Supporting Teachers of Pre-primary Education to Develop Children's Thinking

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The aim of the paper is to present innovative teaching approaches to theoretical and practical modules, which were designed to support students of the pre-school education study programme in the field of communication and critical thinking development. Data were collected through content analysis of student seminar papers (N=185) and from student reflective reports (N=185). Data were analysed using open and thematic coding. The results indicated that students who had the opportunity to study in an integrated course with the use of supportive materials achieved better results in all monitored categories than students studying according to the original study plan. This comparison highlights the importance of an integrated approach to the preparation of future teachers, where they gain a holistic view of the studied issue within the framework of large teaching modules.

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PODPORA VZGOJITELJEM PREDŠOLSKE VZGOJE ZA RAZVOJ MIŠLJENJA OTROK

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Namen prispevka je predstaviti inovativne učne pristope k teoretičnim in praktičnim modulom, ki so bili zasnovani za podporo študentom študijskega programa predšolska vzgoja na področju razvoja komunikacije in kritičnega mišljenja. Podatki so bili zbrani z vsebinsko analizo seminarskih nalog študentov (N=185) in iz refleksivnih poročil študentov (N=185). Podatki so bili analizirani z odprtim in tematskim kodiranjem. Rezultati so pokazali, da so študenti, ki so imeli možnost študirati pri integriranem predmetu z uporabo podpornih gradiv, dosegli boljše rezultate v vseh spremljanih kategorijah kot študenti, ki so študirali po prvotnem študijskem načrtu. Ta primerjava poudarja pomen integriranega pristopa k pripravi bodočih učiteljev, kjer v okviru obsežnih učnih modulov pridobijo celosten pogled na preučevano problematiko.

1 Introduction

The postmodern society places increased demands on pre-primary education, which needs to reflect and innovate its approaches to children's education in order to meet the current needs of children and the future challenges of life in the perspective of children's future living and learning (UNESCO, 2015; Mohammed, 2023). From the perspective of new institutionalism (Steinmo, 2008), education does not always reflect the needs of society. Often it retains approaches conditioned by previous developments and reflects beliefs, routines and norms in specific pedagogical processes (Kratochvíl, 2008). As a result of changes in society, such as the emergence of AI, the need to equip the next generation with competences that enable them to respond to new conditions and situations is increasingly coming to the fore. However, the results of the PISA and PIRLS surveys in the area of reading literacy have long shown that Czech pupils do not reach a sufficient level in the area of comprehension related to thinking. Specifically, this concerns evaluative and critical comprehension. The indicators monitored in the PIRLS international testing, which are information retrieval, the ability to draw conclusions, interpret information and evaluate text, reveal that Czech pupils are successful in literal and inferential comprehension, but have difficulties in interpreting and evaluating text (Czech School Inspectorate, 2023). In order to be able to interpret and evaluate text or information, individuals need to use higher cognitive processes, such as, in particular, discovering causal relationships, drawing on prior experiences and looking for analogies. Therefore, it is crucial that the development of children's independent, creative and critical thinking is emphasized already in pre-primary education, not only in the context of developing future literacy skills (Košťálová, 2017; Salmon, 2010; Snow, 2002; Broek & Kremer, 2000). Research shows that critical thinking can be learned (Tishman et al., 1995; Ritchhart & Perkins, 2005; Williams & Moore, 2021). In order to do this, future teachers need to be equipped with the knowledge and skills that will enable them to effectively support children's independent thinking and their ability to think critically, evaluate, and make decisions (Moiko et al., 2022).

2 Theoretical backgrounds

The interaction between the teacher and the student is important for the effectiveness of learning (Nelešovská, 2005). The condition for effective communication is the acquisition of a certain level of communication competence.

