

Interactive educational technologies as a factor in the development of the subjectivity of university students

Kariyev Adlet^{a*}, Kazakh National Women's Teacher Training University, Research and Innovation of the Graduate, School of Pedagogy and Psychology, 99 Aiteke Bi Street, 050000 Almaty, Kazakhstan, <https://orcid.org/0000-0002-7789-9080>

Sultanova Zhanagul^b, Kazakh National Women's Teacher Training University, Institute of Art and Management, 99 Aiteke Bi Street, 050000 Almaty, Kazakhstan <https://orcid.org/0000-0002-5444-7612>

Yeraliyeva Tolkin^c, T.K. Zhurgenov Kazakh National Academy of Arts, Department of Psychology, 127 Panfi Lova Street, 050005 Almaty, Kazakhstan, <https://orcid.org/0000-0002-8770-024X>

Fadeyeva Olga^d, Kazakh National Medical University named after S. D. Asfendiyarov, Department of Physical education, 94 Tole Bi Street, 050000 Almaty, Kazakhstan, <https://orcid.org/0000-0002-1230-0612>

Assenova Nazymgul^e, Pavlodar Pedagogical University, First Education Graduate School of Pedagogy, 60 Mira Street, 140002 Pavlodar, Kazakhstan, <https://orcid.org/0000-0002-6027-0809>

Nurgalym Kadir^f, Abai Kazakh National Pedagogical University, Department of International Law, 13 Dostyk Avenue, 050010 Almaty, Republic of Kazakhstan <https://orcid.org/0000-0002-5377-5358>

Suggested Citation:

Adlet, K., Zhanagul, S., Tolkin, Y., Olga, F., Nazymgul, A., & Kadir, N. (2022). Interactive educational technologies as a factor in the development of the subjectivity of university students. *World Journal on Educational Technology: Current Issues*. 14(3), 533–543. <https://doi.org/10.18844/wjet.v14i3.7269>

Received from February 10, 2022; revised from March 15, 2022; accepted from May 20, 2022.

Selection and peer review under responsibility of Prof. Dr. Servet Bayram, Yeditepe University, Turkey.

©2022 Birlesik Dünya Yenilik Arastırma ve Yayıncılık Merkezi. All rights reserved.

Abstract

The purpose of this research is to evaluate the use of interactive educational technologies as a factor in the development of university students' characteristics with student views. The study group of the research included 25 students studying at various universities in Almaty, Kazakhstan, in the 2021–2022 academic year. This research was designed in accordance with the phenomenological method, one of the qualitative research methods. Research data were collected through a semi-structured interview form created by the researchers. As a result, it has been revealed that university students tend to use interactive educational technologies. Students stated the positive effects of interactive educational technologies on improving their characteristics and in terms of learning skills, technology skills, cognitive skills, self-skills and social skills. In addition, university students stated unwillingness to learn, technology addiction and cognitive difficulties as the negative effects of interactive educational technologies on student characteristics. In universities, activities should be carried out to improve the level of students' use of interactive educational technologies.

Keywords: Interactive educational technology, student characteristics, student opinions;

* *ADDRESS FOR CORRESPONDENCE: Kariyev Adlet, Kazakh National Women's Teacher Training University, Research and Innovation of the Graduate, School of Pedagogy and Psychology, 99 Aiteke Bi Street, 050000 Almaty, Kazakhstan,

E-mail address: adlet.kari@mail.ru

1. Introduction

In today's understanding of education, the need to reach more students in a more efficient way has arisen. In addition, while doing this, the tendency to benefit from educational opportunities independent of time and place has increased. Increasing the efficiency of education is parallel to the development in technology (Georgina & Hosford, 2009). It has also become an important factor for teachers and students, who are important elements of education, to acquire the knowledge and skills they need through their own efforts. In the understanding of education in accordance with the requirements of the age, the technological opportunities needed to realise more efficient and faster learning have become indispensable for students, teachers and educational environments. In this renewal process, the perspective of interactive education technologies has become more and more important.

