Jana Slezáková
Palacký University in Olomouc
Faculty of Science
Department of Experimental Physics,
Section of Pedagogical training
Czech Republic

UDC 371.321::5-057.875(437.3)
DOI 10.46793/Uzdanica19.S.149S
Preliminary research report
Received: June 5, 2022
Accepted: November 4, 2022

PEDAGOGICAL TRAINING FROM THE PERSPECTIVE OF STUDENTS – FUTURE TEACHERS AT PALACKÝ UNIVERSITY OLOMOUC

Abstract: This paper discusses the issue of perception and evaluation of the first continuous pedagogical training from the perspective of students as future science and mathematics teachers. In the introduction, attention is paid to the definition of pedagogical training from the perspective of selected authors. The following is an overview and a description of the skills of future teachers, which are key during the first continuous pedagogical training. Subsequently, the following section presents the organizational structure of the first training which is applied at the Faculty of Science at Palacký University Olomouc, Czech Republic. Further, for the purposes of the empirical research, the author drew up a survey with questions addressed to future science and mathematics teachers. Based on that, the data were analysed and transformed into results. The main intention of the survey was to investigate how the students appraise their preparation for their practical training and the training itself. Pedagogical training shows the need for the development of digital competencies.

Lastly, the final part of the paper discusses the shortcomings of their practical training, which are perceived by undergraduates as future teachers. Additionally, it presents suggestions and recommendations for how to effectively improve the organizational system of these practical teacher trainings.

Keywords: pedagogical training, teaching competencies, tandem teaching.

INTRODUCTION

The reality of today's education is increasingly focused on a constructivist approach to teaching aimed at individualizing the teaching process in order to put forward transmissive methods that suppress the development of the student's personality and are focused on the verbal monological concept of teaching. The education system is focused on the student's self-education, in which the teacher becomes a facilitator of the student's learning and thus teaches the student to work with new information, motivates him to link new information with previously acquired knowledge, and tries to apply and further interpret the student's information.

jana.slezakova@upol.cz

Through this experience, the student consolidates key competencies. An important task of the teacher is to transfer this information into the form of knowledge, skills, habits and attitudes that the student achieves during education. The basics of professional skills are acquired by future teachers in undergraduate training within general didactics and subject didactics.

The aim of our study was to determine the readiness of students of science and mathematics teaching for their first continuous teaching training. We wanted to determine in the form of a questionnaire survey how they evaluate this first training. We also tried to find out if they are able to prepare and implement a lesson independently. Furthermore, we try to show whether students are able to solve professional problems promptly. Furthermore, we wanted to know if the students are sufficiently prepared to work with pupils with special educational needs. And finally, we wanted to find out to what extent they are able to use digital technologies in the implementation of their own lessons.

THEORETICAL BACKGROUND

Pedagogical training as a part of the study of all teaching disciplines is an integral and necessary form of teacher preparation. The goal of pedagogical training is to connect theoretical education with the possibility of practical application of acquired knowledge. Pedagogical trainings help future teachers to integrate knowledge from general didactics directly into practice. As part of the preparation of future teachers, pedagogical trainings should serve to consolidate relevant pedagogical competencies. Trainings should develop social, communicative and interpersonal skills. They should also teach students self-reflection.

Pedagogical training can be defined in different ways. For example, Buchberger and Busch (1988: 90) define pedagogical training as the acquisition of skills directly related to the teaching process to encourage the ability and willingness to actively apply theory in practice. It is part of the study, influenced by experienced teachers in the school responsible for practical training.

Vonk (1985: 135) defines pedagogical training as an opportunity to learn, specifically through learning situations for future teachers in teacher education that are systematically confronted with possible practice, specific teaching activities and classroom management at school, led by special tutors and practicing teachers.

Šimoník (2005: 49) understands pedagogical training as an inseparable part of undergraduate teacher preparation, which is only a stage in the practical training of teachers, because it is not possible to practice everything we expect from a teacher. He points out the need to connect pedagogical training with theory. Šimoník states that pedagogical training should be a discipline integrating the theoretical and practical components of teacher preparation.

Průcha, Walterová, Mareš (2001: 258) characterize pedagogical training as a part of the practical preparation of teachers and educators at faculties preparing teachers. The main goals of the training include: to combine the theory and practice of all components of higher education, to introduce the future teacher to the conditions of the real school environment and to practice him in the activities of the teaching profession.