In our case, we will focus on the teacher, and thus here it is possible to define the teacher's ability to choose appropriate motivational, activating, communicative and feedback information; as well as to code the information adequately to the level of the child, to structure the information and to prepare the course of the communication situation in a desirable way. To communicate effectively, the teacher shall reflect the cognitive, affective and regulatory components of communication with the child (Gavora & Lyková, 2005; Mareš & Křivohlavý, 1995). Effective communication is characterized by descriptive language, expressing clear information, sharing one's own emotions, needs and expectations, and opening opportunities for active participation of the child in decision-making. Internal and external aspects influence the effectiveness of learning. Internal aspects include the child's characteristics, their cognitive abilities (Mareš, 1998). Internal aspects are innate, yet they can be influenced to some extent. These are genetic predisposition, temperament, intellect, the child's character and motivation to learn (Wildová et al., 2021). External aspects include the personality of the teacher, as well as the climate and physical environment of the pre-school and the classroom and the child's social environment, or external motivational incentives. These aspects can positively or negatively influence the course and outcomes of educational processes.

2.1 Activating communication

For the effectiveness of learning and personality development of the child, it is essential to be active in the educational process, for which we use activating teaching methods. In the field of communication, these include Socratic conversation (the teacher's questions stimulate the child's thinking), discussions and brainstorming (Skalková, 2007). The basic pillar of these verbal methods are questions. Questions are part of the development of a child's thinking from the earliest age (Fisher, 2011; Vágnerová, 2012), which is why they can be used in pre-primary education.

Teachers are most likely to ask questions. However, it depends on how the questions are formulated to effectively help children learn. Švaříček (2011) points out that there is no direct link between the number of questions of a certain type and the level of children's learning achievements. Thus, it is a question of quality and also of the context in which the questions are asked. Similarly, Fisher (2011) argues that too many questions of lower cognitive level lead to a reduction in children's willingness to participate and reflect more on the answers and that it is therefore important to

ask questions that will develop a cognitive conflict. Research by Šeďová and Sedláček (2023) suggests that teachers should actively engage all children as there is a relationship between educational achievement and their engagement. Moreover, engaging children, including those from socially disadvantaged backgrounds, helps to close the achievement gap between children and improves educational outcomes, regardless of gender or level of disadvantage (Šeďová et al., 2019). As critical thinking can be learned by children (Redecker et al., 2011), it is desirable to create opportunities for this from an early age, ideally combining verbal communication with other means of expression (Sorochynska & Hohola, 2022; Williams & Moore, 2021).

This implies that in pre-primary education, it is important for the teacher to be able to create space for children to discuss with each other, to formulate questions of higher cognitive complexity that will activate children's thinking, and to bring interesting topics that present a cognitive challenge for children. For pre-school children, these may be the types of questions listed in Table 1.

Table 1: **Types of teacher questions of higher cognitive demand. Elaborated according to Wildová et al. (2019)**

Type of question	Description
Judgment	This type of question leads children to make a conclusion based on the facts in the statement. The child has to discover interrelationships and distinguish the essential from the non-essential.
Application	This type of question encourages children to think about how they can use the information.
Evaluation	This type of question invites children to take a personal stance on the issue. The child is expected to be able to support their position with arguments.

2.2 Preparation of future pre-school teachers for the development of children's thinking at the Faculty of Education, Charles University

The preparation of future teachers ought to be based on the needs of practice, with an emphasis on the development of didactic competence of the student (Koželuhová & Wildová, 2021; Starý et al., 2012). This requires a functional link between theory and practice and the development of reflective skills (Dymoke & Harrison, 2008). The model of the teacher as a reflective practitioner who is able to observe, analyse and change the sub-moments of the educational process is

emphasised in the current conception of the preparation of future teachers (Korthagen et al., 2011; Syslová, 2017; Vítečková, 2018). An important role in this preparation is provided by the use of video recordings, either of the student's own pedagogical work or of examples from practice (Janík et al., 2009). Simultaneously, it is essential to ensure long-term sustainability, sufficient opportunities for the immediate application of theoretical knowledge and developed skills. The time it takes individual students to master a skill varies considerably. The continuity of the training programme is therefore one of the factors of its effectiveness (Šeďová et al., 2016).

Stimulating children's thinking is not an easy task, especially if in practice we encounter a persistent conception of the role of the teacher as the dominant actor in the educational process. Therefore, when considering how to help students develop their communicative competence, we assumed a close link between the development of thinking and the level of understanding of the literary text that is read to children. We hypothesized that working with children's literature might help students plan educational content to encourage children's independent thinking through their questions. Consequently, we analysed the existing curriculum in terms of the content devoted to the areas of language and communication development, pre-literacy and literary education.

