Exploring the Impact of Flipped Classroom Model in Primary School: A Bibliometric and Content Analysis

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Abstract

Many recent studies have shown that the Flipped Classroom Model [FCM] significantly benefits students' learning processes. This study used bibliometric analysis to evaluate the existing studies on using the flipped classroom model at the primary school level from a broad perspective. According to the results of the bibliometric analysis, it was found that the most frequently used keywords in articles on the use of FCM at the primary school level were flipped classroom, flipped learning, blending learning, primary school, motivation, and academic achievement, respectively. According to the co-citation analysis, Bergman, Hwang, Zainuddin, Lo, and Bishop are the most cited authors in this field. The most cited journals were Computers & Education, Educational Technology & Society. In the content analysis, researchers include 30 articles with the highest citations among the studies on using FCM in primary school. The findings reveal that the number of studies in this field increased between 2014 and 2021 but then decreased. On the other hand, results show that FCM can improve primary school students' academic achievement, critical thinking, motivation, self-efficacy and self-regulation skills. The data provides promising evidence that the flipped classroom model can be effective at the primary school level. This study provides a general perspective for researchers who will conduct studies on the relevant section.

Keywords: Flipped classroom, primary school, bibliometric analysis, content analysis.

Introduction

In the early 20th century, in parallel with the developing digital information society, a contemporary pedagogical model emerged that proposes a different perspective on the educational process (del Arco et al., 2022). The "Flipped Classroom" model moves the knowing and understanding stages, including the primary teaching and learning skills in Bloom's Taxonomy, out of the classroom (Anderson & Krathwohl, 2001; Campión, 2019). According to Bloom, people are innately ready to learn, and their learning capacities are unlimited. However, educational processes determine the use of this equipment and its limits (Bloom, 1976). At this point, the FCM draws attention to its potential to transform teaching and learning processes (Flipped Learning Network [FLN], 2014; Hamdan et al., 2013; Phillips & Trainor, 2014). FCM is the combination of in-class activities with out-of-class activities. Here, direct learning is usually carried out outside the classroom using information technologies, while interactive learning is carried out inside the classroom (Cui & Coleman, 2020). In other words, FCM represents a learning approach in which technological tools transform the group classroom learning process into an individual learning experience. According to this model, students prepare for classroom time by spending pre-class time with content-oriented materials and activities and acquiring basic knowledge. The content presented before class is an essential element that encourages critical thinking and meaningful learning in the classroom (Abeysekera & Dawson, 2015; FLN, 2014; McLaughlin et al., 2016). Therefore, students need to have sufficient prior knowledge and practical study skills to understand the material before the lesson and to successfully achieve the teaching objectives (Bergmann & Sams, 2012; Chang et al., 2022; Chen-Hsieh et al., 2017; Chuang et al., 2018). In FCM, in the classroom, more complex skills are practiced, analyzed, and evaluated in the same teaching-learning process. In this way, while higher-level skills are effectively acquired in the classroom, more basic skills are left to the student's work processes outside the classroom, creating a

student-centered learning environment (Parra-Giménez, 2017). In this direction, it can be said that FCM aims to maximize student engagement with advanced technologies by allocating more time in the classroom for interactive learning and student guidance. FCM generally allows students to take a more active role in the classroom. It focuses on acquiring prior knowledge through online video lessons and preparing for discussion, problem-solving, collaborative, and higher-level activities in the classroom. It also supports a blended learning approach by encouraging students' active participation in inquiry-based learning methodologies (Afshari et al., 2021; Baker, 2000; Bergmann & Sams, 2012; Lage et al., 2000).

FCM is based on peer tutoring, which was introduced by Mazur in the 1990s to help students learn simple tasks at home (Mazur, 1997). As a concept, Dr. J. Wesley Baker presented "The Classroom Flip: Using Web Course Management Tools to Become the Guide by the Side" at a conference. In this presentation, he proposed an approach in which the role of the teacher is changed through the displacement of in-class and out-of-class learning processes and the use of web-based tools (Baker, 2000). At the same time, academics such as Maureen J. Lage, Glenn J. Platt, and Michael Treglia at the University of Miami embraced this approach to meet the needs of students with diverse learning preferences and limited class time. This practice involved twice-weekly 75-minute classes in which students read relevant book chapters, watch videos, or listen to presentations before coming to class. The learning process was supported by group discussions, activities, and questions in the classroom, and the subject was reinforced with various activities after the students' questions were answered. This practice provided students with a learning environment where their responsibilities increased and were supported with additional materials (Lage et al., 2000). However, it took about seven years for FCM to become widespread. In 2007, Jonathan Bergman and Aaron Sams, chemistry teachers at Woodland High School, put their PowerPoint presentations and lecture videos online to share course materials when students could not attend class. This practice attracted attention when they realized that it was more effective than traditional teaching, mainly because it allowed students to have the flexibility to learn at their own pace. Bergman and Sams adopted FCM, thinking this method could be applied to other students. This practice is the first example of flipped classroom practices today. Thanks to the videos shared by Bergman and Sams, FCM gained popularity quickly (Bergmann & Sams, 2012).

