Research and trends in computer science and educational technology during 2016–2020: Results of a content analysis

C. Nurzhanov[*], Institute of information and computational technologies MES RK, Pushkin St., 125, Almaty, Kazakhstan, 050000. c.nurzhanov2020@gmail.com

V. Pidlisnyuk, Jan Evangelista Purkyne University, Kralova vysina 3132/7, Ústínad Labem, Czech Republic.

L. Naizabayeva, Institute of information and computational technologies MES RK, Pushkin St., 125, Almaty, Kazakhstan, 050000.

M. Satymbekov, Al Farabi Kazakh National University MES RK, al-Farabi 70, Almaty, Kazakhstan, 050040.

Abstract

The general purpose of this study is to conduct a content study on 'computer' and 'educational technologies' research and trends between 2016 and 2020. The topics were evaluated according to years, universities of the authors, citations, keywords, document type, source, sponsors and publication languages. The articles examined in the research include keywords related to 'computer' and 'instructional technologies' between 2016 and 2020; 1,798 articles obtained by scanning the Scopus database according to the title, keywords and summary of the articles were examined. When the results of the study were examined, it was concluded that English, which is the universal language, is very common; the researches are mostly published as 'conference papers' and the most used keyword in the study is 'Computer Science'. In addition, it has been concluded that computer science is the basis of educational technologies in recent years. Similar content analysis studies may be recommended for other software used in computer training.

Keywords: Computer, educational technology, computer science, content analysis, trends.

---

[*] Address of correspondence: C. Nurzhanov, Institute of information and computational technologies MES RK, Pushkin St., 125, Almaty, Kazakhstan, 050000.
Email Address: c.nurzhanov2020@gmail.com

1. Introduction

Developments about the computer and its derivatives have caused radical changes in the world in education and in almost all areas of life (Sarioglan, 2020). Computing and educational technology can be specified as a tool and method that helps to support instructor and teacher quality and student achievement at all levels of educational programmes (Tang, Chou & Tsai, 2020). With the development and use of computers today, the development of appropriate content and course programmes has been included by contributing to the education process (Asilkan & Domnori, 2020). In the education process, the computer is used not alone, but together with different materials. In addition, computers can be used together with other technological devices to become a more effective material. Computer is an important educational material in providing an individual learning environment and learning information permanently (Keser & Semerci, 2019). In addition, the use of computers in the learning process is one of the effective methods in education with names such as computer-aided / based learning / education / training (Kalelioglu , Gulbahar & Kukul, 2016).

Considering the studies carried out as computer science, researchers Elsayed and Salama (2020) talked about the gamification of computers and their contribution to education in their study titled 'Educational games for miss-concentration students (ADHD students)' in 2020. In addition, they emphasised that the combination of computers in education in a controlled manner will contribute to educational technologies and literature, if they are controlled, the learning environment will benefit the student and will lead to different approaches in students. Studies with computer units are thought to contribute to education, and today's rising education technology is computer technologies. Computer technologies are used in many areas.

Computer technologies are not only used for communication and entertainment (games, movies and music); however, today, their intended use is increasing day by day. Yildiz (2000), in his study, from the Department of Computer Operators and Technicians conducted a study examining the effectiveness of the first-class computer hardware course in terms of computer-aided education. In the study in which 58 students participated, significant differences were found in favour of computer-aided education at all levels of the cognitive domain, according to the pre-test and post-test results of the students regarding the level of realisation of the goals of the first-year Computer Operator, Technician and Computer Hardware course. It was concluded that computer-aided education is effective on student achievement. According to the explanations above, it can be seen that studies on computers contribute to education, educational technologies and computer environments.

The use of technology in the educational environment is increasing day by day. When talking about educational technologies, white chalkboards no longer come to mind. Nowadays, chalkboards are replaced with interactive boards and papers with tablets. The rapid development of information technologies and the global spread of the internet have caused changes in educational technologies. Computerised education, which is becoming more and more widespread, is now leaving its place to learning with informatics and to different techniques and methods (Kalinkara, 2017). Educational technology helps to achieve the intended goals (Uzunboylu, 2019). In addition to the necessity of using technology in education in general, computer education is a suitable field for using technological resources (Yildiz, Alkan & Cengel, 2020). It is a scientific field with an interdisciplinary nature and where educational technologies, rule. At the same time, Educational Technologies is a field that is constantly being processed and the concepts included in this evolution are constantly innovated (Lusdoc & Namoco, 2019).

