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# THE USE OF EDUCATIONAL TECHNOLOGIES IN THE STUDENTS' PEDAGOGICAL PRACTICE ACTIVITIES

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## Abstract

The process of digitalization has a great influence on every context of people's life: social, work, political, communicative, economic and last but not least educational. The rapid rate of development of educational technologies offers new opportunities for the forming and development of competencies of the future and current teachers, the attitude towards these new technologies being a necessary condition for their adoption in the educational act. This paper addresses the way in which educational technologies have been used in the activities within the discipline Pedagogical Practice both by the mentor teachers from pre-university educational institutions and by the students from the faculties of the Technical University of Cluj-Napoca - North University Center of Baia Mare in the practical testing of didactic competencies. Understanding attitudes towards new technologies has an active role in determining the perceptions of future teachers about their use in the teaching-learning-evaluation process. The present paper aims to investigate, using the survey as research method and a questionnaire applied to students as research instrument, the attitudes of personal and didactic use of technologies, the perception of digital skills of students as future teachers, and the way in which technology is used in lower secondary and upper secondary pre-university education, given that the initial teaching training offers through practical pedagogically activities an opportunity for the students to get acquainted with the teaching profession and digital native pupils.



*Keywords:* Educational technology, didactic competences, students, teachers, pedagogical practice

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## 1. Introduction

Preparing new generations of teachers to develop the necessary skills in a technological, dynamic and unpredictable world focuses on incorporating emerging technologies and innovative teaching strategies. Educational offers are flexible and digitalization is embedded in educational environments. In collaboration, teachers need to master the technology and integrate it into their classroom work, to use active learning strategies, to know and to implement educational innovations. Teachers play an important role in transmitting information but also in teaching how to access this information, given that one of the main characteristics of the digitalization of education is the implementation of a type of learning that emphasizes learning anywhere and anytime. In this regard, teachers must adapt to the change in the dynamics and nature of knowledge caused by technology and have the skills to cope with the uncertainties of the specifics and constantly changing teaching activities. In these conditions, universities through their initial teaching training programs have to update their educational models, emphasizing the development of relevant teaching skills, on encouraging students as future teachers to become lifelong learners and to accept diversity.

## 2. Students' Pedagogical Practice during the Initial Teaching Training (ITT) in the context of Education 4.0 and Fourth Industrial Revolution (IR 4.0)

Starting from the fact that IR 4.0 is characterized by rapidly changing technologies and programmed analysis of digitized data, educational systems need to respond to these challenges (Teo et al., 2021). Rad et al. (2022) see the need of using of digital technology in the classroom in order to close the gap in the digital literacy and prepare pupils and students for the future society. Astuti et al. (2021) consider that competence in using digital technology is an important key to be professional prepared to applicate new and adequate learning models and methods to carry out learning. In the conditions of Education 4.0, human and technology are aligned to offer new facilities for teaching-learning-evaluation process meaning that, more than forming competences, it would be needed to identify the source to learn these skills and knowledge (Hussin, 2018). The trends in Education 4.0 can be observed in Figure 1.

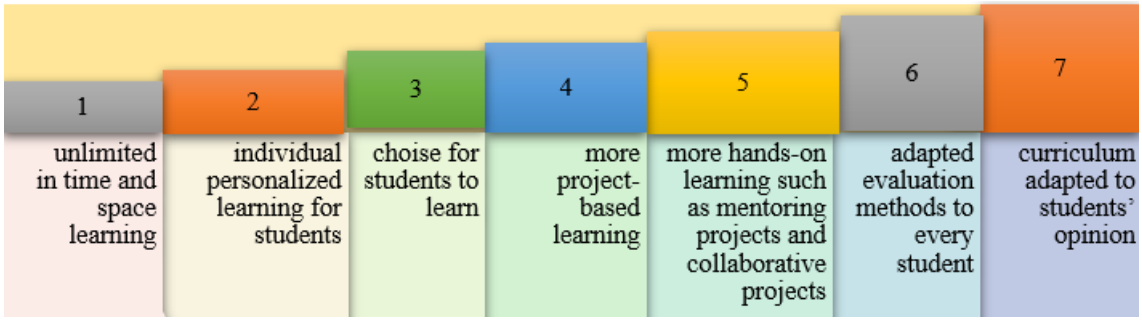


**Figure 1.** Trends in Education 4.0 (adapted from Hussin, 2018)

The pedagogical practice is an activity with a major importance for ITT offering to the students the opportunity to get acquainted with the specific elements of the training cycles, as well as with the didactic

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strategies and styles. The main objective of this stage is to form the specific competences of teaching profession. The students take the role of the teacher trying to increase the connections between theory and practice, being present directly into teaching activities with pupils (Catalano, 2018, p. 101).