Today, FCM is applied in many disciplines worldwide (Hao, 2016). When the studies in the field of education are examined, it is seen that this model provides several advantages in the teaching-learning process. In this context, many studies in the literature show that FCM increases students' academic achievement (Atwa et al., 2022; Han, 2023; Hwang & Lai, 2017; O'Flaherty & Phillips, 2015; Yang & Chen, 2020) and motivation (Bi et al., 2023; Zhao et al., 2021). In addition, many studies are showing that the CMS model reduces students' cognitive load (Abeysekera & Dawson, 2015; Chen & Mokmin, 2024; Cheng et al., 2023; Gao & Hew, 2023; Turan & Göktaş, 2016), encourages active participation in the lesson, improves problem-solving skills (Hsu & Wu, 2023), improves self-efficacy (Enfield, 2013; Lai & Hwang, 2016), improves critical (Atwa et al., 2022; Hsu & Wu, 2023; Ma, 2023) and creative thinking skills (Cai et al., 2023; Hsu & Wu, 2023). Latorre-Cosculluela et al. (2021) emphasized the most crucial feature of FCM: considering students' characteristics. It is seen that FCM generally provides various benefits at different levels of education. This situation reflects the importance

of using FCM in education. In this study, the 30 studies published in the field of primary school education in the Web of Science [WoS] database for content analysis and the most cited studies by the criteria are presented in Table 1.

Table 1.

Aims and Results of the Analyzed Articles

Authors & Year	Aim of the study	Journal title	The number of citations
Lai & Hwang (2016)	Examining the efficacy of a self-regulated FC (flipped classroom) method in enhancing students' academic outcomes in a mathematics class.	Computers & Education	356
Chang & Hwang (2018)	Effects of a flipped learning guide based on augmented reality	Computers & Education	175
Strelan et al. (2020)	The aim of this meta-analysis is to examine the effect of the FCM on student performance.	Educational Research Review	150
Hwang & Lai (2017)	To examine the impacts of an e-book-based flipped learning approach on students' learning achievement and self-efficacy in primary school mathematics courses.	Educational Technology & Society	89
Şahin & Tavil (2023)	Examining how integrating the FCM into vocabulary instruction affects young learners' vocabulary learning and retention.	Journal Language Teaching & Learning	73
Hinojo-Lucena et al. (2020)	To analyze the impact of flipped learning in contrast to traditional teaching approaches.	International Journal of Environmental Research and Public Health	67
Zou (2020)	Examining the perceptions of gamified FCM English language teaching classes on primary school level students and teachers	Journal of Computers in Education	52
Sánchez, et al. (2019)	To examine the effectiveness of FCM compared to traditional methodology in preschool, primary and secondary education levels	Sustainability	40
Aidinopoulou & Sampson (2017)	Examining the application of the flipped classroom model for teaching primary school social studies.	Educational Technology & Society	39
Ye et al. (2019)	To compare the effects of an interactive problem-posing guided slide learning mode and a traditional slide learning mode in a primary school natural science course.	Interactive Learning Environments	35
Tsai et al. (2015)	Examining impacts of flipped classroom and problem-based learning (FPBL) on the development of students' learning performance.	International Journal of Information and Communication Technology Education	31
Galindo-Dominguez, (2021)	Evaluating whether the FC method is more effective compared to alternative methodologies.	Educational Technology & Society	26
Cruickshank & Mainsbridge (2021)	Investigating teachers' experiences of online delivery of physical education in primary school.	Issues in Educational Research	23