Basically, the field of educational technologies, such as technologies, learning approaches, teaching systems and performance technology (Bozkurt, Ucar, Durak & Idin, 2019), is defined as 'being used as a paradigm change in education to encourage participation in secondary learning environments by creating and using appropriate technological tools and resources' (Yehya, 2020). According to this definition, the goal of educational technology is learning and performance. Based on these goals, it is understood that the focus is on technological processes and resources. Mthethwa (2018) emphasised

in her study, which she conducted in 2018, that computers are teacher-oriented and educational technologies will change as computers develop. Accordingly, as the computer and its derivatives develop, educational technologies also develop day by day, and it is seen that there is no consensus on naming the field in both national and international literature (Bhuyan & Tamir, 2020). The same area is called educational technologies by some authors and as instructional technologies by others.

When we look at the literature, it is thought that the existence of more studies about computers and educational technology will benefit the literature studies. As educational technology is a concept that develops with the development of computers and needs to be constantly renewed, it is thought that sharing the innovations in this field in the literature will benefit educators and students. When the studies conducted for students and educators are examined, and when the merger of the fields of 'Computer' and 'Educational Technology' is examined, it is thought that these areas benefit education and learners; moreover, it is important for students to choose the methods and tools used very well in the combination of these concepts. It is thought that studies that pay attention to two factors will provide success for students. In the study conducted by Cakmak et al. (2016), computers have been one of the most used technological tools in teaching activities. However, he concluded that the unplanned use of computers can bring harm as well as benefit. Therefore, it should be planned in accordance with its purpose. In this respect, it can be said that it can be seen as an obligation to treat the studies on the fields of 'computer' and educational technologies with scientific method as a content study and to present the results obtained.

1.1. The aim of the study

The general purpose of this research is to determine common research and trends in the fields of 'computer' and 'educational technology' by conducting a content analysis study in the period of 2016–2020.

In order to reach the general purpose, the sub-goals determined for the articles are as follows: How is the distribution according to years, subject areas, universities of the authors, number of citations, number of articles, type of document, source type, financing sponsor and languages in which it is written?

2. Method

This research in the field of computer and educational technologies was carried out on the basis of content analysis. Pham's (2018) emphasised that content analysis is a research technique that consists of organising, classifying, comparing texts and drawing theoretical conclusions from texts. The basic process in content analysis is to gather similar data within the framework of certain concepts and themes and to organise and interpret them in a way that the reader can understand, and he stated that content analysis is a new method used for the evaluation of publications (Hotaman, 2020).

2.1. Scan criteria

In order to determine the articles used in the study, some screening and selection criteria were determined by the researchers. After the criteria were determined, the numbers published between 2016 and 2020 in the 'Scopus' database where the studies on the use of technology in education were published were searched on the basis of the keywords 'Computer' and 'Education Technology'.
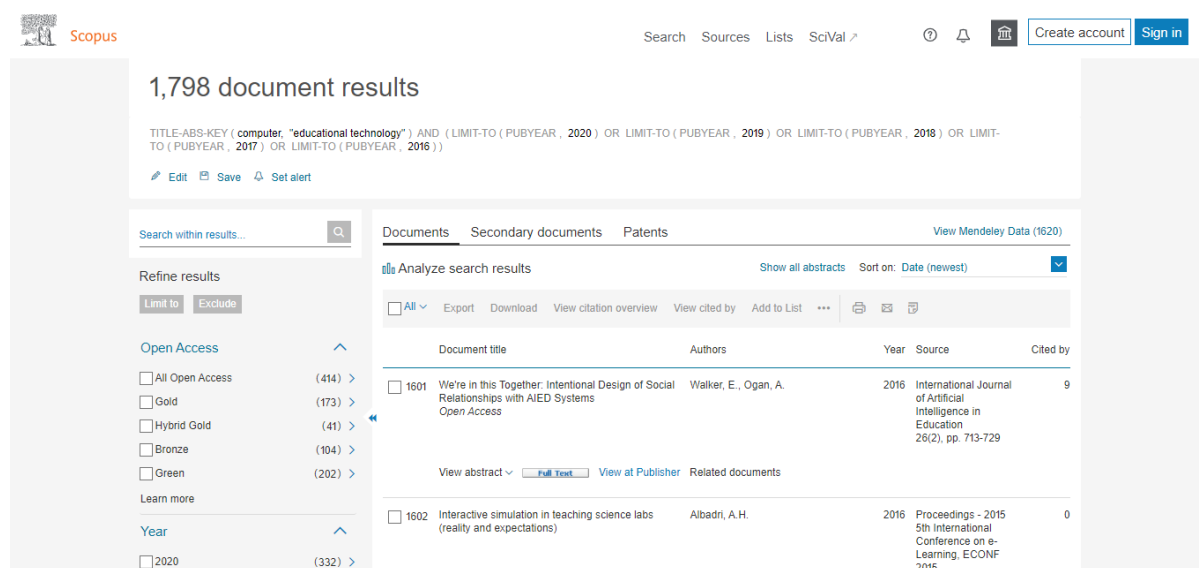
Figure 1. Scopus database

A total of 1,798 articles in accordance with the criteria determined as a result of the screening were examined in terms of 'research subject, research type and data collection tools'.