There are three types of pedagogical practice which are described in the Table 1.

**Table 1.** The types of students' pedagogical practice

| Types of Pedagogical Practice | Description |
|---|---|
| **Documentation Practice** | • outlines the dissemination of information gathered from courses, school documents, scientific literature; |
| **Observational or Passive Practice** | • familiarizes the students with the teaching-learning strategies and styles that teachers use more frequently in fulfilling their duties. The observation of the didactic activity will acquire formative valences if a series of conditions are observed, such as:<br>– clear determination of what to observe,<br>– optimal observation conditions,<br>– optimal recording of observed acts,<br>– revision of the notes, appreciation, reflection on the observed data by giving a necessary time to review the noted ones in order to clarify the ambiguities, to share some experiences, ideas, etc; |
| **Active Teaching Practice** | • consists in the effective assumption of the roles related to the teaching activity starting from the lesson projection to the preparing of teaching materials and finishing with teaching lesson, pupils' evaluation and self-evaluation of the teaching act. |

Being a teacher means to follow a constant training of teaching, mentoring and professional retraining based on professional standards for teaching and quality standards (Catalano et al., 2020). Curtis et al. (2019) highlight in their research that the evaluation in ITT could no longer continue in the traditional model of separation between educational theory and knowledge at university and practice in pre-university institutions. Bilbao et al. (2021) consider that the future teachers have the characteristics needed in order to adopt the challenges presented in Figure 2.

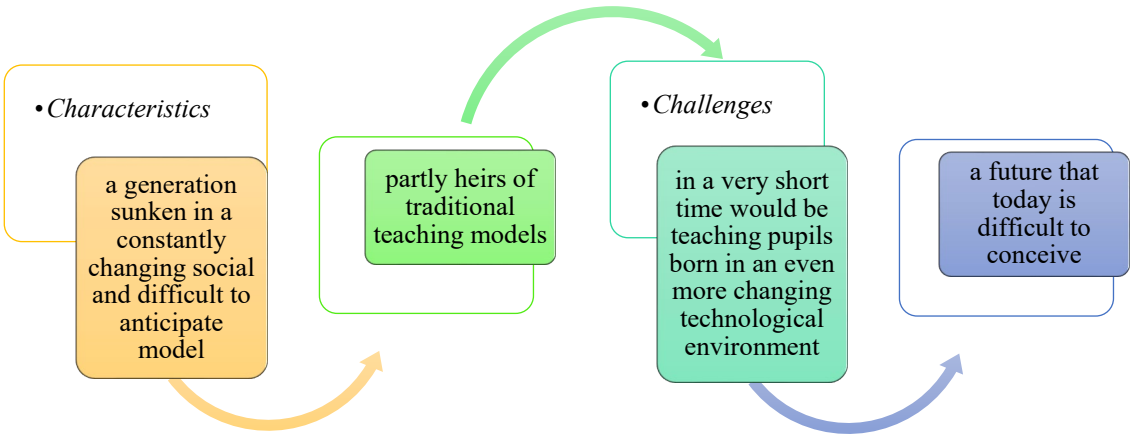


**Figure 2.** Characteristics and challenges for future teachers (adapted from Bilbao et al., 2021)

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Cucoș (2020) sees that the use and maximization of the new technological and social framework in education are developed under the influence of factors as those presented in Figure 3.