Continue to Table 1

Gómez-García et al. (2020)	Investigating how the combination of FC and gamification impacts the enhancement of motivation, autonomy, and self-regulation in learning, within the context of a didactic unit focusing on healthy habits and nutrition.	Nutrients	23
Yang & Chen (2020)	Investigating the use of FC in primary EFL classrooms in China	Education and Information Technologies	23
Hui et al. (2018)	Examining the effect of learning activity design to improve learning attitudes	Open Learning	18
Županec et al. (2018)	Evaluation of the effectiveness of a flipped biology classroom in primary schools and comparison of students' engagement levels with the conventional classroom approach	Journal of Baltic Science Education	18
Cui & Yu (2019)	Knowledge and concept maps' prevalence in promoting deeper learning in the FC.	British Journal of Educational Technology	17
Girmen & Kaya (2019)	Improving the process of developing primary school 4th-grade students' basic language skills with digital story activities and games based on the FCM	International Journal of Instruction	17
Vicente et al. (2020)	It presents "Sustainable City," an educational robotics-based STEAM project to bring climate change issues closer to primary school students.	Sustainability	16
Doğan et al. (2023)	Analysis of recent research findings regarding the efficacy of implementing the FC method in science instruction.	Research in Science & Technological Education	14
Hwang et al. (2021)	Examining how the use of concept maps as a guide to problem-posing activities in a flipped learning environment can increase students' higher thinking skills	Journal of Computer-Assisted Learning	14
McEvoy et al. (2016)	Evaluate the applicability of the FC program	Health Education Journal	13
Tutal & Yazar (2021)	Evaluation of foundational research exploring the impacts of FC on academic performance, retention of knowledge and attitudes towards coursework.	Asia Pacific Education Review	11
Sáez-López & Cózar-Gutiérrez (2017)	It explores the application of block-based visual programming using the Scratch application in the field of Primary Social Studies. The study uses a Design-Based Research approach to evaluate the benefits and practices brought by the intervention while incorporating data triangulation, Bloom's classical taxonomy, the Technological Pedagogical Content Knowledge (TPACK) model, and the Reverse Classroom model.	Revista Complutense de Educacion	10
Hultén & Larsson (2018)	To contribute to understanding of the FCM.	Scandinavian Journal of Educational Research	9

Continue to Table 1

Gao & Hew (2023)	Examines the impact of a theory-based (5E framework) FCM on the comprehension of computational thinking (CT) concepts, problem-solving skills in computing, and students' perspectives on flipped learning in elementary schools.	Journal of Educational Computing Research	9
Botella et al. (2021)	To assess the effect of implementing the Parkour Didactic Unit within the FL model on primary school students' motivation.	Acta Gymnica	8
Zou & Zhang (2021)	Investigating how teachers and students view the effects, feasibility, and possibilities of the flipped EFL classroom.	ELT Journal	5
Erbil & Kocabaş (2020)	Exploring changes in motivation and academic achievement among 4th-grade primary school students through the combined and individual implementation of FC and cooperative learning methods.	Studies in Educational Evaluation	5

In line with the literature, many studies on this subject have been conducted at various levels and focused on different variables to better understand the effects of FCM in education. However, in the review studies on FCM in the literature, it was revealed that the studies on this subject were mainly conducted with older students, and there was limited research on the use of FCM in primary school (Fornons & Palau, 2021; Lo, 2020; Loizou & Lee, 2020; Wright & Park, 2022). Similarly, there needs to be a content analysis-based bibliometric study in the literature that reveals the current trends in the use of FCM in primary school. Bergmann and Sams (2015), on the other hand, stated that since the abilities and educational needs of students in primary school differ from those of students at other levels of education, the use of FCM in primary school involves differences in terms of teacher training, video use, and parental involvement compared to other levels. This study will guide future studies by revealing the current trends of studies on using FCM in primary school through content and bibliometric analysis methods. Therefore, this study aims to contribute to a better understanding of the effects of this model on primary school education by examining the effects of FCM at the primary school level through content and bibliometric analysis. For this purpose, we sought answers to the following research questions:

1. What is the distribution of articles on FCM in primary school, regarding years and number of citations?

2. Who are the most cited authors in articles on FCM in primary school?

3. Which journals have the most cited articles on FCM in primary school?

4. What keywords are most frequently used in primary school articles on FCM?

5. What are the most used words in the abstracts of articles on FCM in primary school?

6. What variables are examined in articles on FCM in primary school?

7. What is the distribution of articles on FCM in primary school according to years?

8. Which research methodologies are mostly used in primary school articles on FCM?

9. What sample sizes are preferred in primary school articles on FCM?

10. Which data collection tools are commonly preferred in primary school articles on FCM?

11. Which data analysis methods are mostly used in primary school articles focusing on FCM?

Method

This study presents a systematic evaluation of the use of FCM through bibliometric and content analysis methods. We used the bibliometric analysis method in the study because it provides a broad perspective on the field by considering the studies conducted to date. Bibliometrics uses quantitative analysis and statistical methods to assess data collected from the bibliographic elements of research (Zan, 2019). Bibliometric analysis offers the opportunity to reveal the development of the topic over time (Pinto et al., 2019). In this way, it enables researchers to understand the developments in the field more comprehensively (Zupic & Čater, 2015). In the study, after determining the general framework of the field, we preferred the content analysis method to indicate the research tendencies in FCM use in primary school. Consequently, our aim in scrutinizing research within this domain was to offer insights into contemporary research directions for scholars intending to explore this field further. We used the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols [PRISMA] reporting technique (Page et al., 2021). We selected the study data from the WoS database.