3. Results

3.1. Distribution of research subjects studied in articles according to years

When Table 1 is examined, the distribution of the studies by years can be seen.

Table 1. Distribution of studies examined in articles by years

Research years	*f*	%
2020	332	18.27
2019	382	21.50
2018	307	17.05
2017	447	24.85
2016	330	18.33
Total	**1.798**	**100**

In Table 1, according to research years, 24.85% (447) of the studies were conducted in 2017; in addition, 18.27% (332) of the research were conducted in 2020 and 21.50% (387) were conducted in 2019; in 2018, the distribution of the research by years was 17.05% (307) and 18.33% (330) of the studies were conducted in 2016. The data in Table 1 reflect the real numbers in the Scopus environment.

3.2. Distribution of Articles by Subject Areas

When Table 2 is examined, the distribution of the studies by subject areas can be seen.

Table 2. Distribution of studies examined in articles by subject areas

Subject areas	*f*	%
Computer Science	1.113	34.24
Social Sciences	985	30.30

Engineering	404	12.43
Mathematics	168	5.17
Medicine	110	3.39
Materials Science	52	1.60
Decision Sciences	50	1.54
Psychology	47	1.44
Arts and Humanities	38	1.17
Dentistry	38	1.17
Other	245	7.63
Total	**3,250**	**100**

When Table 2 is examined, the distribution of the researched subject areas in the articles was examined and the subject areas below 50 were collectively given as other subject areas, and the total number of the research subject areas was determined to be 3,250, while the findings of the research keywords found 1,798 studies in the literature. In addition, the most preferred subject areas in the fields of computer and educational technologies are determined as Computer Science (1.113) with 34.24%, while Social Sciences (985) is the second-most preferred subject area with 30.30%. While 12.43% (404) preferred Engineering, 5.17% preferred Mathematics (168), 3.39% of the least preferred subject areas of the study is determined as Medicine (110), 1.6% as Material Science (52), 1.54% as Decision Sciences (50), 1.44% (47) as Psychology and 1.17% (38) as Dentistry and Arts Humanities; in addition, 7.63% (245) preferred other fields.

3.3. Distribution of published documents by universities

When Table 3 is examined, the distribution of studies by universities can be seen.

Table 3. Distribution by universities

University name	f
Huazhong Normal University	31
Arizona State University	21
Carnegie Mellon University	19
Kryvyi Rih National University	19
Kryvyi Rih State University	19
Kazan Federal University	16
Beijing Normal University	15
National Academy of Educational Sciences of Ukraine	14
National Taiwan Normal University	13
University of Melbourne	13
Khon Kaen University	12
University of North Texas	11
The University of Hong Kong	10
Monash University	10
East China Normal University	10
National Central University Taiwan	10
Other University	742
Total	**985**

When Table 3 is examined, the distribution of studies in the fields of computer and educational technologies can be seen, and the universities below 10 are listed as other universities. According to the distribution of universities examined, it can be seen that Huazhong Normal University is at the top

of the list (31). It can be seen 21 were from Arizona State University, 19 from Kryvyi Rih National University, Kryvyi Rih State University and Carnegie Mellon University. Again according to research data, the distribution of universities was 16 from Kazan Federal University, 15 from Beijing Normal University and 14 from National Academy of Educational Sciences of Ukraine; it can be seen from Table 3 that 13 were from National Taiwan Normal University and Melbourne University. In addition to these data, 12 were from Khon Kaen University and 11 were from the University of North Texas, and finally 10 were from the University of Hong Kong, Monash University, East China Normal University and National Central University Taiwan each. It has been concluded from the data that there are other universities (985). The data in Table 3 reflect the real numbers in the Scopus environment.

3.4. Distribution of published documents according to citations between 2016 and 2020

When Table 4 is examined, the distribution of the citations between 2016 and 2020 can be seen.

Table 4. Distribution of citations between 2016 and 2020

Years	ƒ	%
2020	284	4.77
2019	1.054	17.69
2018	1.256	21.09
2017	1.635	27.45
2016	1.728	29.00
Total	**5.957**	**100**

When Table 4 is examined, the citation rankings by years have been researched from the literature and presented with years over the percentile. According to the findings in Table 4, it is seen that the number of citations decreases as they increase over the years. 1,637 were cited in 2017, and according to Table 4, 21.09% (1.256) were cited 2018, 17.69% (1.054) were cited in 2019, and finally 4.77% (284) were cited in 2020. According to the data, the year with the highest number of citations is 2016.