1.1. Theoretical and conceptual framework

Interaction, which is defined as the process of mutual influence, is seen as a necessity in many learning and teaching theories and also as a critical element of good learning. Muirhead and Juwah (2004) defined interaction as a simultaneous and discrete dialogue, discourse or events that occur between people as a response to questions, responses or technology.

It is possible to say that there are three basic interactions in technology-supported education environments. They are student–content, student–teacher and student–student interactions. Student–content interaction is the interaction between the student and the subject of study; in other words, between the student and the content. Student–teacher interaction is the interaction between the student and the experts who teach the distance education course. Finally, student–student interaction is the interaction of students with each other individually or as a group, with or without a teacher (Keegan, 2005).

The rapid change in technology-supported education in recent years has changed the direction of learning activities. Education policies of developed and developing countries around the world point to technology support for increasing the quality of education. Conscious involvement of educational technologies is of great importance in terms of both raising individuals who have the needs of the information age and in improving the learning–teacher processes (Hew & Brush, 2007). It is possible to say that many developed countries handle educational technologies with an interdisciplinary approach and tend to use educational technologies more and more every day in teaching field courses (Korte & Hüsing, 2006).

Research on the effects of the use of educational technologies in educational practices with different dimensions reveals the positive effects of the use of educational technologies in education on student success. In this direction, it is seen that the effective use of teaching materials in computer-assisted technology-based learning environments also affects student success positively (Kiboss, 2002). With the compulsory use of digital technologies in education, especially during the COVID-19 pandemic period, students, teachers, families and educational institutions and societies have experienced the impact of educational technologies on educational outcomes in the most effective way (Mukhtarov & Vedyushkina, 2021). Virtual classrooms, one of the distance education applications in which interactive education technologies are used most effectively, have become applicable at all levels of education, especially during the pandemic period. Education given at the higher education level has also changed direction with virtual classroom applications. Virtual classroom applications reveal the effort to create an ideal environment for learning and teaching practices by combining mobile devices, technological tools and the development speed of technology (McSweeney, 2010). With this new transformation in education, face-to-face lessons in traditional classrooms have been replaced by an interactive educational technologies platform with new methods and applications. In these platforms, training was carried out in different environments for simultaneous (synchronous) lessons and in different environments at different times for asynchronous (asynchronous) lessons through virtual classroom applications (Alshahrani, Ahmed, &

Ward, 2017). From this point of view, it is possible to say that interactive education technologies are an indispensable tool used to increase the efficiency, continuity and quality of the education process.

1.2. Related research

When the literature on the use of interactive educational technologies in education is explored, it is seen that there are studies on virtual classroom applications. It is seen that especially these studies focus on the effect of interactive educational technologies on course success in national and international dimensions. In addition, it is seen that researches focusing on the effects of interactive educational technologies on the attitude to learning, the effect on the course participation process, the importance of developing virtual classroom material and the importance of interaction in the virtual classroom (Martin, Parker, & Deale, 2021). In their study, De Westelinck, Valcke, De Craene and Kirschner (2005) revealed that interactive educational technologies make knowledge permanent. Rovai and Barnum (2003) tried to reveal the quality of web-based interactive education. As a result, it has been revealed that the motivation of the students, their past experiences, the quality of the education provided and the students' tendency towards technology-based education are the factors that affect the quality of interactive education. Young and Norgard (2006), on the other hand, emphasised the importance of interaction between student–teacher and student–student in their research in terms of increasing the quality of education.

Many issues such as how to use educational technologies by students, to what extent technology will be independent of and connected with content in the integration of technology into education and whether technology can be handled as a stand-alone tool have become important fields for researchers after technology and education meet in the same environment. The information obtained as a result of the researches revealed the effect of successful technology integration on student success (Barron, Kemker, Harmes, & Kalaydjian, 2003; Dionys, 2012; Sanchez, 2011). Devedzic and Devedzic (2019) emphasised the importance of not only technology-assisted education but also technology-assisted assessment in their research. Keser and Semerci (2019), on the other hand, evaluated the effects of technology trends on learning and teaching processes, taking into account the changing educational paradigms and educational approaches. Liao (2007) in his research conducted in Taiwan revealed that the effect of interactive education technologies on student achievement is more effective than traditional methods.