Data Collection

Bibliometric Analysis

In the data collection phase for bibliometric analysis, we aimed to identify studies on the use of FCM in primary school, which is the aim of the research. For this aim, we searched the WoS database using "Advanced Search". As a result of the search, we listed the articles with the words "[*flipped classroom or *flipped learning] and [*primary school or *elementary school or *primary school education or *elementary school education]" in the title, abstract, and keywords. As a result of the search, we reached 189 articles. The selection stages of the articles in the bibliometric analysis data collection process are given below (Figure 1).

Figure 1.

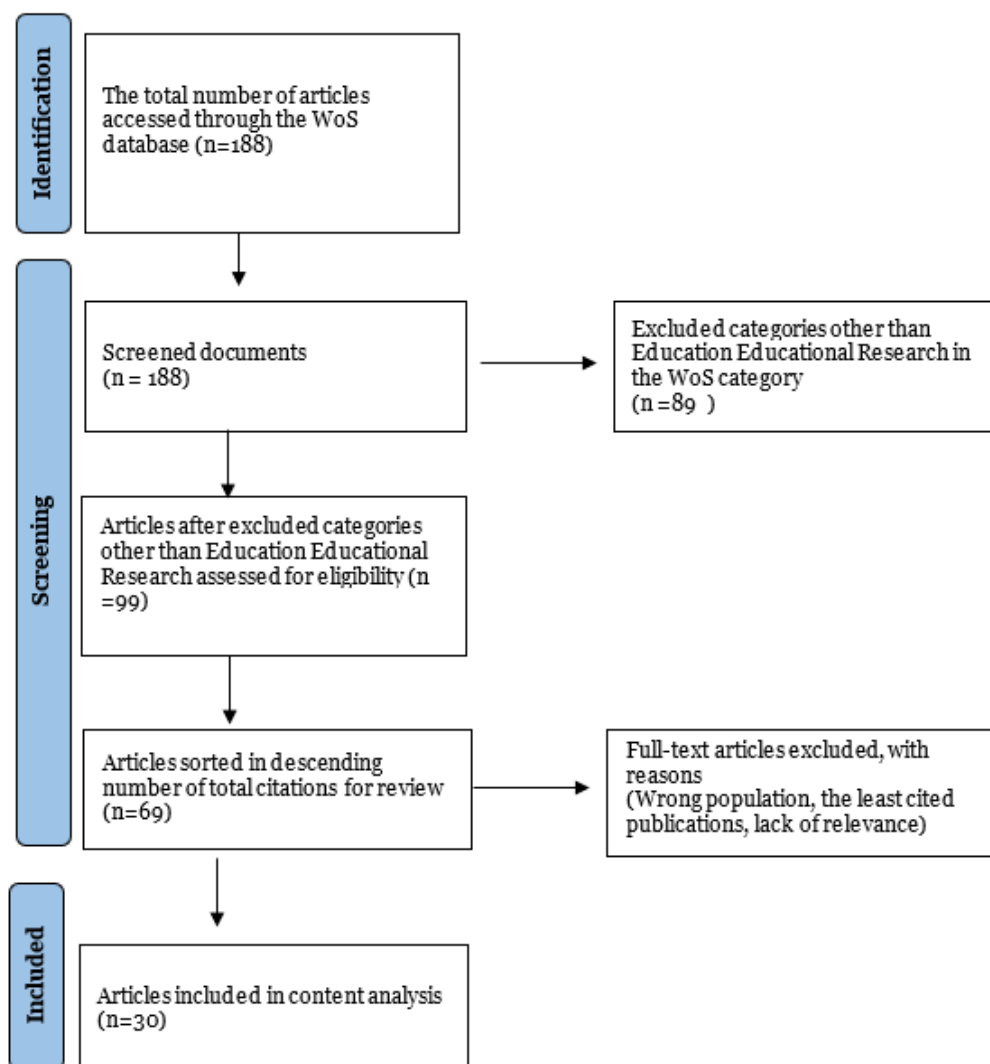*Article Selection Process for Bibliometric Analysis*
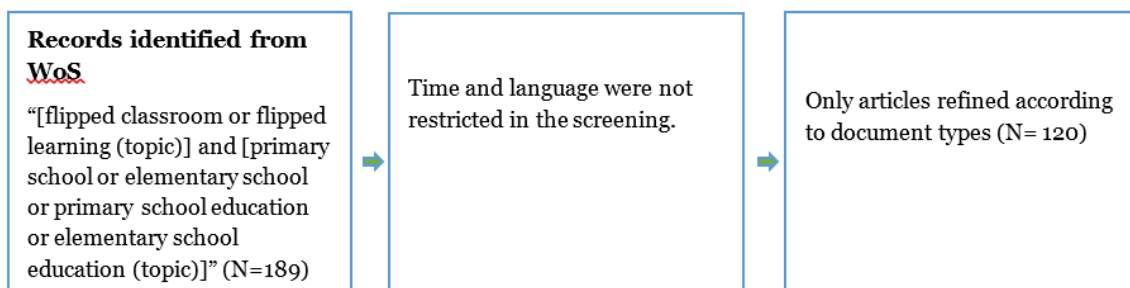
Content Analysis

