 4 we can claim that there is a significant difference between the 1st and 4th group of teachers and between the 1st and 5th group of teachers. This leads to the conclusion that teachers with an experience of 5 years or less have a significantly lower self-assessment in 'Didactic competence' than more experienced teachers, particularly teachers with experience of 16 to 20 years, as well as teachers with experience of 21 years or more. Teachers with experience of 21 years or more differ statistically significantly in self-assessment in 'Didactic competence' from all other groups of teachers. This showed that self-assessment in the field of didactic competence is influenced by the length of practice and grows throughout the practice of the pre-primary teacher. For the educational needs of the pre-primary teachers, there is a significant difference only between the 1st and 5th group of teachers. This means that teachers with experience of 5 years or less, as well as teachers with experience of 21 years or more, perceive their educational needs significantly differently in the dimension 'Didactic competence'. Moreover, their educational needs, in contrast to self-assessment, decline with increasing years of experience.

Table 4. Average score of self-assessment and educational needs of teachers in dimension D3 'Didactical knowledge' by length of practice.

Length of Practice (Years)	N	Self-Assessment (M)	Self-Assessment (SD)		Educational Needs (M)	Educational Needs (SD)	
0–5	125	2.769	0.543	a	2.896	0.587	a
6–10	71	2.989	0.473	ab	2.883	0.563	ab
11–15	49	3.015	0.431	ab	2.857	0.553	ab
16–20	67	3.024	0.476	b	2.752	0.684	ab
21 and more	249	3.228	0.458	c	2.686	0.605	b

Note: values marked with different letters (a, b, c) differ significantly based on the results of post-hoc pairwise comparison by Dunn test ($p < 0.05$).

4.5. Influence of the Length of Teachers' Practice on the Perception of Self-Assessment and Educational Needs in Dimension D4—Classroom Management Knowledge

Even in the case of the dimension D4, 'Classroom management knowledge', the differences in self-assessment between the five groups of teachers was confirmed as significant by the means of the Kruskal–Wallis test ($H = 55.738$, $p < 0.001$), i.e., self-assessment in the dimension 'Classroom management knowledge' competence is affected by length of practice. Subsequently, the post-hoc Dunn's test was used to find out which of the abovementioned age categories of teachers according to their length of practice differ from each other in the self-assessment in the dimension 'Classroom management knowledge'. The test results are summarized in Table 5. The difference between the 5th group of teachers and all other groups is statistically significant. Thus, the teachers with a practice of 21 years or more had significantly different self-assessment scores in the 'Classroom management knowledge' dimension than all other teachers. In the case of educational needs, the significance of the differences in educational needs between the five groups of teachers in the field of classroom management was also confirmed (Kruskal–Wallis test, $H = 12.230$, $p = 0.016$). In the post-hoc pairwise comparison by Dunn's test, a significant difference was confirmed only between the 1st and 5th group of teachers. Therefore, teachers with an experience of 5 years or less and teachers with an experience of 21 years or more perceive their educational needs in the dimension 'Classroom management knowledge' in a significantly different way.

Table 5. Average score of self-assessment and educational needs of teachers in dimension D4 'Classroom management knowledge 'according to the length of practice.

Length of Practice (Years)	N	Self-Assessment (M)	Self-Assessment (SD)		Educational Needs (M)	Educational Needs (SD)	
0–5	125	2.932	0.593	a	2.818	0.621	a
6–10	71	3.060	0.450	a	2.808	0.581	ab
11–15	49	3.091	0.444	a	2.758	0.573	ab
16–20	67	3.090	0.439	a	2.673	0.657	ab
21 and more	249	3.333	0.438	b	2.590	0.627	a

Note: values marked with different letters (a, b) differ significantly based on the results of post-hoc pairwise comparison by Dunn test ($p < 0.05$).

Based on the results of statistical analysis, we can state that the research hypothesis 2 was confirmed: individual categories of teachers perceive self-assessment as well as educational needs differently in individual dimensions according to the length of their practice. In all monitored dimensions, self-assessment increased significantly with an increasing length of practice. The reverse trend was observable for educational needs,

which decreased significantly in three of the four dimensions examined with increasing years of practice.