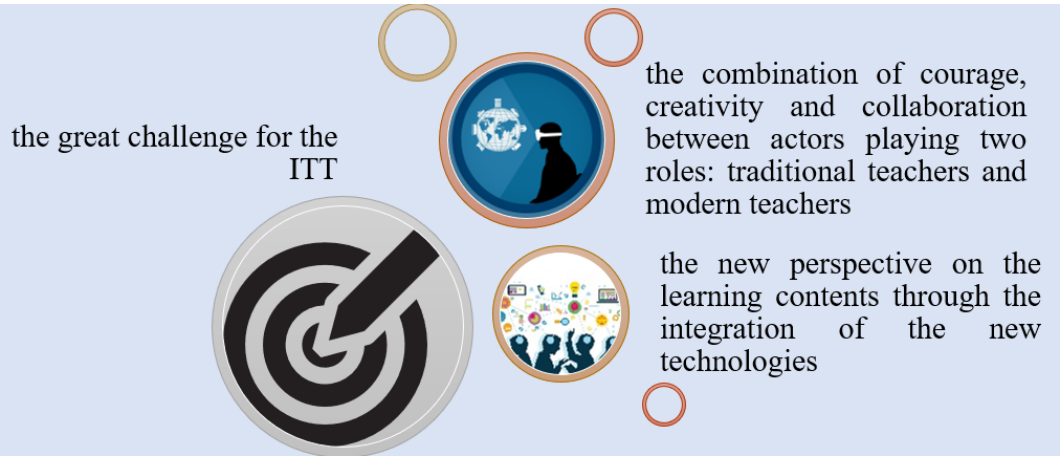


**Figure 3.** Determinative factors of the new techno-social framework's maximization and use

The same author consider that "a good teacher will have not only a competence on the content but also on the presentation of that content through the appeal of the right supports and registers" (p. 271).

## 3. Problem Statement

The fast development of the new technologies implies the development of innovation solutions for education and training challenges. Early adoption of innovation solutions that draw educational challenges need for an user-driven innovation although the user's perspective is often not sufficiently considered because of the possibility to limit the solutions to a need given that, usually, individuals develop the solutions only for problems they face (European Commission, 2018). Barkoczi (2022) considers that teachers and students need to adopt new technologies even that they do not have enough information on how to use them.

The use of technologies in the personal life doesn't mean that the users are ready to adopt new technologies for studies or in professional life, in our case didactic activity and active pedagogical practice. The sources of information has a great influence on the way the students see the technology as a necessity. According to Costin and Roman (2020), the family is considered a credible source of information even regarding the trust in using technology although the time spent on social networks by the children is a constant concern of the parents (Coșarbă et al., 2021).

## 4. Research Questions

The research questions are as follows:

i. What are the technologies adopted by the students from the mentor teachers in order to use it in pedagogical practice activities?

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ii. Why are informational sources and the way in which the students take the information about new technologies important for forming digital competences in order to be prepared to use it in active pedagogical practice in the school's classrooms?

Starting from the approach of technology acceptance in education, the authors proceed to investigate how often the technologies were use in the pedagogical practice activities highlighted through using devices and open education resources as means of education.

## 5. Purpose of the Study

The study approaches the use of educational technologies in the students' pedagogical practice activities, but also the opinions regarding:

i. the availability to use devices as smartphone, laptop, tablet, interactive whiteboard anytime, anywhere,
ii. the attitude towards new technologies,
iii. the source of information in order to find about new technologies,
iv. the degree of confidence needed for using the new technologies.

This research is about the adoption of new technologies in the didactic activities by mentor teachers and students in order to identify the adequate didactic strategies for forming didactic competences in line with technological education.

## 6. Research Methods

The data collection tool is the ascertaining questionnaire designed online so as to allow the acquiring of useful answers in order to gather as much information as possible about the degree of using the devices and open educational resources in the didactic activity. The research method is the survey addressed to the students from the faculties of the Technical University of Cluj-Napoca - North University Center of Baia Mare. The researchers appeal to the judgment of choosing those subjects from which it can be obtained correct information, sending the link by WhatsApp in order to allow the completion of the questionnaire. The opinion poll focused on tracking the trust in using new technologies in didactic activity. The questionnaire presents information about students' attitude towards use of technologies in the pedagogical practice activities. The questions used are:

i. closed questions of opinion and facts,
ii. rank order question with a nine-point scale of importance which enables a relative degree of priority, intensity, ranging from *very important* to *unimportant,*
iii. rank order question with a five-point scale of importance, ranging from *very important* to *unimportant*, asking respondents to identify priorities*,*
iv. rank order question with rating scale: 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree,
v. open-ended questions of identification the reason of not using technology in the pedagogical practice activities.