In the next phase of research, we used content analysis to provide a holistic picture of the research methodologies and areas where FCM is used in primary school to obtain more profound and more comprehensive findings. For the content analysis, we only examined the most cited articles on FCM at the primary school level. The researchers independently

reviewed the articles ("flipped classroom" or "flipped learning") and ("primary school" or "elementary school"). We then reviewed each article's abstract and excluded articles unrelated to FCM, not elementary school education. We analyzed 30 articles that met the study criteria: "research topic, research outcome, variables examined in the study, year of publication, research method, preferred sample sizes, data collection tools, and data analysis methods." While conducting the content analysis, we followed the steps of the PRISMA flow diagram for selecting articles in the data collection process (Figure 2).

Figure 2.

Article Selection Process for Content Analysis

Data Analysis

Data Analysis Process for Bibliometric Analysis

We used VOSviewer software for statistical analysis and visualization of bibliometric analyses. VOSviewer is very functional in directly viewing and interpreting large-scale bibliometric maps (van Eck & Waltman, 2010). Within the scope of bibliometric analysis, the identified studies are brought together, the data of the studies are standardized and classified, and interpreted by analyzing them in line with the research purpose. In this analysis, journals,

authors and their institutions, total number of publications, countries of research, and keyword networks can be analyzed as bibliometric variables.

We used content analysis to analyse the 30 most cited studies that met the criteria. Content analysis is an analysis method that serves as an essential bridge between qualitative analysis and statistical results by quantitatively revealing some features of texts (Bauer, 2003). It provides a better understanding of the data by classifying similar data within the framework of specific themes and concepts (Creswell, 2013). In this study, we categorized and analyzed the data regarding various variables.

Ethical Permits of Research:

In this study, all the rules specified to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were complied with. None of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics", which is the second part of the directive, have been taken. Since there is no situation in the data of this study that would require ethical permission, ethical permission was not obtained.

Ethics Committee Permission Information:

Since the research data was obtained by examining documents in a database accessible online, it does not require ethics committee permission.
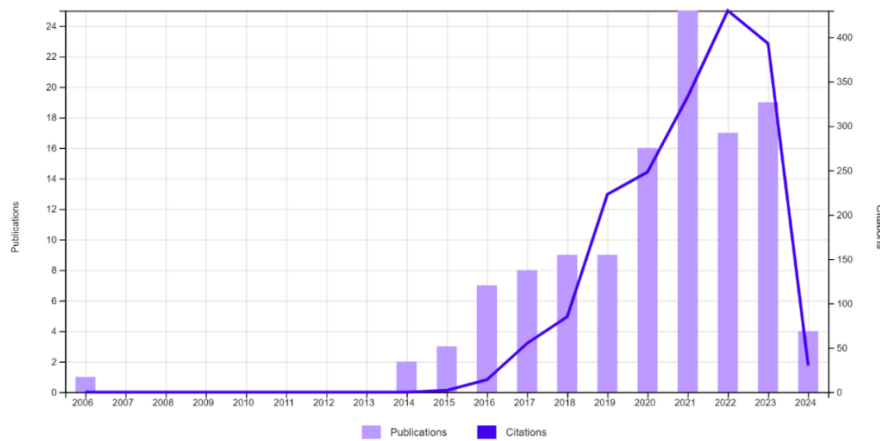
Findings

Findings of Bibliometric Mapping Analysis

Figure 3 shows the graph of the number of publications and citations of the FCM by year. These results show that the first article was published in 2006 and then increased and reached the maximum number of publications (f=25) in 2021.

Figure 3.
Distribution of FCM by Years and Number of Citations

Most Cited Authors

Figure 4 shows the map of the most cited authors and citation analysis. According to the data obtained, the most cited (co-citation) authors in this field are Bergmann (37 citations), Hwang (21 citations) and Zainuddin (20 citations). The 10 authors with must co-cited citations are presented in Table 2.

Figure 4.