According to Nezvalová (2007: 8), the indicated definitions show that pedagogical training is understood as an opportunity for students to use their theoretical knowledge, verify their teaching skills and, based on observing the activities of experienced teachers and reflection of their own activities, to create individual teaching concepts.

APPROACH TO CREATING PROFESSIONAL SKILLS OF TEACHING STUDENTS OF THE FACULTY OF SCIENCE OF THE PALACKÝ UNIVERSITY IN OLOMOUC, CZECH REPUBLIC

Pedagogical training strongly influences students-prospective teachers in their decision-making and strengthens or weakens their decision to educate future generations. In general, trainings form an important part of educational preparation, as they connect the theoretical teaching of branch didactics with the practical. Related to this is the need for feedback from future teachers and their suggestions for improving the organization of pedagogical trainings.

Department of Pedagogical Preparation of the Faculty of Science, Palacký University in Olomouc provides pedagogical trainings for students of science and mathematics teaching. As part of their study programs, future teachers complete the first and second continuous pedagogical trainings. These trainings provide an opportunity to get to know the educational activities of the school as a whole. Students acquire skills that are directly related to the teaching process. During these trainings, they develop follow-up skills that we consider key during the first teaching training.

These include the following:

1. Planning and preparation for the lesson
2. Realization of lessons
3. Lesson management
4. Classroom climate
5. Evaluation of pupils' results
6. Reflection of own activity and evaluation

Planning and preparation have a clear intention and goal, where the educational content and methods correspond to the educational needs and abilities of the pupils and the required outcomes. The lesson must be structured in such a way that it always builds on the previously acquired concepts in an appropriate way and creates preconditions for clarification and understanding of subsequent and related concepts. In the implementation phase of the lesson, the future teacher in the role of facilitator of student learning presents the planned content using appropriate organizational forms and teaching methods that will lead to the achievement of the planned learning objectives. The future teacher develops skills leading to the successful achievement of set goals. The student of teaching is already able to effectively monitor the results of their activities, correct their procedures, monitor students' activities and provide feedback.

With his attitudes and actions, the practicing student creates a positive classroom climate and corrects any inappropriate behavior of some students. As part of the reflection, he should be able to identify those sites that need further improvement and associated development.

Future teachers learn to apply all these skills in a specific situation at school in the presence of experienced teachers.

ORGANIZATION OF THE FIRST CONTINUOUS PEDAGOGICAL TRAINING AT THE FACULTY OF SCIENCE, PALACKÝ UNIVERSITY IN OLOMOUC

Pedagogical training is a part of the mandatory preparation of future science and mathematics teachers. In the bachelor's study program, students of teaching programs complete only theoretical preparation through the compulsory subject General and school didactics. In the follow-up master's study program, students have theoretical subjects supplemented by a mandatory first and second continuous teaching training. Both types of trainings are implemented at so called faculty schools that cooperate with the Faculty of Science of Palacký University Olomouc. These schools enable students to connect theoretical knowledge with practical experience.

Continuous pedagogical training is realized in the first year of the follow-up master's study, in the summer semester lasting 3 weeks. A student who intends to perform a continuous teaching practice submits an application. All documentation (date of training, list of students registered for pedagogical training, location of students at individual schools, information for students on the course of pedagogical training, forms) is located on the website of the Department of Pedagogical Training (cpp.upol.cz). The staff of this Department will provide students with the necessary recommendations at the information meeting. The student does not provide the training independently, but on the basis of his application the Depart-

ment staff perform the necessary administrative activities (communication with the school management, list of students conducting continuous teaching training at school, information on continuous teaching training, requirements for continuous teaching training, agreement for the head teacher training). The student's teaching activity at the relevant school is evaluated by the head teacher of the school on the appropriate form.

During the pedagogical training of future teachers, the teaching student gets acquainted with the basic theoretical pedagogical and didactic knowledge and skills, which he then applies in his activities in a real school environment, thus creating his initial individual professional skills and attitudes under the guidance of experienced schoolteachers. Within the pedagogical training, emphasis is placed on the development of the teacher's personality. Pedagogical training and theory according to (Dytrtová, Krhutová 2009:40) proves that any ideal content of education is in itself an indifferent phenomenon, and the driving force is the teacher's personality and the methods of education that the teacher uses.

QUESTIONNAIRE SURVEY METHODS

How do future science and mathematics teachers, who have undergone only theoretical subjects in their undergraduate preparation, perceive their first continuous pedagogical training?