3.5. Distribution of published documents by keywords

When Table 5 is examined, the distribution of studies according to their keywords can be seen.

Table 5. Distribution by keywords

Keywords	ƒ	%
Educational Technology	1.230	12.09
Students	596	5.86
E-learning	552	5.43
Computer-aided Instruction	499	4.91
Teaching	488	4.79
Education	433	4.26
Engineering Education	310	3.05
Learning Systems	292	2.88
Human	190	1.86
Education Computing	184	1.80
Other Keywords	5.399	53.07
Total	**10.173**	**100**

When Table 5 is examined, their rankings according to keywords are researched from the literature and presented with keywords. According to the findings above, 12.09% (1.230) of the keywords were

determined as 'Education Technology', while 5.86% (596) 'students', 5.43% (552) 'E-learning', 4.91% (499) 'Computer-Aided Instruction Teaching', 4.79% (488) 'teaching', 4.26% (433) 'Education', 3.05% (310) 'Engineering Education', 2.88% (292) 'Learning Systems' 1.86% (190) 'Human', 1.80% (184) 'Education Computing' and, finally, 53.07% (5.399) were 'other keyword'. Table 5 shows that the most outstanding finding of the research is 'education technology' with the highest data. The data in Table 5 reflect the real numbers in the Scopus environment.

3.6. Distribution of reviewed articles by document type

When Table 6 is examined, the distribution of studies by document type can be seen.

Table 6. Distribution of the research by document type

Document Type	f	%
Conference Paper	957	53.34
Article	722	40.23
Review	57	3.18
Book Chapter	31	1.73
Conference Review	7	0.39
Editorial	7	0.39
Erratum	4	0.22
Book	4	0.22
Letter	3	0.11
Short Survey	3	0.11
Data Paper	1	0.05
Note	1	0.05
Total	**1.798**	**100**

When Table 6 is examined, it can be seen that the rankings of the research according to the distribution according to the document type have been examined from the literature and presented over the percentile. 'Conference Paper' was 53.34% (957), 'Article Paper' was 40.23% (722), 'Review' was 3.18%, 'Book Chapter' was 1.73% (31), 0.39% was 'Conference Review', 0.39% was 'Editorial', 0.22% (4) was 'Erratum' and 0.22% (4) was 'Book'. Table 6 shows that 0.11% (3) was 'Letter', 0.11% (3) was 'Short Survey', 0.05% (1) was 'data paper and note' each. It can be seen that the most ranked was 'conference paper' (957) from the results given in Table 6.

3.7. Distribution of published documents by source title

When Table 7 is examined, the distribution of the studies according to source title can be seen.

Table 7. Distribution by source title

Source title	f	%
Turkish Online Journal of Educational Technology	106	8.51
Ceur Workshop Proceedings	99	7.95
ACM International Conference Proceeding Series	95	7.63
Icce 2017 25th International Conference On Computers In Education Technology And Innovation Computer Based Educational Systems For The 21st Century Workshop Proceedings	80	6.43
Communications In Computer And Information Science	56	4.50
Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics	48	3.85
Computers and Education	37	2.96
British Journal of Educational Technology	34	2.73

Journal of Dental Education	32	2.56
Australasian Journal of Educational Technology	28	2.24
Ascilite 2016 Conference Proceedings 33rd International Conference of Innovation Practice And Research In The Use of Educational Technologies In Tertiary Education Show Me The Learning	27	2.17
Other Source title	604	48.47
Total	**1.246**	**100**

When Table 7 is examined, the distribution of the research according to the source title was examined from the literature and presented over the percentile.

When the source titles of the research are considered according to the findings in Table 7, 8.51% (106) of the findings are 'Turkish Online Journal of Educational Technology', 7.95% (99) are 'Ceur Workshop Proceedings', 7.63% (95) are 'ACM International Conference Proceeding Series ',6.43% (80) 'Icce 2017 25th International Conference On Computers In Education Technology And Innovation Computer-Based Educational Systems For The 21st Century Workshop Proceedings', 4.50% (56) 'Communications In Computer And Information Science', 3.85% (48) was 'Lecture Notes In Computer Science Including Subseries', 2.96% (37) was 'Computers And Education', 2.73% (34) was 'British Journal of Educational Technology', 2.56% (32) 'Journal of Dental Education', 2.24% (28) 'Australasian Journal of Educational Technology and 2.17% (27) was 'Ascilite 2016 Conference Proceedings 33rd International Conference Of Innovation Practice And Research In The Use of Educational Technologies In Tertiary Education Show Me The Learning'. Lastly, 48.47% was 'other source title' (604). According to the data, it is seen that the highest source title is Turkish Online Journal of Educational Technology.