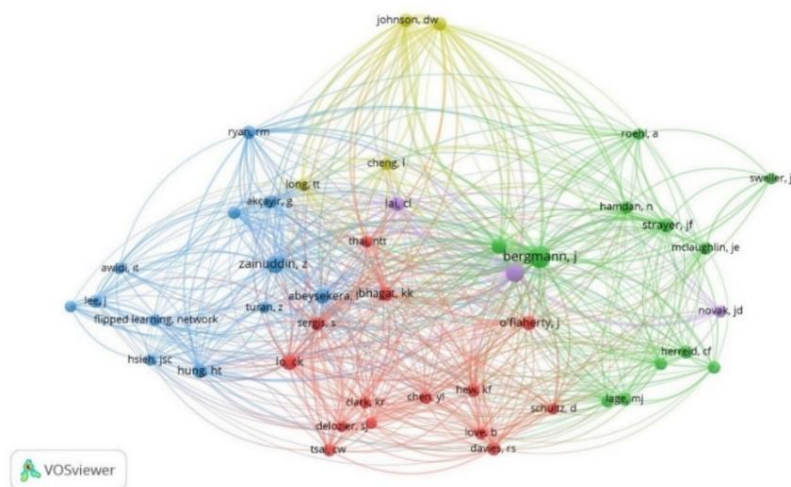*Most Cited Authors in FCM-Related Articles (Co-Citation Analysis)*

Table 2.

The 10 Most Cited Authors in FCM-Related Articles

Authors	Citations
Bergmann	37
Hwang	21
Zainuddin	20
Lo	14
Bishop	12
Abeysekera	11
Strayer	10
Lai	9
Bhagat	9
Hung	9

Most Cited Journals

Figure 5 shows the most cited journals. The data shows that the most cited journals are Computers & Education (125), Educational Technology & Society (55) and Journal of Chemical Education (42). The 10 most cited journals are presented in Table 3.

Figure 5.

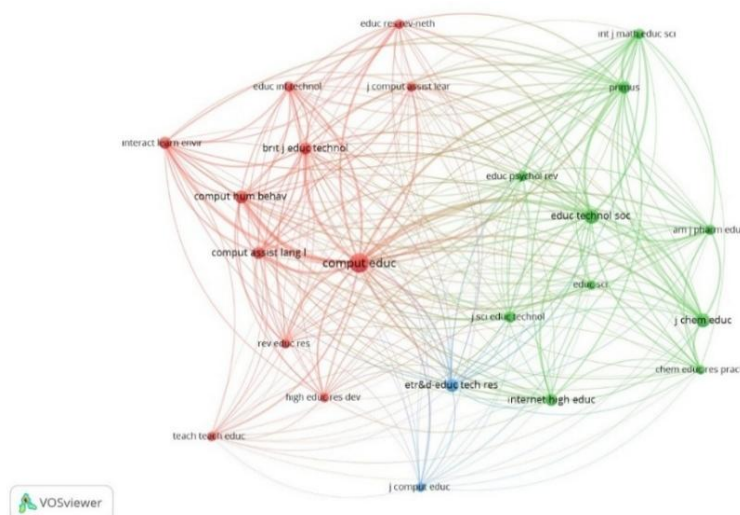*Most Cited Journals in FCM-Related Articles*

Table 3.

The 10 Most Cited Journals İin FCM-Related Articles

Journals	Citations
Computers & Education	125
Educational Technology & Society	55
Journal of Chemical Education	42
Computers in Human Behavior	36
Educational Technology Research and Development	33
British Journal of Educational Technology	28
Computer Assisted Language Learning	28
Internet and Higher Education	27
Interactive Learning Environments	25
PRIMUS	23

Most Used Keywords in FCM-Related Articles

The findings regarding the keywords used in the articles on the use of the flipped classroom model are presented in Figure 6. These findings show that "flipped classroom" (f=25), "flipped learning" (f=7), "blended learning" (f=5), "primary school" (f=5), "motivation" (f=4), "academic achievement" (f=4) are the most used keywords. The most used keywords in the articles are presented Table 4. In the distribution of keywords over the years (Figure 7), it is clear that recent articles focus on augmented reality.