In our study, we focused on quantitatively oriented research. We used the questionnaire survey method (Gavora 2010: 67). Our goal was to create a simple questionnaire that would not inconvenience the respondents too much. This is because the students filled out the questionnaire in written form immediately after the end of their training. At the same time, we did not want it to address the teaching of other subjects. We were also aware that the questionnaire was filled out by students across science disciplines, so it was not possible to address them at the same time.

A total of 50 first-year follow-up students of science and mathematics took part in the questionnaire survey, of which 44% were women and 56% were men. Empirical methods focused on proportional stratified selection – Chráska (Chráska 2003: 35) were chosen for the survey. A questionnaire was presented to students in March 2021 (immediately after the end of the first continuous pedagogical training), which aimed to find out how future teachers perceive their readiness for the first continuous pedagogical training, whether this training met their expectations, what they see as the benefit of this training and what suggestions they have for possible improvements to the system of pedagogical training.

We created a group of pre-prepared and carefully formulated questions, which we have tried to arrange thoughtfully and to which the interviewed person

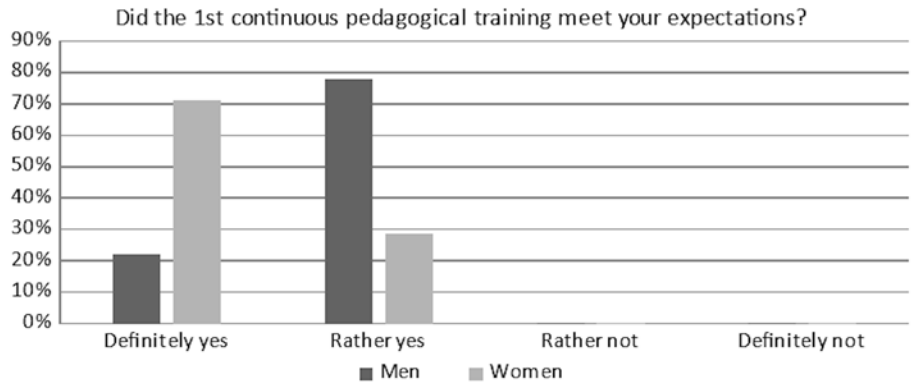
answers in writing. At the same time, we realized that the obtained data require careful interpretation. This is to avoid subjective judgments.

The tested group consisted of students who have had a modified study program since the academic year 2019/2020 and who have not completed assistant or listening pedagogical training within their study program.

RESULTS OF THE QUESTIONNAIRE SURVEY

The introductory question asked whether the first continuous training met all the expectations of future science and mathematics teachers. In both groups of women/men examined, only answers *yes* or *rather yes* appeared. In the case of women, the answer was *definitely yes*, in the case of men *rather yes*. However, none of the respondents indicated the answer *rather no* or even *definitely no*.

Graph 1. Percentage expression of the fulfillment of expectations of future teachers for their first continuous pedagogical training



The second question asked what the biggest problems future teachers had in their first training and what surprised them the most during the training. Both groups of men/women mentioned the timing and organization of the teaching unit to the same extent, especially the correct estimation of the pace of interpretation. There were also answers regarding indiscipline in teaching, time-consuming preparation, working with pupils with special educational needs, prompt solutions of professional problems and graphic expression on the blackboard.

In the third question, students should state what they see as the benefit of their first continuous teaching training. Again, two types of responses appeared in both groups. The first was the answer that pedagogical training allows them to directly apply the acquired theory in practice. The second most common answer was to realize that it is a good experience that is a necessary part of preparation