3.8. Distribution of articles published by financing sponsor

When Table 8 is examined, the distribution of the studies according to the financing sponsor can be seen.

Table 8. Distribution of the research by financing sponsor

Funding sponsor	*f*	%
National Science Foundation	49	10.04
Ministry of Science and Technology, Taiwan	36	7.37
Japan Society for the Promotion of Science	18	3.68
National Natural Science Foundation of China	18	3.68
European Commission	13	2.67
Institute of Education Sciences	13	2.67
Conselho Nacional de Desenvolvimento Científico e Tecnológico	13	2.67
Australian Research Council	9	1.84
European Regional Development Fund	8	1.63
Coordenação de Aperfeiçoamento de Pessoal de Nível Superior	6	1.22
Khon Kaen University	6	1.22
Other Funding Sponsor	299	61.27
Total	**488**	**100**

When Table 8 is examined, the distribution according to the financing sponsor of the research is examined and the rankings have been investigated from the literature and presented over the percentile.

'National Science Foundation' contributed 10.04% (49), 'Ministry of Science and Technology, Taiwan' 7.37% (36), 3.68% (18) was from 'Japan Society for the Promotion of Science' and 'National Natural Science Foundation of China', respectively, 2.67% (13) from 'European Commission', 'Institute of Education Sciences' and 'Conselho Nacional de Dekorvolvimento Científico e Tecnológico',

respectively, 1.84% (9) from 'Australian Research Council', 1.63% from 'European Regional Development Fund' (8), 1.22% (6) from 'Coordenação de Aperfeiçoamento de Pessoal de Nível Superior' and 'Khon Kaen University', respectively, 'and finally 61.27% (299) was from 'Other Funding Sponsors'. When table 8 is examined, it can be seen that the highest sponsor is the 'National Science Foundation' with 10.04% (49).

3.9. Distribution of articles published according to languages

When Table 9 is examined, the distribution of studies according to the written languages can be seen.

Table 9. Distribution by languages written

Written languages	f	%
English	1,726	95.83
Portuguese	35	1.95
Spanish	17	0.95
Ukrainian	8	0.45
Russian	6	0.35
Chinese	2	0.12
Arabic	1	0.05
Bulgarian	1	0.05
Czech	1	0.05
German	1	0.05
Hungarian	1	0.05
Persian	1	0.05
Turkish	1	0.05
Total	**1.801**	**100**

When Table 9 is examined, its distribution according to the languages written can be seen, and its rankings were searched from the literature and presented over the percentile. According to the above findings, the languages written are in the following order: 95.83% (1,726) was in 'English', 1.95% (35) in 'Portuguese', 0.95% (17) in 'Spanish', 0.45 (8) in 'Ukrainian', 0.35 (6) in 'Russian', 0.12% (2) in 'Chinese', 0.05% (1) in 'Bulgarian', 'Czech', 'German', 'Hungarian', 'Persian' and 'Turkish', respectively. When Table 9 is examined, it is seen that 95.83% (1,726) of the articles are written in 'English'.

3.10. Distribution of the articles with decreasing citations in the study by years

When Table 10 is examined, the distribution of the articles with decreasing citation numbers can be seen by years.

Table 10. Distribution of the articles with decreased number of citations in the research by years

Years	f	%
2020	2.814	48.54
2019	1.726	29.78
2018	835	14.40
2017	348	6.00
2016	74	1.28
Total	**5.797**	**100**

When Table 10 is examined, the distribution of articles with decreased number of citations by years was examined, their order was searched from the literature and presented over the percentage. 48.54% (2.814) had decreased in 2020, 29.78% (1.726) in 2019, 14.40% (835) in 2018, 6.00% (348) in 2017 and finally 1.28% (74) in 2016. According to the data, it is seen that the number of citations was the highest with 48.54% of the decreasing years in 2020 and the least was in 2016 with 1.28%.

4. Discussions

Simsek et al. (2009) examined 259 master theses that were completed in the field of educational technology in their studies. They stated that most of the theses consist of quantitative research, questionnaires, tests and scales. The frequently used data collection tools are descriptive statistics, *t*-test and analysis of variance. They stated that the most researched subjects are computer-assisted teaching, alternative teaching–learning approaches, web-assisted learning, problems in using educational technology, internet-based learning and distance education. In light of the results of the researches, educational technology is seen to be 259 in 2009, while the highest data was 447 in 2017. According to these results, it can be said that the number of studies on the subject has increased in years.