In their study, Masalimova et al. (2021) discussed the transformations in the educational approach of universities during the COVID-19 pandemic from the perspective of interactive educational technologies. As a result, the positive effects of interactive educational technologies on learning activities were revealed. Markoska (2021), on the other hand, aimed to reveal the acceptance level of university students in interactive educational technologies. As a result, it was emphasised that the use of interactive educational technologies by university students increases student success and the necessity of using them in wider areas.

1.3. Purpose of the research

The purpose of this research is to evaluate the use of interactive educational technologies as a factor in the development of university students' characteristics with student views. In line with this purpose, answers are sought for the following sub-objectives:

1. What are the tendencies of university students to use interactive educational technologies?
2. What are the opinions of university students about the positive effects of interactive educational technologies on the development of students' characteristics?
3. What are the opinions of university students about the negative effects of interactive educational technologies on the development of students' characteristics?

2. Method and materials

This section contains information about the method, technique, data collection tools, participant group and data analysis of the research.

2.1. Research method

This research was designed in accordance with the phenomenological method, one of the qualitative research methods. Qualitative research can typically focus on a single case, purposefully selected, to allow for a deeper understanding and examination of a phenomenon on relatively small samples (Patton, 2002). Phenomenological studies are concerned with how people experience the world at a particular time and in a particular context. In other words, phenomenological studies aim to describe, understand and interpret the structure of phenomena that occur in consciousness as a result of the interaction of the individual with the world (Bloor & Wood, 2006). The rationale for using the phenomenology pattern in the research can be explained as follows: The focus of the research is how university students make sense of their experiences with the technologies of interactive education. In this focus, the role of interactive educational technologies in the development of students' characteristics is examined in depth.

2.2. Participants

The study group of the research was tried to be formed in such a size that an in-depth analysis of the answers to be taken from the questions in the semi-structured interview form prepared in accordance with the phenomenological method could be made. Some authors also gave the number of samples according to the research design. For example, Creswell (2007) recommends 3–5 participants for case study, 10 participants for phenomenological research and 15–20 participants for grounded theory (Creswell & Poth, 2016). In this direction, it was deemed appropriate to form the study group of the research with 25 students. The study group of the research consists of students who are studying at various universities in Almaty, Kazakhstan, in the 2021–2022 academic year and who voluntarily agreed to participate in the research. Of the university students participating in the research, 6 are studying in the Faculty of Education, 11 in the Faculty of Engineering and 7 at the Faculty of Health Sciences. 2 students are in the first year, 4 students are in the second year, 10 students are in the third year and 9 students are in the fourth year. Of the university students participating in the research, 11 are male and 14 are female.

2.3. Data collection tools

Research data were collected through a semi-structured interview form created by the researchers. In this direction, interviews were held with the study group of the research. The interviews were conducted by determining the appropriate place and time for the university students participating in the research. The semi-structured interview form prepared to collect the research data is given in Table 1.

Table 1. Semi-structured interview form

Demographic information				
Your gender:	Female ()		Male ()	
Class You're Studying:	1. Class ()	2. Class ()	3. Class ()	4. Class ()
Faculty where you studied:				
Questions on Interactive Educational Technologies				
What is your tendency to use interactive educational technologies?				
What are your views on the positive effects of interactive educational technologies on the development of students' characteristics?				

What are your views on the negative effects of interactive educational technologies on the development of students' characteristics?

The semi-structured interview form given in Table 1 was presented to three experts during the preparation phase for their opinions. The semi-structured interview form created was then applied to four university students and it was determined that the questions in the form were clear and understandable.

2.4. Data collection process

In the process of collecting research data, one-on-one interviews were conducted with university students. The interviews were held in the university, in an area where a quiet environment was provided where the interviews could be conducted. During the interviews, the students were given in-depth information about the content and ethical principles of the research. Permission was then requested to record the interviews. Each interview lasted for approximately 45 minutes. The process of collecting the data by completing the interviews with all students took an average of 4 weeks.