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The questionnaire also includes socio-demographic questions such as gender, age, place of studying.

The questionnaire was implemented and administered by the authors. The website isondaje.ro was used in order to apply the online questionnaire. The implementation period was May 2022. The target group is represented by the students from Technical University of Cluj-Napoca – North University Centre of Baia Mare, Psycho-Pedagogical Training Program. At the end of the implementation period, a number of 106 respondents resulted. The authors use the SPSS statistical package to investigate the results.

The main framework hypotheses, that formed the basis of the research, are:

**H 01.** The systematic use of technologies in the private life of the students from the Psycho pedagogical Training Program and the sources from which they take the information about it contributes to the increasing of the quality of their activities.

**H 02.** The systematic use of technologies in educational practices by the mentor teachers contributes to the acceptance of using technologies in active pedagogical practice of the students.

## 7. Findings

The research is an ascertaining study regarding the degree of using technologies in the pedagogical practice activities. The results obtained for each of the questions are correlated with the hypothesis as basis of the research questions.

The target group being students, the socio-demographic analysis of the respondents shows the percent 89% represented by the students up to 25-year-olds. as it can be observed in the Figure 4.

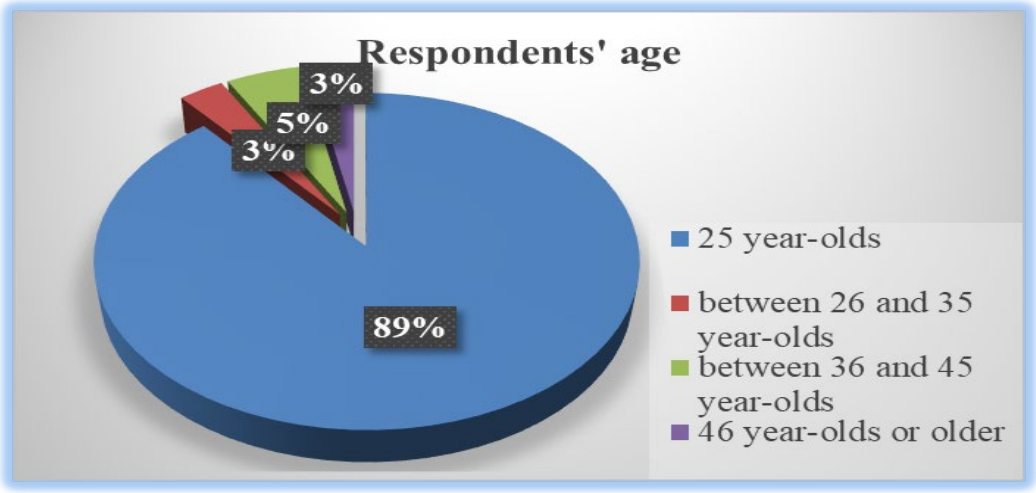


**Figure 4.** Representation of the sample by age categories of respondents

The descriptive statistics of respondents' gender and the faculty where they are studying is presented in Table 2. There is a small number of the students from the Faculty of Engineering comparatively to the other two faculties because most of them do not think about having a didactic career.

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**Table 2.** Sample structure by students' gender and the faculty where they are studying

| Gender | Faculty of Sciences | Faculty of Humanities | Faculty of Engineering | Total |
|---|---|---|---|---|
| Male | 10 | 4 | 8 | 22 |
| Female | 39 | 36 | 9 | 84 |
| Total | 49 | 40 | 17 | 106 |

### 7.1. The new technologies in the students' life

Keser and Semerci (2019) see smart technologies as becoming increasingly used in many fields of a person's life. The item regarding the time spent using technologies like computer, tablet or smartphone in the personal activities (shopping, socializing, entertainment, making a reservation, contacting relatives and friends) shows that 93% of the respondents use them daily, 5% use them weekly and 2% use them monthly.