Yıldız, Alkan and Cengel (2020), in their study titled 'Current trends in education technologies research worldwide: Meta-analysis of studies between 2015 and 2020', emphasised that educational technology is the dysfunctionalisation of scientific knowledge produced in educational sciences and its application in practice, aiming to determine the current trends in educational technology research in the research. In the research, content analysis of the studies conducted in Turkey and abroad in the last 5 years was presented. As a result, they found that the most emphasised subject within the scope of the research field was the adequacy of using educational technologies. Based on these results, it is known that the year in which the number of citations decreased from the results of the study was 2016. According to this result, it was concluded that the old sources shed light on the studies, as the new results of the study are 2021.

Yehya (2020) in his study titled 'Promoting Technology- Implementation Learning paradigm for online learning in secondary Education' aimed to use online learning through Educational Technology tools as a paradigm change in education to transfer knowledge and encourage students to participate in secondary learning environments, student participation in his study, motivating students to successfully apply high-level critical thinking skills and achieve the learning objectives of the course and advance in their education examined the degree of attention, focus, belief, interest and emotions that encourage meaningful learning experiences. In this article, the technology application learning paradigm has been researched to encourage students' participation in online learning, and this proposed paradigm is based on four interactive dimensions: attitude, pedagogical, social and technical, which lead learners to engage emotionally, behaviourally and cognitively in a technology-supported learning environment. The attitude dimension is the intentions and perspectives of technology users to understand, interact and manage the emotional skills and abilities required for the effective use of educational technology tools. The pedagogical dimension is the active learning process for cognitive development that uses predefined learning goals and pedagogical theories to determine learning strategies and evaluations to achieve planned educational results. As a result, the technical dimension has come to the conclusion that students and educators allow students to use online learning without technical difficulties, and that students have a computer and media literacy, and stated that students' perspectives on educational technologies are also seen as positive. Finally, the social dimension has stated that students network with other students and are willing to share their experiences with peers and/or teachers in a positive way in order to achieve their emotional, social and cognitive commitment, and create a technology collaboration where they motivate and even inspire them.

When looking at the studies conducted with education and training technologies, Cakmak et al. (2016) study titled 'Examination of Articles Published in Educational Technology in 2014', can be taken as an example. The articles in the leading international journals in the field of educational technologies within the scope of the Social Sciences Citation Index were analysed using the content analysis method, and it was concluded that 'instructional design' and 'information technologies in education' were the most studied topics, and when combined with the researches, the subject was it can be said that it has gained meaning and importance since.

Moreover, Cakir, Ozcan and Celen (2020) in their study 'Content Analysis of Learning Object Research in Turkey' learning objects and educational technology research entitled in a particular subject frame, independently of a file or a small file of different purposes in again and updated reusable. They planned an investigation to determine that the collection can be used for educational purposes as they are in Turkey on learning objects that can bring about holistic perspective on the issue Although there are various studies to be combined to form a whole, between the years 2005–2019 this research gives information about the properties of learning objects and educational technology in Turkey. Turkish thesis letters were coded (from A to M) when the content analysis was made and they aimed to present a holistic perspective on the properties of learning objects. Researchers as a result of the research examined seven properties of learning objects and their mention in theses. Accessibility and search features were studied in 11 theses, reusability in 10 theses, diversity and flexibility in 9 theses, granular structure in 5 theses and low cost and economical properties in 4 theses. While 'accessibility and search' are the most studied features, the least studied feature is 'low cost and economy'. Again in 2011, more studies were conducted on learning objects (three theses) compared to other years. It has reached the result that when combined with the studies carried out, the cost is important for educational technologies.

In similar studies on Educational Technology, Tongel, Aydin and Cakir (2020), studies titled 'Research Tendencies of Master's and Doctoral Theses' written in the fields of computer and instructional technologies and 'Educational Technologies: An Image of the Period 2013–2018', researched the studies in the field and as a result they stated that teacher candidates and undergraduate students were determined as the target audience and they were preferred more. According to this, studies conducted and examined in the field of educational technologies with university students in the last 5 years have maintained their popularity.

5. Conclusion

When the study in general is considered, it is seen that the published articles were written in the Scopus database mostly in 2017, In addition, it is seen that the second highest number of studies was in 2016; it can be said that there are more articles in the literature on educational technologies and computer issues, because education and technology are always updated and renewed. Adding more studies to the literature to support educators and students is very important for education, and the most researched subject area in the research is seen as 'Computer Science' in the Scopus database. When looking at similar studies in the literature, it is seen not only in computer science but also in relevant studies in the discussion environment where every field is combined with educational technologies, For this reason, it is thought that the combination of education technology field with every field will benefit the field of education technology. Another result is that the most written keyword title is 'Educational Technology', which is obtained from the Scopus database and is of great importance for these articles. Giving the names of the researched subjects reflects the truth for those who conducted it.