In the original curriculum of the Faculty of Education at Charles University, the language and literature areas were covered by six different courses, which students had to spread over three years of study. These were the courses Literature for Children I and II, Culture of Spoken Language, Czech Language in Pre-school Education, Literature for Children with Didactics and Developing Reading Literacy. Each course was given 1 to 2 teaching hours per week and the results of students were very varied and inconsistent. In practice, the educational content of each course overlapped, or students encountered some content repeatedly in different courses. Other areas, on the other hand, remained hidden from them, believing that students had already been exposed to the content in a previous course. Another shortcoming seemed to be the fragmentation of the content, where students lacked an understanding of how the areas of literature, language development and pre-school didactics were interconnected. For this reason, there has been a radical change in the preparation of future pre-school teachers in the field of language and literacy development and the related development of the child's thinking.

2.3 The proposed innovation of the training of future pre-school teachers

The primary foundation was the establishment of cooperation between teachers from three different departments of the faculty - the Department of Czech Language, the Department of Czech Literature and the Department of Pre-Primary and Primary Education. Teachers of these departments considered together how to logically organize and connect the educational content so that students could get to know it comprehensively and in its entirety. A new course has been created, a two-semester course - Language, Communication and Literacy Development - which emphasises the interconnectedness of all the components. The course runs 4 hours per week in the winter term and 2 hours per week in the summer term of the first year of study. This provides students with the necessary foundation right at the beginning of their studies when their professional self-concept is just taking shape. It is therefore already during this period that they encounter the idea of the role of teacher-facilitator of the child's learning.

The instruction of individual university teachers builds on each other during the course, or the teachers use tandem teaching. They cover topics such as definitions of literacy and preliteracy, the development of productive and receptive language competence of children, the basic communication theories, the fundamentals of rhetoric and the development of a cultivated speech of a teacher. This is followed by an introduction and mastery of constructivist teaching methods appropriate for the pre-school age. These include the E-U-R model of learning and reading strategies with an emphasis on comprehension development. Students are introduced to literary types and genres as well as criteria for selecting a quality literary text. The course concludes with an exam in which students demonstrate knowledge and skills in the entire field. The content of the course is then linked to the content of the course Theory and Didactics of Early Childhood Education I, where students gain additional theoretical knowledge, and to the teaching practice, where they acquire practical experience under the guidance of mentors.

Supporting study materials for the course were gradually developed within the project. It was a Moodle course that includes a methodological guide for working with critical thinking methods in pre-primary education and video demonstrations of the use of individual methods in practice. The students were provided with a website containing suggestions for contemporary children's literature and sample

reading lessons, examples of good practice created by their fellow students. These support materials were also offered for use to third year students who were still studying according to the original curriculum. The innovation was based on changes in teaching structures, requiring interdisciplinary cooperation and the use of new forms of teaching. It meant a lot of effort for university lecturers. We were therefore interested in how effective this innovation was and whether it had the expected benefits for the quality of students' pedagogical work.

3 Methods

Table 2: Characteristics of the research group

	Academic Year	Form of Study	Year of Study	Number of students	Study support
A	2021/22	full-time	3rd	25	Studying according to the original accreditation
B	2022/23	full-time	3rd	33	Studying according to the original accreditation using educational materials (videos, methodology, Moodle course with practice examples)
C	2021/22	part-time	3rd	20	Studying according to the original accreditation
D	2022/23	part-time	3rd	14	Studying according to the original accreditation using educational materials (videos, methodology, Moodle course with practice examples)
E	2021/22	full-time	1st	20	Studying according to the new teaching concept without additional study support
F	2022/23	full-time	1st	25	Studying according to the new teaching concept using educational materials (videos, methodology, Moodle course with practice examples)
G	2021/22	part-time	1st	17	Studying according to the new teaching concept without additional study support
H	2022/23	part-time	1st	33	Studying according to the new teaching concept using educational materials (videos, methodology, Moodle course with practice examples)

The aim of the study was to assess the effectiveness of an innovation in the professional training of future pre-school teachers. The research was carried out in the academic years 2021/22 and 2022/23 among first- and third-year students of the full-time and part-time forms of the Pre-school Teacher Education Programme. The total number of students was 185 (N=185). A detailed overview of the individual study groups is presented in Table 2.