Information or data about new technologies are collected from all the ways, channels or means that are available for the people (Mohammed et al., 2022). At the ranking item about the sources used for taking the information about new technologies, the students give the first place to family, friends or colleagues and the last place to printed magazines and newspapers as it can be observed in the Figure 5.

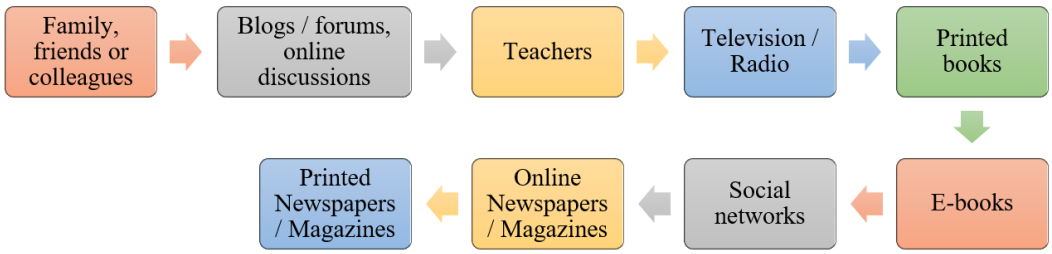


**Figure 5.** Representation of the sources of information about the new technologies

At the rank order question with rating scale: 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree What is your attitude towards new technologies?, the answers of the respondents validate the first hypothesis according to which H 01 The systematic use of technologies in the private life of the students from the Psycho pedagogical Training Program and the sources from which they take the information about it contributes to the increasing of the quality of their activities as it can be observed in the Table 3.

**Table 3.** Systematization of the categories of answers on the students' attitude towards using technology

| The alternatives from the questionnaire regarding the attitude towards new technologies | The scale | The faculty where students study: | | | Total |
|---|---|---|---|---|---|
| | | Faculty of Sciences | Faculty of Humanities | Faculty of Engineering | |
| When I have the opportunity to use new technologies, I am afraid that I could damage something. | 1 | 34% | 38% | 35% | 35% |
| | 2 | 20% | 10% | 29% | 18% |
| | 3 | 14% | 18% | 18% | 16% |
| | 4 | 24% | 24% | 12% | 23% |
| | 5 | 8% | 10% | 6% | 8% |
| I hesitate to use new technologies | 1 | 43% | 55% | 35% | 46% |

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| | | | | | |
|---|---|---|---|---|---|
| for fear that I might make some mistakes that cannot be corrected. | 2 | 27% | 33% | 41% | 31% |
| | 3 | 20% | 2% | 18% | 14% |
| | 4 | 10% | 10% | 6% | 9% |
| I don't feel comfortable when I must use new technologies. | 1 | 45% | 58% | 41% | 49% |
| | 2 | 31% | 22% | 12% | 25% |
| | 3 | 16% | 8% | 35% | 16% |
| | 4 | 8% | 5% | 12% | 7% |
| | 5 | 0.0% | 7% | 0% | 3% |
| New technologies make the activity more interesting. | 1 | 0% | 3% | 0% | 1% |
| | 2 | 2% | 0% | 0% | 1% |
| | 3 | 6% | 12% | 6% | 8% |
| | 4 | 43% | 28% | 35% | 36% |
| | 5 | 49% | 57% | 59% | 54% |
| I like to use new technologies. | 1 | 0% | 3% | 0% | 1% |
| | 2 | 2% | 7% | 0% | 4% |
| | 3 | 12% | 5% | 12% | 9% |
| | 4 | 41% | 23% | 47% | 35% |
| | 5 | 45% | 62% | 41% | 51% |
| I intend to use new technologies often. | 1 | 0% | 3% | 0% | 1% |
| | 2 | 2% | 3% | 0% | 2% |
| | 3 | 14% | 12% | 18% | 14% |
| | 4 | 43% | 30% | 41% | 38% |
| | 5 | 41% | 52% | 41% | 45% |
| My activities are better when I use new technologies. | 1 | 0% | 5% | 0% | 2% |
| | 2 | 6% | 3% | 0% | 4% |
| | 3 | 22% | 20% | 24% | 22% |
| | 4 | 37% | 30% | 35% | 34% |
| | 5 | 35% | 42% | 41% | 38% |

Beside finding about the new technologies, the students need to have access to specialized sites, specialized training for the use of new technologies, guidance in the use of new technologies, opinion of someone which is appreciated, assistance from a special instructor for the use of new technologies. The sources of the assistance providers are presented above in the order of their importance for the students based on the responses to the question What would you give confidence in using new technologies?.