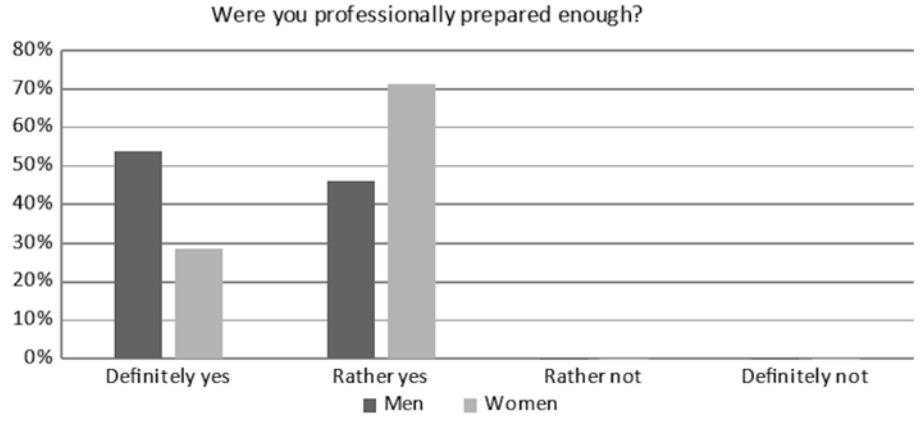
for future careers. The main ideas in the women's answers were that in the training they made sure that they "really wanted to pursue the teaching profession", that they "stood in front of the class for the first time", that they "only realized during the training what the teacher's job entails", etc. The men then mostly answered that they literally wanted to see whether they would enjoy this profession and wanted to get acquainted with the school environment from the teacher's point of view, etc.

The fourth question asked whether the students at the practicing school encountered something they were not prepared for during the first three years of study. Both groups of men and women responded "working with pupils with special educational needs". According to RVP G (MŠMT 2021), pupils with special educational needs are considered to be pupils with disabilities and pupils with social disadvantages. Diagnosing such pupils and creating conditions for their education is an extremely demanding activity for a teacher, which is carried out in cooperation with a pedagogical-psychological counseling center, a special pedagogical center, or a special pedagogue or a psychologist.

The fifth question focused on gauging the training of future teachers from a professional point of view. Both groups felt sufficiently trained. It is worth noting that the women were more inclined to answer *yes* to the question "Were you professionally prepared enough?", but men chose the first answer, *definitely yes*.

In their study, Pinheiro and Zaidan (2022: 447) discussed the importance of theoretical preparation, including the content evaluation of professional subjects, for the quality of teacher training.

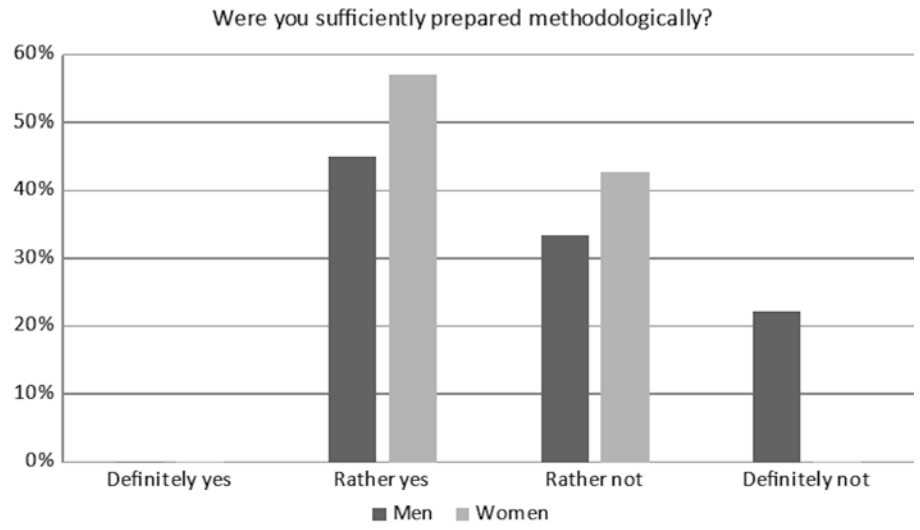
Graph 2. Percentage expression of training of future teachers



The penultimate question examined the extent to which students are methodologically prepared. None of the respondents to the question "Were you sufficiently prepared from a methodological point of view?" answered unequivocally

positive (*definitely yes*), the answers *rather yes* and *rather no* were almost balanced. *Definitely no* answers appeared in men.

Graph 3. Percentage expression of future teachers in terms of methodology



The last question gave room for suggestions for improving the system of pedagogical trainings. 31% of respondents would welcome longer training, 44% suggest strengthening the preparation of future teachers for listening and assistant training during their bachelor's studies, 50% of students said that they would like to focus on forms of teaching or teacher versus student communication within subject didactics, and 37% of respondents are interested in starting with tandem teaching during the first exposure to the school environment.