3.1 Research Questions

1. How has the change in the design of the students' training affected their level of competences enabling them to support the development of children's thinking?
2. What supports students to be able to stimulate the development of children's thinking?

3.3 Data collection and data analysis

A qualitative approach was used in a multi-case study design (Yin, 2003). A case is understood as always one group of students in a study programme in a particular academic year (see Table 2). The data were collected through content analysis (Mayring, 2000) of students' seminar papers, reflective reports and responses. The seminar papers had the same assignment for all students – to design a one-week thematic blocks for pre-school children based on a literary text. Assessment criteria were developed for the data collection in research and students were made aware of these in their courses. Students' work was assessed by two independent assessors who supplemented the work with feedback. Reflective reports were submitted anonymously by students in the Moodle course environment after studying the course materials.

Pre-determined categories were followed in the seminar papers (Table 3).

The categories were defined in relation to the theoretical backgrounds, i.e. mainly the quality of the teacher's questions and the chosen topic, and in relation to didactic aspects, i.e. the formulation of educational objectives and the forms and methods of education. The occurrence of each category in the student's paper was scored 1 point; in total, each group could score a maximum number of points in one category

equal to the number of students in that group (e.g., Group A of 25 members could score just 25 points in each individual category observed). For the purpose of comparing the results, the results were then expressed as percentages indicating how many students in a given study group were able to meet the requirements of the category under study, i.e. have the necessary competences. Firstly, the individual case-study groups were analysed, and their results were then compared.

Table 3: Analytical categories

Category	Description
Questioning	The student uses open-ended questions of a higher cognitive level, i.e. judgment, evaluation and application questions, which stimulate children's independent thinking.
The E-U-R model of learning	The student proposes a functional division of individual lessons so that the parts of evocation, understanding and reflection are included.
Educational plan	The student clearly defines what he/she wants to achieve with the children, what topics he/she wants to open, why he/she wants to implement the thematic unit with the children.
Educational goals	The student formulates educational goals that correspond to the declared intention, planned educational activities and that are evaluable.
Choice of children book	The student chooses a book (fiction or nonfiction) that corresponds to the didactic purpose and age of the children and that provides them with space for independent thinking.

Reflective reports were analysed using open coding, where individual student statements were divided into data segments that were assigned individual codes. These were subsequently grouped into clusters (Švaříček & Šeďová, 2014). The data from the reflective reports are used to contextualise the results generated from the content analysis of the students' work. The investigation was conducted in accordance with the Code of Ethics of the Charles University.

4 Results

4.1 How has the change in the design of the students' training affected their level of competence to support the development of children's thinking?

The results of the analyses of the student papers showed that there was a significant shift in student performance in all categories for all study groups. For groups A, B, C, D, these were students who studied within the original curriculum, so they took

6 different courses at different times and the educational content was not presented consistently. We can see in Fig. 1 that the use of supporting study materials in the form of methodological materials and video demonstrations led to a better performance (B and D) compared to the study groups without supporting materials. Students made the most significant progress in their ability to use constructivist teaching methods, particularly in the application of the three-phase learning model, although the results are not yet satisfactory. Only 67% of full-time students and 50% of part-time students were able to apply constructivist methods almost at the end of their studies, drawing on children's knowledge and preconceptions and designing learning activities effectively to lead to the intended goals. The formulation of educational goals was also problematic (76% and 50%), although even here there has been a significant improvement. Students were unable to define educational goals in a way that could be evaluated. The most common error was to copy the expected outcomes from the national framework for pre-school education or to replace them with a description of the activity the children will complete. Full-time students achieved better results than part-time students.