5. Discussion

In the first phase of the analysis of the obtained data, we found that there were statistically significant differences in teachers' self-efficacy in individual dimensions. Thus, there was a certain imbalance between the competencies belonging to different dimensions. By comparing the answers about the self-assessment of teachers' competencies and educational needs, we observed that educational needs corresponded to the level of self-assessment of teachers in individual dimensions. Therefore, we can consider the data obtained on the educational needs of teachers to be relevant. An interesting finding is that the lowest average scores were achieved by teachers in the D2 (diagnostic knowledge) dimension. It was also the only dimension where teachers achieved higher average scores in their need for professional development than in self-efficacy in the same dimension. Our findings correspond to the results of several studies in which diagnostic skills were identified as a weakness of teachers [58]. According to some research, teachers' diagnostic competence is developed through practical experience during teaching practice [59]. When analyzing teachers' answers according to the length of their teaching practice in dimension D2, the average score increased depending on the length of practice. At the same time, a significant difference was found between teachers with experience of up to 5 years compared to all other groups of teachers except teachers with a length of practice of 16 to 20 years. These findings correspond to the results of other researchers [60,61], who report that teachers' diagnostic skills improve during their teaching practice. In Watson and Marschall [62], beginning mathematics teachers first master classroom management, then student management (including teacher noticing), and finally instructional strategies (including an individual approach). It is the individualization of instructional strategies that is the most difficult to master in reported studies, in congruence with the presented results, for future and beginning teachers. The most frequently reported practice leading to an increased self-assessment of beginning teachers in higher-level teaching skills (this includes diagnostics, and responsive approaches—response to current events in the classroom) is reflection and peer support, not external sources or institutions [63].

In the analysis of educational needs depending on the length of practice, only in dimension D2 were the educational needs not affected by the length of teachers' practice. In all age categories except 21 and over, the average score for educational needs was higher than for self-assessment. Although the diagnostic skills of teachers improve with the length of practice, only teachers with a very long experience were satisfied with the levels of acquired diagnostic competencies over the need for further education in this area. The ability to diagnose usually goes hand in hand with the quality of the teacher—they can adapt their teaching to the individual needs of their students [64,65]. Such teachers can match the assigned tasks with the knowledge and skills of their students [66]. Therefore, diagnostic competence was recognized as an important part of pre-service and in-service teacher training. Not only is it part of the recommendations for teacher training in Germany [67], but it is also one of the five basic proposals of the US National Council for Professional Training Standards [66].

Another finding was the prevailing satisfaction of teachers with their professional knowledge, because in dimension D1 there was no gradual increase in the level of self-assessment of professional knowledge depending on the length of practice. There was also no gradual increase in the level of competencies in dimensions D3 (didactical knowledge) and D4 (classroom management knowledge); however, in dimensions D3 and D4, where it was shown that teachers with 21 or more years of experience assessed their level of relevant competencies significantly higher than for other groups of teachers, they were in line with the findings of Wilson and Tan [68]. They found that teachers with more than 20 years of teaching experience had a greater sense of their own level of acquired competencies than those with less than 20 years of teaching experience. The same result was reached by

de la Torre Cruz and Arias [69]. The research found a relatively high level of interest in professional development in individual areas of pedagogical competencies. Thus, teachers were more interested in obtaining the new information.

Our findings that the self-assessment of teachers improve throughout their whole careers is in strong accordance with the seminal ideas of Bandura [51]. He identified the teacher's experience, whether mastery experience (own success) or vicarious experience (observed success) as the most prevalent source of self-assessment.

As the teachers with longer career experience have a better chance of experiencing and managing (either directly or indirectly) different situations, they have more experience with and therefore a higher rate of self-assessment. In our results, the role of verbal persuasion was not observable, nor was physiological or affective states at all.

Recommendations and limitations

Based on our findings, we also recommend increasing the attention paid to pedagogical diagnostics during the training of future teachers for all types of schools. An integral part of a teacher's competencies is diagnostic competence, which can have a positive effect on children's learning processes and performance [59,67]. Diagnostic competence is generally considered to be a teacher's ability to assess the learning and behavior of his/her students according to predetermined criteria. In addition, diagnostic competence includes the ability to support the learning processes of individual students [70,71]. Related to this is the ability to diagnose students' mistakes and use them constructively in the classroom, thus creating an "error-friendly" learning environment [72,73]. Diagnostic competence can be considered as a "cross-cutting" competence and its level fundamentally affects the level of other competencies of the teacher.

Additionally, based on our findings we recommend increasing the attention paid to pedagogical diagnostics during the training of future teachers for all types of schools. The ability of a kindergarten teacher to properly diagnose a child's needs would contribute to the early detection of the specific educational needs of children. At the same time, such erudite teachers can "prepare" the ground for the possible inclusion of children in the first stage of primary school. Finally, teachers with a higher degree of diagnostic competence have a higher presumption to detect in children already in kindergarten tendencies towards inappropriate behavior [74]. Diagnostic competencies also extend to other teacher competencies. According to some studies, diagnostic competencies or diagnostic knowledge are a special form of expertise [75].