2.5. Data collection analysis

The research data were converted into findings by the content analysis method. Content analysis requires a more detailed examination of the collected data and reaching the concepts, categories and themes that explain this data. Content analysis focuses on collected data; codes are extracted from the events and facts that are frequently repeated in the data set or which the participant emphasises heavily on. One can go to categories from codes and to themes from categories. In short, data (codes) that are found to be similar and related to each other are interpreted by bringing them together within the framework of certain concepts (categories) and themes. In content analysis, the content of participants' views is systematically separated (Bengtsson, 2016). The findings obtained from the interviews with the university students participating in the research were obtained by the analysis of the audio recordings. Student responses recorded during the interviews were transferred to semi-structured interview forms by the researchers. Transferred responses were compared by cross-checking by two researchers. Student responses transferred to the semi-structured interview form were categorised by content analysis method in order to turn them into findings. The findings are given in tables with frequency and percentage calculations. In addition, in each table, sample answers are given by keeping the information of the students hidden and coding (S1, S2, S3 ...).

3. Results

In this section, the opinions of university students participating in the research on the use of interactive educational technologies as a factor in the development of their characteristics are given.

In Table 2, the tendencies of university students participating in the research to use interactive education technologies are evaluated.

Table 2. Teachers' tendencies to use interactive educational technologies

Categories	Themes	Student Feedback	F	%
I tend to use interactive educational	Tendency to use in terms of effect on learning	S2: <i>I think interactive educational technologies have a positive effect on learning. It has a feature that reinforces learning and makes it permanent.</i>		
		S13: <i>In my opinion, interaction and technology in education are among the factors that positively affect</i>		

		<i>learning.</i>	15	60
I tend to use interactive educational technologies partially	Tendency to use in terms of the development of student characteristics	<i>S4: My tendency to use interactive educational technologies mostly stems from my belief that new technologies improve me.</i>		
		<i>S20: I find it very positive and have a tendency to use it. I find it very important for personal development.</i>		
	The tendency to use it partially in terms of its effect on learning	<i>S1: I'm partial to using it. Using educational technologies too much can cause laziness in learning.</i>		
		<i>S7: Using educational technologies in a way that does not replace learning in the classroom is partially beneficial to learning.</i>	6	24
Partial use tendency in terms of the development of student characteristics	<i>S11: Interactive educational technologies need to be used to a certain extent. Too much can cause technology addiction.</i>			
	<i>S25: I believe that the combination of formal education and interactive learning technologies is more efficient in terms of the personal development of the student.</i>			
I do not tend to use interactive educational technologies	Tendency not to use in terms of its effect on learning	<i>S14: I do not find it as efficient as in school, using interactive educational technologies in education.</i>		
		<i>S18: I haven't gotten used to learning through technology yet. I am not inclined to use it.</i>	4	16
	Tendency not to use in terms of the development of student characteristics	<i>S22: I think it negatively affects student motivation. I am reluctant. I can't learn.</i>		
		<i>S23: It lowers motivation. I think it makes the student lazy. I do not support the use of interactive educational technologies in education.</i>		

In Table 2, the tendencies of university students participating in the research to use interactive education technologies are evaluated. The students participating in the research evaluated their tendency to use interactive educational technologies in two categories: the tendency to use it in terms of its effect on learning and the tendency to use it in terms of the development of student characteristics. 60% of the university students participating in the research stated that they tend to use interactive educational technologies. 24% of the students stated that they tend to use interactive educational technologies partially. 16% of the students stated that they tend not to use interactive educational technologies.

In Table 3, the opinions of university students participating in the research on the positive effects of interactive educational technologies on the development of students' characteristics are evaluated.

Table 3. Students' views on the positive effects of interactive educational technologies on the development of students' characteristics

Category	Theme	F	%
Learning skills	Increases the love of learning	21	84
	Increases effectiveness in learning		
	Have motivation to learn		
Technology skills	Gains the ability to use technology effectively	17	68
	Technology gains awareness		
	Approaches technology from different angles		
	Gains the ability to blend digital and real environment		
Cognitive skills	Gains the ability to be solution oriented	12	48
	Gains the ability to be creative and open to innovation		
	Acquire critical thinking and problem-solving skills		
Core skills	Increases self-confidence	9	36
	Realises what they can do		
	Manages and evaluates self		
Social skills	Gains communication skills	3	12
	Will be open to sharing		

In Table 3, it is seen that university students participating in the research evaluated the positive effects of interactive education technologies on the development of students in five categories. These categories are learning skills, technology skills, cognitive skills, self-skills and social skills. 84% of the students stated that they found interactive educational technologies useful in terms of gaining learning skills, 68% technology skills and 48% cognitive skills. 36% of the students stated that interactive education technologies had a positive effect in terms of gaining self-skills and 12% social skills.