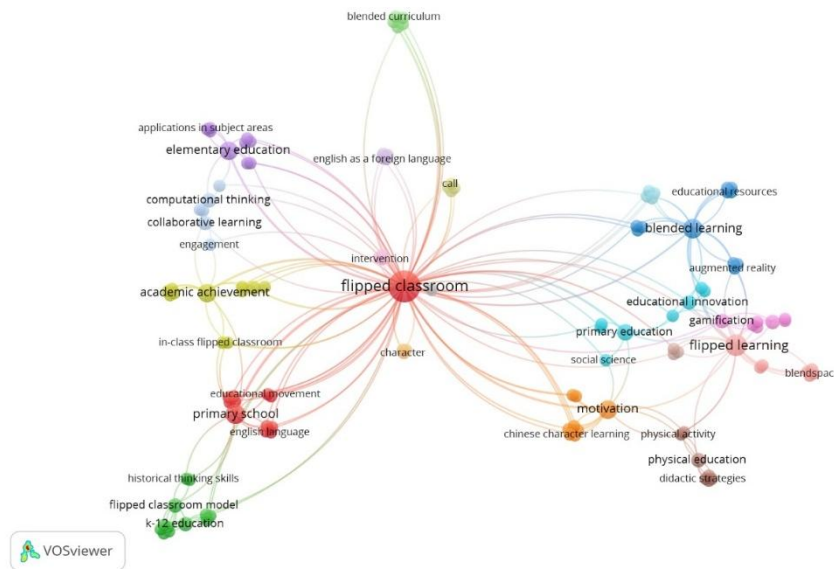**Figure 6.**

Most Used Keywords in FCM-Related Articles

Table 4.

The Most Used 10 Keywords in the Articles

Keywords	f
Flipped classroom	25
Flipped learning	7
Blended learning	5
Primary school	5
Motivation	4
Academic achievement	4
Elementary education	4
Primary education	3
K-12 education	2
Flipped classroom model	2

Figure 7.

Distribution of Most used Words in Article Abstracts by Year
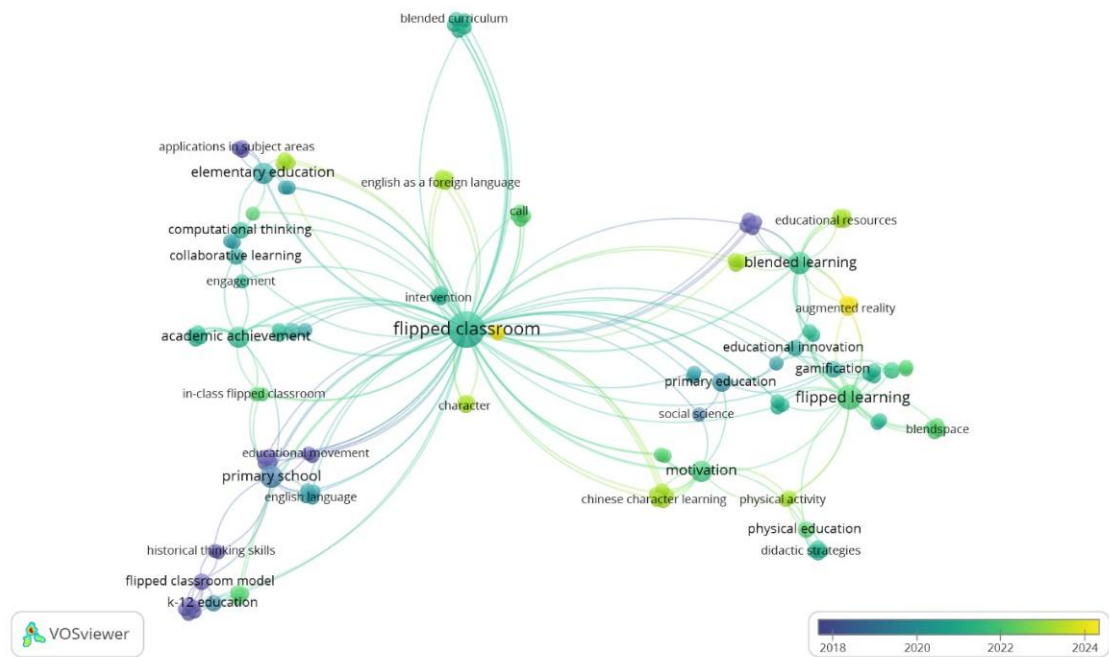
Words used in Abstract Sections of FCM-Related Articles

Figure 8 includes the most commonly used words in article abstracts. According to the data obtained, the most common words in the abstract sections are "teaching" (f=20), "level" (f=18), "analysis" (17), "group" (f=15), "effect" (f=15) and "development" (f=13). The most used words in the abstract sections are presented Table 5.

Figure 8.