The preparation of pre-service or in-service training courses, with content based on the practical needs of teachers, could be an effective tool for increasing teachers' self-assessment, since the teachers who feel they have access to useful resources tend to have higher self-assessment [76,77].

When generalizing the results of the presented study, it is necessary to take into account that the research took place in the Slovak Republic and the fact that the return rate of the questionnaire was approximately 72%. The biggest limitation of this research can be considered the absence of additional qualitative analysis that would maximize the validity of the research. Additional qualitative data from observations and interviews with pre-primary teachers would make possible the examination of the hidden factors influencing teachers' self-efficacy and educational needs. On the other hand, such an analysis was not in the scope of the presented research.

6. Conclusions

The aim of this study was to determine the relationship between the educational needs and length of practice of pre-primary teachers through a questionnaire survey. At the same time, we identified whether the educational needs of teachers corresponded to the self-assessment of their own teaching competencies. Based on described research, we identified that pre-primary teachers perceive themselves the least competent in diagnostic skills. For teachers with less than five years of experience, this can be related to the content of their university education. The vast majority passed courses aimed at increasing

their subject matter and didactic competencies. As our research also confirmed that diagnostic competencies increase during pedagogical practice, we recommend that students should pay more attention to the development of their diagnostic competencies within the pedagogical practice. This would allow for a reduction in the relatively significant lag of beginning teachers in diagnostic competencies compared to content-related competencies. The problems with pedagogical practices affected by the COVID-19 pandemic require the search for alternative options for the development of teachers' diagnostic competencies. The lack of personal contact between teachers and students make it difficult to correctly identify students' needs, therefore, it is necessary to create effective tools that would help teachers of all ages to correctly identify a pupil's personality and then set their education regarding the goals of sustainable development. Future teachers could learn to use these tools and provide quality education even if there were a further need for a transition to online education.

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Appendix A.

Appendix A.1. Questionnaire Part A

Respondent code: _____

Length of pedagogical practice (in years): _____

Table A1. The table shows the pedagogical activities of pre-primary teachers. Mark on the scale from 1 to 4 (1—weak belief; 2—mild belief; 3—strong belief; 4—very strong belief) the degree of your competence to perform the given pedagogical activity.

	Teacher's Pedagogical Activity	Self-Assessment			
1.	Identification of the child's developmental and individual characteristics	1	2	3	4
2.	Identification of psychological and social factors of the child's learning	1	2	3	4
3.	Identification of the socio-cultural context of the child's development	1	2	3	4
4.	Differentiation of activities and tasks according to children's level	1	2	3	4
5.	Maintaining children's motivation during the learning process	1	2	3	4
6.	Informing children about the specific goals of educational activities	1	2	3	4
7.	Using pedagogies that respect the individuality of the child	1	2	3	4
8.	Using teaching aids respecting the focus of educational activities	1	2	3	4
9.	Providing specific feedback to children	1	2	3	4
10.	Planning educational activities with respect for individual differences among children	1	2	3	4
11.	Evaluating the progress and results of educational activities and learning of the child	1	2	3	4
12.	Planning one's own professional growth and self-development	1	2	3	4
13.	Implementation of own professional growth and self-development	1	2	3	4
14.	Creating a positive learning atmosphere	1	2	3	4
15.	Reflecting own pedagogical skills	1	2	3	4

Appendix A.2. Questionnaire Part B

Respondent code: _____
Length of pedagogical practice (in years): _____

Table A2. The table shows the pedagogical activities of pre-primary teachers. On a scale from 1 to 4 (1—weak belief; 2—mild belief; 3—strong belief; 4—very strong belief), indicate the degree of your belief in the need for your further education in the field.

	Teacher's Pedagogical Activity	Educational Need			
1.	Identification of the child's developmental and individual characteristics	1	2	3	4
2.	Identification of psychological and social factors of the child's learning	1	2	3	4
3.	Identification of the socio-cultural context of the child's development	1	2	3	4
4.	Differentiation of activities and tasks according to children's level	1	2	3	4
5.	Maintaining children's motivation during the learning process	1	2	3	4
6.	Informing children about the specific goals of educational activities	1	2	3	4
7.	Using pedagogies that respect the individuality of the child	1	2	3	4
8.	Using teaching aids respecting the focus of educational activities	1	2	3	4
9.	Providing specific feedback to children	1	2	3	4
10.	Planning educational activities with respect for individual differences among children	1	2	3	4
11.	Evaluating the progress and results of educational activities and learning of the child	1	2	3	4
12.	Planning one's own professional growth and self-development	1	2	3	4
13.	Implementation of own professional growth and self-development	1	2	3	4
14.	Creating a positive learning atmosphere	1	2	3	4
15.	Reflecting own pedagogical skills	1	2	3	4

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