In Table 4, the opinions of university students participating in the research on the negative effects of interactive educational technologies on the development of students' characteristics are evaluated.

Table 4. Students' views on the negative effects of interactive educational technologies on the development of students' characteristics

Category	Theme	F	%
Unwillingness to learn	Affects motivation negatively	22	88
	Negatively affect learning		
	Does not fulfil learning needs		
Technology addiction	Technology creates addiction	10	40
	Addiction to technological tools		

	Creates laziness		
Cognitive difficulties	Creates aversion to inadequacy	7	28
	Difficulty of belonging due to inability to solve technological problems		

In Table 4, the views of students participating in the research are evaluated based on the negative effects of interactive educational technologies on the development of students' characteristics in three categories. They are learning reluctance, technology addiction and cognitive difficulties. 88% of the students expressed their reluctance to learn as a negative effect of interactive educational technologies on student characteristics. 40% of the students stated technology addiction and 28% stated that cognitive difficulties and interactive educational technologies have negative effects on the development of students' characteristics.

4. Discussion

The tendency of university students participating in the study to use interactive educational technologies was evaluated, and the majority of students stated that they tended to use interactive educational technologies. Sahin and Namli (2019) stated that the attitudes of university students to use technology in education are moderately positive. Gross and Latham (2007) similarly stated in their study that students' tendency to use educational technologies is moderate and positive. In addition, it is seen in the literature that researches were conducted to determine the educational technology use levels of university students and teacher candidates. The common feature of these studies is that students' tendency to use educational technologies is positive (Blankson, Keengwe, & Kyei-Blankson, 2010; Evans, 2006; Giles & Kent, 2016; Judge & O'Bannon, 2007).

The university students participating in the research were asked about the positive effects of interactive educational technologies on the development of students' characteristics. Students evaluated the positive effects in five categories: learning skills, technology skills, cognitive skills, self-skills and social skills. The majority of the students participating in the research stated that interactive educational technologies have a positive effect on learning skills from student characteristics. Gedera (2014) revealed in his study that interactive educational technologies provide students with flexibility, interaction and cooperation. Asadı et al. (2019) revealed that students who receive education in an interactive education environment perform better and communicate better than those who receive education in a traditional classroom environment. Liu (2015) revealed that virtual classrooms, an interactive educational technology environment, can visualise logical reasoning and abstract theory, so students in virtual classroom groups can learn logical reasoning skills and abstract theoretical knowledge more easily.

The university students participating in the research were asked about the negative effects of interactive educational technologies on the development of students' characteristics. Students' negative effects were evaluated in three categories as reluctance to learn, technology addiction and cognitive difficulties. The majority of the students who participated in the study revealed that interactive educational technologies have a negative effect on the unwillingness to learn from student characteristics. Dumont and Raggio (2018) revealed in their research that interactive educational technologies negatively affect the interaction between students. In addition, when the studies in the field are examined, it has been revealed in some studies that interactive education technologies trigger students' Internet addiction (Lin & Tsai, 2002; Nalwa & Anand, 2003; Sally, 2006; Simkova & Cincera; 2004).

5. Conclusion

It is possible to say that the integration of educational technology has gained momentum in recent years all over the world. Learning environments equipped with interactive educational technologies

are seen as an important platform aiming to meet the learning needs of our age. In this direction, in this study, it is aimed to evaluate the use of interactive educational technologies as a factor in the development of university students' characteristics with student views. As a result, it has been revealed that university students tend to use interactive educational technologies. Students stated the positive effects of interactive educational technologies on improving student characteristics and in terms of learning skills, technology skills, cognitive skills, self-skills and social skills. In addition, university students stated unwillingness to learn, technology addiction and cognitive difficulties as the negative effects of interactive educational technologies on student characteristics.