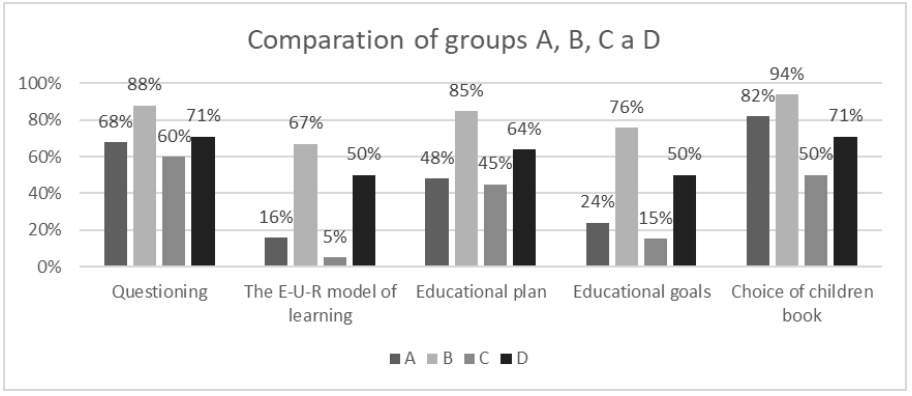

Figure 1: Comparison of the results achieved by third-year students, full-time and part-time forms.
Source: own.

4.2 What supports students to be able to stimulate the development of children's thinking?

It is interesting to compare the results of the third-year students studying in the original accreditation and the first-year students, where neither group had access to study support materials. The only difference between the groups was the coherence

of the related educational content of the original 6 courses into one course for first-year students. It appeared that this change had already led to improvements in most categories (Figure 2). Students who had the whole issue presented in one coherent course were better able to use the individual theoretical knowledge and practical skills. However, the more significant shifts were for part-time students (Group G), who seem to have more difficulty in synthesising all the theoretical knowledge in practice.

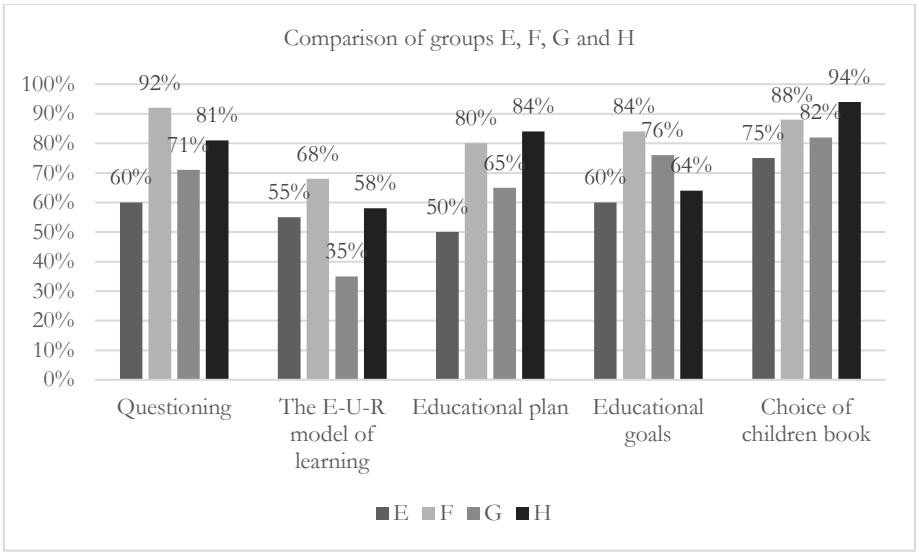

Figure 2: Comparison of the results achieved by first-year students, full-time and part-time forms.
Source: own.

If we compare the results of students who have already had the opportunity to study in a comprehensively upgraded course, i.e. benefited both from the integration of several courses and from the existence of supporting study materials (first years, groups F and H), with students who have not had this opportunity (third years, groups B and D), we come to a surprising conclusion. In fact, first-year students after their first year of study performed either almost the same or even higher than their fellow-students at the end of their studies in all the categories studied (Figure 2). This comparison indicates the importance of both an integrated approach to the preparation of future teachers, whereby they gain a holistic view of the subject matter

studied in large teaching modules, and support in the form of videos and concrete examples of good practice.