When the results of the study are considered, it is seen that Huanhong Normal University has the highest number of articles published in the Scopus database in the university rankings, Although this reflected as the first among universities, it can be said according to the findings of the research that it published very little as a university between 2016 and 2020, The most cited numbers were in 2016

with a total of 1,728; however, there are 284 citations in 2020. According to this finding, although the studies in 2016 are old and preferred, the fact that they are less than the citations of the studies in 2020 will contribute less to the literature, because studies have been added; educational technology has changed shape since 2016. It is thought to make learning more meaningful by gaining innovation, and according to the results of the research, it is seen that the documents are the most 'conference papers' in the Scopus database. It is seen that the articles are presented as conference papers, and this is of great importance for the literature because the noodles made in the conference environment make a serious contribution to the publications. Updates of the mistakes made, it is thought that the publication has become better and added to the literature, when the publications in the discussion environment are taken into account and analysed, it is seen that the number of 'educational technologies' studies has increased significantly after 2002. This makes a serious contribution to the field of educational technologies.

Another result of the research is the distribution of the publications researched in the Scopus database according to the source title. According to this, it can be seen that the highest source title was 'Turkish Online Journal of Educational Technology' with 106 publications. Resource titles are of great importance for the authors, the regular and careful publication of the studies will shed light on future researchers. It is also seen that the financial sponsors are the 'National Science Foundation' with 49 financial sponsorships. This statement under the heading 'Role of funding source' should be made in a separate section of the text and given before the References. Authors should describe the role of study sponsors (if any) in study design, which is seriously important.

Finally, when the distribution of the research according to the preferred and written languages is examined in the Scopus database, it is seen that 1,726 articles were published in 'English', representing the universal language, and the fact that the majority of them is English is of great importance for computer and educational technologies, because it is thought that gathering them in a single language paves the way for educational technology and computer concepts and supports the past with new studies. Also, when the number of citations of published documents is examined in Scopus database, it is seen that the minimum year was 2016 with 74 articles and the maximum was in 2020 with 2,814. 2020 had the most number; references are of serious importance; writing a research using which sources is like the basic framework of the article; citations made from these researches are of great importance for the article and the old publication. When citing, it is thought that it will primarily benefit the article to be written in the research year and subject. When this study is handled with the discussion environment, it is thought that the relevant parts of the 1,798 publication will contribute to the literature, and it is thought that updating these studies and adding them to the literature will show the changes between the years. In this way, how the change comes every year will be introduced to the literature. Since education and technology are renewed every day, it is recommended that educational technology be combined with every field. It is suggested that the content analysis of articles and presentations made on computer and educational technologies will make a significant contribution to the literature. Similar content analysis studies may be recommended for other software used in computer training.

References

Asilkan, O. & Domnori, E. (2020). Roadmap of shifting to online education during COVID-19: Case of Albania. *New Trends and Issues Proceedings on Humanities and Social Sciences, 7*(3), 192–197. doi:10.18844/prosoc.v7i3.5252

Bhuyan, M. H. & Tamir, A. (2020). Evaluating COs of computer programming course for OBE-based BSc in EEE program. *International Journal of Learning and Teaching, 12*(2), 86–99. doi:10.18844/ijlt.v12i2.4576

Bozkurt, A., Ucar, H., Durak, G. & Idin, S. (2019). The current state of the art in STEM research: a systematic review study. *Cypriot Journal of Educational Sciences, 14*(3), 374–383. doi:10.18844/cjes.v14i3.3447

Nurzhanov, C., Pidlisnyuk, V., Naizabayeva, L & Satymbekov, M. (2021). Research and trends in computer science and educational technology during 2016–2020: Results of a content analysis. *World Journal on Educational Technology: Current Issues*. 13(1), 115-128. https://doi.org/10.18844/wjet.v13i1.5421

Cakir, H., Ozcan, H. & Celen, Y. (2020). Research analysis of learning content objects in Turkey. *Turkey Social Research Journal, 24*(3), 631–640. Retrieved from https://dergipark.org.tr/en/download/article-file/774756

Cakmak, E. K., Ozudogru, G., Bozkurt, S. B., Ulker, U., Unsal, N. O., Boz, K., ... & Gul, H. U. (2016). Examining the articles published in the field of educational technologies in 2014. *Educational Technology Theory and Practice, 6*(1), 80–108. doi:10.17943/etku.04638

Elsayed, M. & Salama, R. (2020). Educational games for miss-concentration students (ADHD students). *International Journal of Innovative Research in Education, 7*(1), 26–31. doi:10.18844/ijire.v7i1.4762