6. Recommendations

In this study, the effect of the use of interactive educational technologies on the characteristics of university students was evaluated. In this direction, the following are recommended:

1. Educational seminars should be given at universities to improve the level of use of interactive educational technologies by university students.
2. Immediate solution-oriented technical support should be provided by universities to improve the level of use of interactive educational technologies by university students.
3. Interviews should be organised within universities to increase the motivation of university students to use interactive educational technologies and to enable students to share their problems.

References

- Alshahrani, S., Ahmed, E., & Ward, R. (2017). The influence of online resources on student–lecturer relationship in higher education: A comparison study. *Journal of Computers in Education*, 4(2), 87–106. Retrieved from <https://link.springer.com/article/10.1007/s40692-017-0083-8>
- Asadi, N., Khodabandeh, F., & Yekta, R. R. (2019). Comparing and contrasting the interactional performance of teachers and students in traditional and virtual classrooms of advanced writing course in distance education university. *Turkish Online Journal of Distance Education*, 20(4), 135–148. Retrieved from <https://dergipark.org.tr/en/pub/tojde/issue/49972/640552>
- Barron, A. E., Kemker, K., Harnes, C., & Kalaydjian, K. (2003). Large-scale research study on technology in K–12 schools: Technology integration as it relates to the National Technology Standards. *Journal of Research on Technology in Education*, 35(4), 489–507. [doi:10.1080/15391523.2003.10782398](https://doi.org/10.1080/15391523.2003.10782398)
- Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, 2, 8–14. [doi:10.1016/j.npls.2016.01.001](https://doi.org/10.1016/j.npls.2016.01.001)
- Blankson, J., Keengwe, J., & Kyei-Blankson, L. (2010). Teachers and technology: Enhancing technology competencies for preservice teachers. *International Journal of Information and Communication Technology Education (IJICTE)*, 6(1), 45–54. Retrieved from <https://www.igi-global.com/article/teachers-technology-enhancing-technology-competencies/38983>
- Bloor, M., & Wood, F. (2006). Phenomenological methods. In *Keywords in qualitative methods* (vol. 129, p. 131). Retrieved from <https://methods.sagepub.com/book/keywords-in-qualitative-methods/n64.xml>
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage Publications. Retrieved from <https://edge.sagepub.com/creswellqi4e/access-codes-0>
- De Westelinck, K., Valcke, M., De Craene, B., & Kirschner, P. (2005). Multimedia learning in social sciences: Limitations of external graphical representations. *Computers in human behavior*, 21(4), 555–573. [doi:10.1016/j.chb.2004.10.030](https://doi.org/10.1016/j.chb.2004.10.030)
- Devedzic, V., & Devedzic, M. (2019). Technology-Enhanced Assessment at universities and in schools: An initiative. *International Journal of Learning and Teaching*, 11(3), 89–98. [doi:10.18844/ijlt.v11i3.4319](https://doi.org/10.18844/ijlt.v11i3.4319)