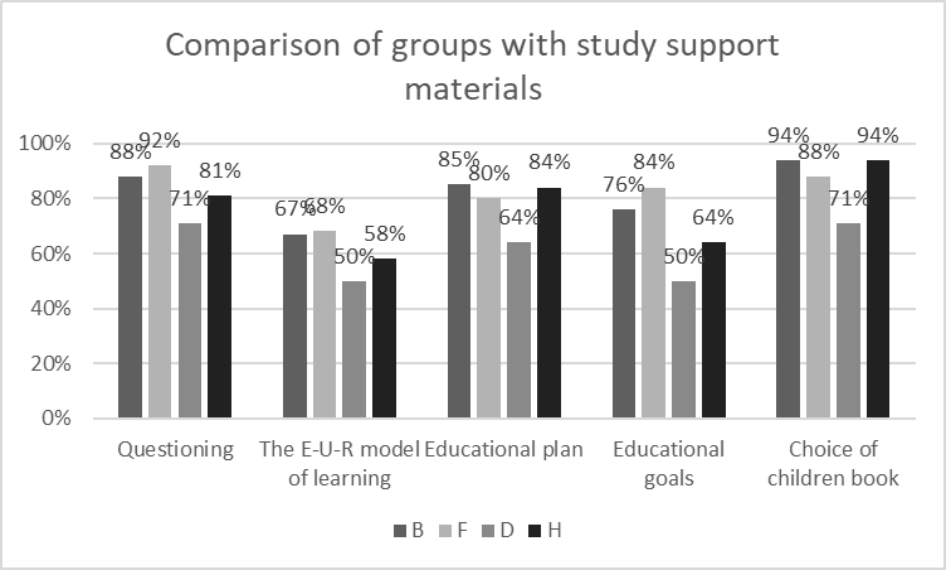

Figure 3: Comparison of the results achieved by third- and first-year students (both years had study support materials at their disposal)
Source: own.

5 Discussion and conclusion

The aim of the research was to evaluate the effectiveness of the innovation in the preparation of future pre-school teachers at the Faculty of Education, Charles University. We analysed how the change in the design of the students' preparation has affected their level of competence to support the development of children's thinking, and what helps student teachers to be able to support the development of children's thinking. The results indicated that the proposed measures led to an increase in the quality of the students' outcomes – students were better able to interact with children and facilitate the development of their thinking. Implemented were (1) the integration of the educational content of several courses into a longer-term educational module, (2) its connection with teaching practices, and (3) the creation of supporting learning materials. Students performed better in all the monitored indicators related to the use of activation methods in teaching and supporting children's thinking development than students who studied in the

curriculum before the innovation was introduced. It is important to highlight that this improvement is all the more significant as a result of the inclusion of learning support materials in the curriculum, even for students who spent most of their study time learning online during the covid pandemic (groups B and D), where on the contrary we would have expected a slight decrease due to more difficult conditions. This corresponds with other research on the development of students' competences when using online learning features (Andrade-Arenas et al., 2023).

The essence of the innovation was the integration of the courses into a modular course. The modularisation is one of the developments in teacher education in Europe (Loudová Stralczynská et al., 2022; Nelešovská & Šmelová, 2023; Vlčková, 2010) and in higher education (Li & Pilz, 2016). It is the positive contribution of the modular course to the development of students' competences that is significant for the further direction of the reaccreditation of the curriculum towards a more clearly structured, pervasive and interdisciplinary model.

Of the indicators observed, students continue to find it most difficult to use constructivist methods (especially the three-phase learning model) and to formulate learning goals, which corresponds with another research outcomes (Stará & Starý, 2018; Syslová et al., 2019). Therefore, it is essential to develop these skills in further follow-up courses and to deepen the acquired knowledge in the context of other disciplinary didactics and in the context of contextual teaching practices. These findings place demands on the quality of mentors in teaching practice.

A challenge for further development is the lower attainment of part-time students already working as pre-school teachers. Their established patterns and pedagogical practices are sometimes, paradoxically, a certain burden that students need to overcome. Research findings suggest that preschool practice is still dominated by approaches to educational content planning that are consistent with a sociocentric and teacher-centred conception of education (Opravilová, 2016), and that children have little space in these pedagogical environments to be active agents of their learning and to develop critical and creative thinking (Koželuhová et al., 2020; Loudová Stralczynská et al., 2024). This corresponds with our theoretical framework of new institutionalism (Steinmo, 2008), as it is the poorer outcomes of student-teachers in practice that point to internal aspects in the culture of pre-schools, which maintain 'tried and tested' approaches and are less receptive to innovative strategies

from outside. This finding reinforces our belief in the importance of involving professional reflection into student teachers' learning (Dymoke & Harrison, 2008) as an important part of their professional competence development.

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