According to R. Dofková (2019: 12), tandem teaching is one of the less common forms of teaching through the specific experience of a practical teacher. Dofková states that this form of teaching leads to more efficient teaching hours, as it takes place in the presence of two or more teachers. It follows from the above that in the school environment there is also space for self-observation of the work of experienced teachers. Another aspect is the joint implementation of group teaching, in which the student – future teacher and head teacher can share activities and complement each other. All these aspects will enable future teachers to create their own idea of real events in school practice and at the same time the concept of their own quality teaching.

DISCUSSION

It can be stated clearly that the first continuous pedagogical training met the expectations of students. Although unexpected problems arose that they were unprepared for, they were able to deal with them properly. The training was also beneficial in that some students only clarified during it whether or not they want to devote themselves to pedagogical work. The respondents evaluated their own professional erudition very positively, but from a methodological point of view they themselves perceived significant shortcomings.

The study (Skafa, Evseeva, Abramenkova, Goncharova 2021: 212) describing the system of preparation of future teachers at the Donetsk National University also dealt with the improvement of the preparation of future mathematics teachers. It was an implementation of heuristic activities. The research results pointed not only to the importance of mastering various methods and forms of work, but also to the often-neglected methodical preparation.

An important factor that helps future teachers to better adapt in the school environment is also the development of critical thinking. Cobo-Huesa, Abril and Ariza (2022: 360203) studied the preparation of future primary education teachers. In their study, they proposed recommendations necessary for the educational preparation of future teachers. One of the factors that should not be neglected in education is, for example, preparation and planning for the lesson. This deficiency was also found in our survey.

Here is an overview of issues that appeared in the questionnaire responses repeatedly:

– are unable to properly structure the lesson with regard to the subject matter, teaching schedule, pace of interpretation
– are not able to immediately address professional issues from students
– are unable to deal promptly and correctly with disciplinary problems
– do not have sufficient ability to work with gifted pupils and pupils with special educational needs
– show shortcomings in the choice of appropriate teaching methods

The questionnaire survey also brought several stimulating suggestions for improving the concept of teaching training: inclusion of listening and assistant training during bachelor's studies, enabling tandem teaching in training, extension of continuous training, training of teacher-student communication and practical training of various forms and methods of teaching within subject didactics.

CONCLUSION

Based on the results obtained from the questionnaire survey, the importance of the implementation of pedagogical trainings in the undergraduate training of future teachers at the Faculty of Science, Palacký University Olomouc is confirmed.

Pedagogical trainings should fulfill three important tasks. Training should help science and mathematics teaching students to get to know the school and the school environment. Trainings should relieve students of fear during communication. Training should integrate the knowledge gained by studying at the faculty with the reality of school life. It follows that future teachers should observe school environments. Subsequently, they should move to their positions as educators. They should be able to confront this initial knowledge with their possibilities, motivation and perspective. It also follows that the absence of listening and observation practice in the bachelor's study program hinders awareness of the teacher's position in education.

In our research, we focused on the evaluation of pedagogical trainings of future science and mathematics teachers. We tried to capture the importance of pedagogical skills of future teachers. It is also important to realize that education is constantly changing. The educational process is becoming more and more interactive. Therefore, targeted preparation of future teachers for mobile education is also important. Sharafeeva (2022: 31) also dealt with this issue in her research.

Pedagogical trainings in general allow students to connect theoretical knowledge with a specific situation in the school; they provide a reflection of all activities not only from the position of the teacher but also the student. It develops the ethics of social communication with all participants in the educational process. Trainings strengthen competencies for planning, managing and diagnosing educational activities.

Our research also pointed to a lack of preparation for working with pupils with special educational needs. Future teachers should be better prepared to work with children with disabilities and health disadvantages. Studies dealing with the problems of teachers who taught children with disabilities were published by Berikkhanova (202: 675). The results of their pedagogical research confirmed the importance of the adaptation of future teachers in an inclusive environment.

In the field of digital competencies, it is necessary to focus on the transfer of knowledge in the field of information and communication technologies into the process of teaching science and mathematics, specifically the use of various software for e.g., validation of results, possible procedures for solving specific examples and visualization of specific issues. The use of mathematical software in science subjects enables students (future teachers) to better understand the current educational context, develop their sense of imagination and learn this way of thinking.

Everyday work in the educational environment helps to better develop pedagogical thinking. The trainings integrate all components of the university preparation of future teachers and thus form overall pedagogical competence. Teaching practice is one of the important basic pillars that will prepare future teachers for a very demanding but enriching professional career.