- Adlet, K., Zhanagul, S., Tolkin, Y., Olga, F., Nazymgul, A., & Kadir, N. (2022). Interactive educational technologies as a factor in the development of the subjectivity of university students. *World Journal on Educational Technology: Current Issues*, 14(3), 533–543. <https://doi.org/10.18844/wjet.v14i3.7269>
- Dionys, D. (2012). Introduction of ICT and multimedia into Cambodia's teacher training centres. *Australasian Journal of Educational Technology*, 28(6). [doi:10.14742/ajet.812](https://doi.org/10.14742/ajet.812)
- Dumont, G., & Raggo, P. (2018). Faculty perspectives about distance teaching in the virtual classroom. *Journal of Nonprofit Education and Leadership*, 8(1). Retrieved from <https://www.proquest.com/openview/ba411fd2954c6d09101dd3d66cf2cbf2/1?pq-origsite=gscholar&cbl=2037378>
- Evans, S. A. (2006). *A validation study of a measurement of technology integration skills for pre-service teachers* [Doctoral dissertation, The University of North Carolina at Charlotte]. Retrieved from <https://www.proquest.com/docview/304943831?pq-origsite=gscholar&fromopenview=true>
- Gedera, D. (2014). Students' experiences of learning in a virtual classroom: An activity theory perspective. *International Journal of Education and Development using ICT*, 10(4). Retrieved from <https://www.learntechlib.org/p/150708/>
- Georgina, D. A., & Hosford, C. C. (2009). Higher education faculty perceptions on technology integration and training. *Teaching and Teacher Education*, 25(5), 690–696. [doi:10.1016/j.tate.2008.11.004](https://doi.org/10.1016/j.tate.2008.11.004)
- Giles, R. M., & Kent, A. M. (2016). An investigation of preservice teachers' self-efficacy for teaching with technology. *Asian Education Studies*, 1(1), 32. Retrieved from <http://journal.julypress.com/index.php/aes/article/view/19>
- Gross, M., & Latham, D. (2007). Attaining information literacy: An investigation of the relationship between skill level, self-estimates of skill, and library anxiety. *Library & Information Science Research*, 29(3), 332–353. [doi:10.1016/j.lisr.2007.04.012](https://doi.org/10.1016/j.lisr.2007.04.012)
- Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, 55(3), 223–252. Retrieved from <https://link.springer.com/article/10.1007/s11423-006-9022-5>
- Judge, S., & O'Bannon, B. (2007). Integrating technology into field-based experiences: A model that fosters change. *Computers in Human Behavior*, 23(1), 286–302. [doi:10.1016/j.chb.2004.10.013](https://doi.org/10.1016/j.chb.2004.10.013)
- Keegan, D. (2005). *Theoretical principles of distance education*. London, UK: Routledge. [doi:10.4324/9780203983065](https://doi.org/10.4324/9780203983065)
- Keser, H., & Semerci, A. (2019). Technology trends, Education 4.0 and beyond. *Contemporary Educational Researches Journal*, 9(3), 39–49. [doi:10.18844/cerj.v9i3.4269](https://doi.org/10.18844/cerj.v9i3.4269)
- Kiboss, J. K. (2002). Impact of a computer-based physics instruction program on pupils' understanding of measurement concepts and methods associated with school science. *Journal of Science Education and Technology*, 11(2), 193–198. Retrieved from <https://link.springer.com/article/10.1023/A:1014673615275>
- Korte, W. B., & Hüsing, T. (2006). *Benchmarking access and use of ICT in European schools 2006*. Empirica, Ges. für Kommunikations- und Technologieforschung. Retrieved from https://www.empirica.com/publikationen/documents/No08-2006_learnInd.pdf
- Liao, Y. K. C. (2007). Effects of computer-assisted instruction on students' achievement in Taiwan: A meta-analysis. *Computers & Education*, 48(2), 216–233. [doi:10.1016/j.compedu.2004.12.005](https://doi.org/10.1016/j.compedu.2004.12.005)
- Lin, S. S., & Tsai, C. C. (2002). Sensation seeking and internet dependence of Taiwanese high school adolescents. *Computers in Human Behavior*, 18(4), 411–426. [doi:10.1016/S0747-5632\(01\)00056-5](https://doi.org/10.1016/S0747-5632(01)00056-5)
- Liu, Y. (2015). Design and application of a virtual classroom system in major courses in industrial arts. *International Journal of Emerging Technologies in Learning*, 10(5). Retrieved from <https://www.learntechlib.org/p/172256/>
- Masalimova, A. R., Ryazanova, E. L., Tararina, L. I., Sokolova, E. G., Ikrennikova, Y. B., Efimushkina, S. V., & Shulga, T. I. (2021). Distance learning hybrid format for university students in post-pandemic perspective: collaborative technologies aspect. *Cypriot Journal of Educational Sciences*, 16(1), 389–395. Retrieved from <https://eric.ed.gov/?id=EJ1288798>