Hotaman, D. (2020). The analysis of content organization strategies preferred for the 3rd and 4th grades in the primary school curriculum. *International Online Journal of Educational Sciences, 12*(2). Retrieved from http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=fa488c34-4acf-45c3-86ec-51442b2d99f0%40sessionmgr4008

Kalelioglu, F., Gulbahar, Y. & Kukul, V. (2016). *A framework for computational thinking based on a systematic research review*. Retrieved from http://hdl.handle.net/11727/3831

Kalınkara, Y. (2017). *Developing mobile educational material for the computer hardware course and examining its effect on student achievement*. Retrieved from http://hdl.handle.net/11616/11263

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

Lazic, J. L. (2017). The interest of elementary school students in computer science. *New Trends and Issues Proceedings on Humanities and Social Sciences, 4*(1), 232–238. doi:10.18844/prosoc.v4i1.2260

Lusdoc, C. S. & Namoco, R. A. (2019). Selecting an SPA (special program in the arts) major for high school students using AHP combined with interest inventory. *International Journal of Innovative Research in Education, 6*(1), 1–11. doi:10.18844/ijire.v9i1.4118

Mthethwa, P. (2018). Teaching vocabulary using multimedia: the case of U.S. International Students. *Global Journal of Foreign Language Teaching, 8*(2), 68–75. doi:10.18844/gjflt.v8i2.3190

Sarioglan, A. B. (2020). The effect of computer based instruction on middle school students' ideas about weather events and climate concept. *New Trends and Issues Proceedings on Humanities and Social Sciences, 7*(1), 178–185. doi:10.18844/prosoc.v7i1.4895 (Original work published July 2, 2020)

Simsek, A., Ozdamar, N., Uysal, O., Kobak, K., Berk, C., Kılıçer, T. & Cigdem, H. (2009). In the year couse trends observed in educational technology research in Turkey. *Educational Sciences: Theory and Practice, 9*(2), 115–120. Retrieved from https://www.researchgate.net/profile/Harun_Cigdem3/publication/274960172_Iki_Binli_Yillarda_Turkiye'deki_Egitim_Teknolojisi_Arastirmalarinda_Gozlenen_Egilimler/links/552d673a0cf2e089a3ad75c4/Iki-Binli-Yillarda-Tuerkiyedeki-Egitim-Teknolojisi-Arastirmalarinda-Goezlenen-Egilimler.pdf

Tang, K. Y., Chou, T. L. & Tsai, C. C. (2020). A content analysis of computational thinking research: an international publication trends and research typology. *The Asia-Pacific Education Researcher, 29*(1), 9–19. Retrieved from https://link.springer.com/article/10.1007/s40299-019-00442-8

Töngel, E., Aydın, A., Mehmet, K. A. R. A. & Cakir, R. (2020). Research trends of master's and doctorate theses written in the fields of 'computer and instructional technologies' and 'educational technology': an outlook of the 2013–2018 Term. *Ondokuz Mayıs University Journal of Education Faculty, 39*(1), 69–82. doi: 10.7822/omuefd.552656

Uzunboylu, H. (2019). Assessment of student scores based on specific variables in the web-assisted English grammar exercises. *World Journal on Educational Technology: Current Issues, 11*(3), 205–219. doi:10.18844/wjet.v11i3.4262

Yehya, F. M. (2020). Promoting technology- implementation learning paradigm for online learning in secondary education. *Global Journal of Information Technology: Emerging Technologies, 10*(1), 12–21. doi:10.18844/gjit.v10i1.4620

Yildiz, I. (2000). *Abant Izzet Baysal University, Bolu Vocational School, Department of Computer Operators and Technicians, the effectiveness of the Computer Hardware course taught in the first year in computer aided education* (Unpublished Master's Thesis). Bolu Abant Izzet Baysal University. Retrieved from

Nurzhanov, C., Pidlisnyuk, V., Naizabayeva, L & Satymbekov, M. (2021). Research and trends in computer science and educational technology during 2016–2020: Results of a content analysis. *World Journal on Educational Technology: Current Issues*. *13*(1), 115-128. https://doi.org/10.18844/wjet.v13i1.5421

https://tezarsivi.com/aibu-bolu-meslek-yuksekokulu-bilgisayar-operatorlugu-ve-teknikerligi-bolumu-birinci-sinifta-okutulan-bilgisayar-donanimi-dersinin-bilgisayar-destekli-egitim-acisindan-etkililigi

Yildiz, E. P., Alkan, A. & Cengel, M. (2020). Current trends in education technologies research worldwide: Meta-analysis of studies between 2015 and 2020. *New Trends and Issues Proceedings on Humanities and Social Sciences, 7*(1), 47–62. doi:10.18844/prosoc.v7i1.4867 (Original work published July 2, 2020).