REFERENCES

Berikkhanova, Ospanova, Yermenova, Zharmukhametova, Sultanova, Urazbaeva (2021): G. Berikkhanova, B. Ospanova, B. Yermenova, R. Zharmukhametova, N. Sultanova, A. Urazbaeva, The Effectiveness of the Training Model of the Future Teacher in Conditions of Inclusive Education, *International Journal of Education and Practice*, IX/4, 670–686.

Buchberger, Busch (1988): F. Buchberger, F. W. Busch, The role of Practical Element in Initial Teacher Education, *European Journal of Teacher Education*, XI/ 2–3, 89–91.

Cobo-Huesa, Abril, Ariza (2022): C. Cobo-Huesa, A. M. Abril, M. R. Ariza, Pedagogical content knowledge for teaching of nature of science and critical thinking in initial primary teacher education, *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias*, XIX/3, Universidad de Cádiz, 360201–360215.

Dofková (2019): R. Dofková, Tandemová výuka v matematice jako instrument reflektivního modelu vzdělávání, *e-Pedagogium*, XIX/1, UP Olomouc, 7–13.

Dytrtová, Krhutová, (2009): R. Dytrtová, M. Krhutová, *Učitel-příprava na profesi*, Grada Publishing: Praha.

Gavora (2010): P. Gavora, *Úvod do pedagogického výzkumu*, Paido: Brno.

Chráska (2003): M. Chráska, *Úvod do výzkumu v pedagogice*, UP Olomouc: Olomouc.

MŠMT (2021): *Rámcový vzdělávací program pro gymnaziální vzdělávání*. Retrieved in June 2022 from https://www.edu.cz/rvp-ramcove-vzdelavaci-programy/ramcove-vzdelavaci-programy-pro-gymnazia-rvp-g/

Nezvalová (2007): D. Nezvalová, *Pedagogická praxe v počáteční přípravě učitelů přírodovědných předmětů a matematiky pro střední školy*. Retrieved in May 2020 from http://esfmoduly.upol.cz/

Pinheiro, Zaidan (2022): N. V. Pinheiro, S. Zaidan, Learning Evaluation in Mathematics Teaching Degree and the Possible Implications for Teacher Training, *The Mathematics Enthusiast*, XIX/2, Montana, 442–469.

Průcha, Walterová, Mareš (2001): J. Průcha, E. Walterová, J. Mareš, *Pedagogický slovník*, Praha: Portál.

Sharafeeva (2022): L. Sharafeeva, A Model of Future Mathematics Teachers' Preparedness to Organize Mobile Learning for Schoolchildren, *Journal of Curriculum and Teaching*, XI/3, Special Issue, 30–37.

Skafa, Evseeva, Abramenkova, Goncharova (2021): E. I. Skafa, E. G. Evseeva, Y. V. Abramenkova, I. V. Goncharova, The system of training a new generation of mathematics teachers based on project and heuristic activities, *Perspectives of Science & Education*, LIII/5, 208–222.

Šimoník (2005): O. Šimoník, Pedagogická praxe – připomínky k jejich organizaci a průběhu, náměty na jejich zefektivnění, In: *Pedagogická praxe a profesní rozvoj studentů*, Brno: Masarykova Univerzita Brno, 48–53.

Vonk (1983): J. H. C. Vonk, Problems of Beginning Teacher, *European Journal of Teacher Education*, VI/2, 133–150.

Јана Слезакова

Универзитет Палацки у Оломоуцу
Факултет природних наука
Одсек за експерименталну физику, Одељење за педагошку праксу
Чешка Република

ПЕДАГОШКА ПРАКСА ИЗ ПЕРСПЕКТИВЕ СТУДЕНАТА – БУДУЋИХ УЧИТЕЉА СА УНИВЕРЗИТЕТА ПАЛАЦКИ У ОЛОМОУЦУ

Резиме: Рад се бави питањем перцепције и евалуације прве континуиране педагошке праксе из угла студената, будућих наставника природних наука и математике. Најпре је дат преглед и опис компетенција будућих наставника, које су кључне у оквиру прве континуиране праксе. У другом делу представљена је организациона структура прве праксе на Факултету природних наука Универзитета у Оломоуцу у Чешкој Републици. Циљ истраживања је био да се испита како студенти процењују сопствену припремљеност за праксу и саму праксу.

Кључне речи: педагошка пракса, компетенције наставника, извођење наставе у пару.