- Adlet, K., Zhanagul, S., Tolkin, Y., Olga, F., Nazymgul, A., & Kadir, N. (2022). Interactive educational technologies as a factor in the development of the subjectivity of university students. *World Journal on Educational Technology: Current Issues*, 14(3), 533–543. <https://doi.org/10.18844/wjet.v14i3.7269>
- Markoska, R. (2021). Smart learning technology for computer programming driven by research related to COVID-19. *Global Journal of Computer Sciences: Theory and Research*, 11(2), 88–99. [doi:10.18844/gjcs.v11i2.5380](https://doi.org/10.18844/gjcs.v11i2.5380)
- Martin, F., Parker, M. A., & Deale, D. F. (2012). Examining interactivity in synchronous virtual classrooms. *International Review of Research in Open and Distributed Learning*, 13(3), 227–261. [doi:10.19173/irrodl.v13i3.1174](https://doi.org/10.19173/irrodl.v13i3.1174)
- McSweeney, D. (2010) A framework for the comparison of virtual classroom systems. *NAIRTL/ LIN Conference on Flexible Learning at the Royal College of Surgeons. Dublin, Ireland. October 2010*. Retrieved from <https://arrow.tudublin.ie/itbinfocsecon/3/>
- Muirhead, B., & Juwah, C. (2004). Interactivity in computer-mediated college and university education: A recent review of the literature. *Journal of Educational Technology & Society*, 7(1), 12–20. Retrieved from http://elibrary.lt/resursai/Uzsienio%20leidiniai/IEEE/English/2006/Volume%207/Issue%201/Jets_v7i1.pdf#page=17
- Mukhtarov, S., & Vedyushkina, D. (2021). Open educational resources as an innovative teaching practice in Kazakhstan. *New Trends and Issues Proceedings on Humanities and Social Sciences*, 8(3), 195–203. [doi:10.18844/prosoc.v8i3.6411](https://doi.org/10.18844/prosoc.v8i3.6411)
- Nalwa, K., & Anand, A. P. (2003). Internet addiction in students: A cause of concern. *Cyberpsychology & Behavior*, 6(6), 653–656. [doi:10.1089/109493103322725441](https://doi.org/10.1089/109493103322725441)
- Patton, M. Q. (2002). *Qualitative Research & Evaluation Methods*. Thousand Oaks, CA: SAGE. Retrieved from https://books.google.com.tr/books?hl=tr&lr=&id=FjBw2oi8EI4C&oi=fnd&pg=PR21&ots=bxq_jBFGqF&sig=S0Thm9wWv8FzkcBWE48j6EX8LTg&redir_esc=y#v=onepage&q&f=false
- Rovai, A. P., & Barnum, K. T. (2003). On-line course effectiveness: An analysis of student interactions and perceptions of learning. *International Journal of E-Learning & Distance Education/Revue internationale du e-learning et la formation à distance*, 18(1), 57–73. Retrieved from <https://www.ijede.ca/index.php/jde/article/view/121>
- Sahin, M. C., & Namli, N. A. (2019). Examination of teacher candidates' attitudes to use technology in education. *Turkish Journal of Social Studies*, 23(1), 95–112. Retrieved from <https://dergipark.org.tr/en/pub/tsadergisi/issue/44605/432280>
- Sally, L. P. M. (2006). *Prediction of internet addiction for undergraduates in Hong Kong* [UMI Dissertation Information Service, Baptist University, Hong Kong]. Retrieved from <https://libproject.hkbu.edu.hk/trsimage/hp/03007154.pdf>
- Sanchez, A. X. (2011). *Obstacles to integrating technology into the middle school curricula*. Minneapolis, MN: Walden University. Retrieved from <https://www.proquest.com/docview/856131974?pq-origsite=gscholar&fromopenview=true>
- Simkova, B., & Cincera, J. (2004). Internet addiction disorder and chatting in the Czech Republic. *CyberPsychology & Behavior*, 7(5), 536–539. [doi:10.1089/cpb.2004.7.536](https://doi.org/10.1089/cpb.2004.7.536)
- Young, A., & Norgard, C. (2006). Assessing the quality of online courses from the students' perspective. *The Internet and Higher Education*, 9(2), 107–115. [doi:10.1016/j.iheduc.2006.03.001](https://doi.org/10.1016/j.iheduc.2006.03.001)