### 7.2. The use of educational technologies in the pedagogical practice activities

Top et al. (2021) consider that the teaching-learning-evaluation process needs to be reconfigured to the requirements of the developments in the education brought by the ever-changing world which need an adaptation to technological innovations and that the role of teachers is of integrating the new technologies in education. At the item regarding the type of the educational means used during the observational pedagogical practice in the didactic activities it can be observed in the Table 4 that the printed materials are still the most used didactic material and that the open educational resources are used only by the 42% of the mentor teachers. In order to see the availability to use technologies by the mentor teachers, the authors introduced two items: Which of the following devices have been frequently used by the mentor teacher in the classes you have attended in his or her work with students? and In how many

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lessons at which you practiced observative activities per semester were the devices, mentioned in the previous question, used?. The respondents' answers are that 60% of the teachers used laptop, 15% smartphone, 11% interactive whiteboard, 7% tablets. The remained percent of 5% represents the teachers who do not used devices in the teaching-learning-evaluation process during the pedagogical practice period. At the next item, the descriptive analyse shows us that 50% of the mentor teachers used the devices the whole period of the students' pedagogical practice.

**Table 4.** Systematization of the categories of answers regarding the teaching-learning means used during the observational pedagogical practice

| The didactic materials used during the observational pedagogical practice | Faculty of Sciences | Faculty of Humanities | Faculty of Engineering | Total Frequency |
|---|---|---|---|---|
| Printed materials | 35 | 34 | 13 | 78% |
| Audio / video materials | 29 | 32 | 11 | 68% |
| Power Point Presentations | 37 | 21 | 15 | 69% |
| Practical activities in the experimental laboratory | 20 | 3 | 3 | 25% |
| Online or computer simulations | 15 | 18 | 8 | 39% |
| Datasets / Spreadsheets (MS Excel for example) | 9 | 5 | 5 | 18% |
| Editing techniques (MS Word, OneNote, Notepad for example) | 17 | 7 | 8 | 30% |
| Open educational resources | 16 | 23 | 5 | 42% |
| Resources for students with special needs | 4 | 3 | 0 | 7% |

As a consequence of the acceptance and using the technologies by the mentor teachers and by the coordinators from the university in the period of pedagogical practice, the descriptive statistics show us that 43% of the respondents used open educational resources during the test lesson and 10% of the respondents used interactive whiteboard. It can also be observed a percent of 35% of the respondents represented by the number of the students which taught in online because of the pandemic period and a percent of 12% of the respondents represented by the students who do not used technologies during the test lesson because of various reasons as the suggestion of the mentor teacher, the time needed for preparing the lesson in order to teach, the choose for teaching in a traditional way. These results validate the second hypothesis H 02. The systematic use of technologies in educational practices by the mentor teachers contributes to the acceptance of using technologies in active pedagogical practice of the students.

Marin et al. (2022) consider that the students should be encouraged by the teachers to have self-confidence in what they know even in the context of the big changes in educational system because of the technology.

## 8. Conclusions

The process of teaching and learning takes place within an adaptable context to the new waves coming from Education 4.0. The teacher's didactic strategy for the ITT is more than transmitting knowledge and then expecting students to use the knowledge effectively. An important role for developing didactic competencies is played by the practical environment with a mentor teacher which one, in order to have professional development, need a technology coach as an effective way to be helped to learn to integrate technology in the teaching-learning-evaluation process. If the mentor teacher is

experienced with technology instruction, this arrangement helps the future teachers to integrate technology. The adoption of technology by the students in the pedagogical practice activities is influenced by how teachers learn to use technology with their classes. At this trend, the teachers' role is not only that of teaching knowledge but of teaching technology.

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