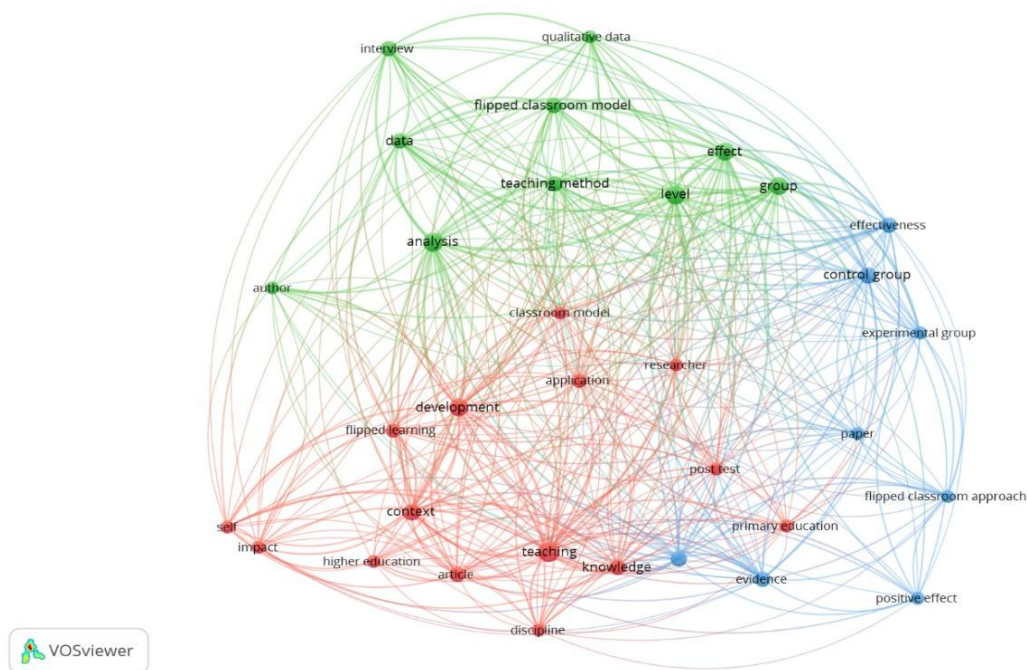*Words used in the Abstract Sections of FCM-Related Articles*

Table 5.

The Most Used 10 Words in the Abstract Sections

Words	*f*
Teaching	20
Level	18
Analysis	17
Group	15
Effect	15
Development	13
Context	12
Control group	12
Knowledge	10
Flipped classroom model	10

Countries with the Most Cited Papers on FCM

Figure 9 shows the countries with the most cited articles on the use of the flipped classroom model. Accordingly, the top five countries with the highest number of papers in this field are Taiwan (386 citations), Australia (250 citations), Spain (99 citations), Greece (98 citations), and China (94 citations). The most cited countries and the number of documents are presented in Table 6.

Figure 9.

Countries with the Most Cited Articles on FCM
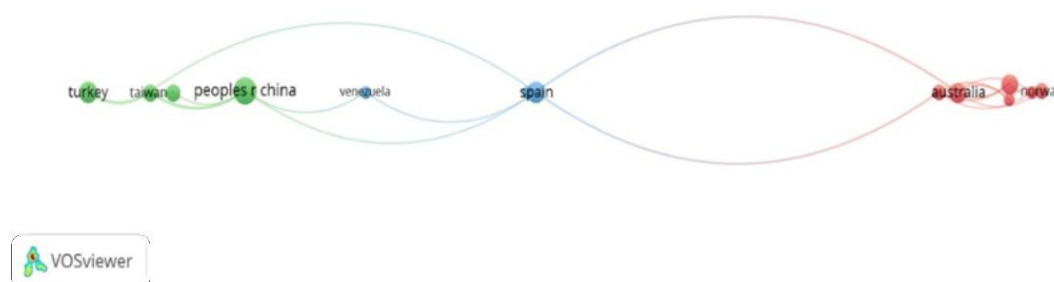
Table 6.

The Most Cited 10 Countries and Number of Documents

Countrys	Documents	Citations
Taiwan	3	386
Australia	4	250
Spain	6	99
Greece	2	98
China	12	94
Venezuela	1	72
Norway	2	59
USA	6	26
Turkey	5	20
Serbia	1	18

Top 30 Cited Articles

It is essential to pay attention to the content of the studies. A highly cited study indicates that it has been critically evaluated (Jin et al., 2020). This provides insight into the popular topics and their impact on research. This study reviewed the 30 most cited articles related to primary school education in the WoS database. These articles represent the most influential

studies in this field and clearly describe this research area. The information about the studies included in the content analysis is examined under the following headings.

Variables Analyzed in Articles on the Use of the FCM in Primary Schools

Content analysis revealed that articles examined the flipped classroom model in primary school education depending on different variables. Figure 10 shows the variables analyzed in the articles. According to the findings, learning/academic achievement, perception and motivation variables were examined the most.

Figure 10.

Variables Analyzed in the Articles
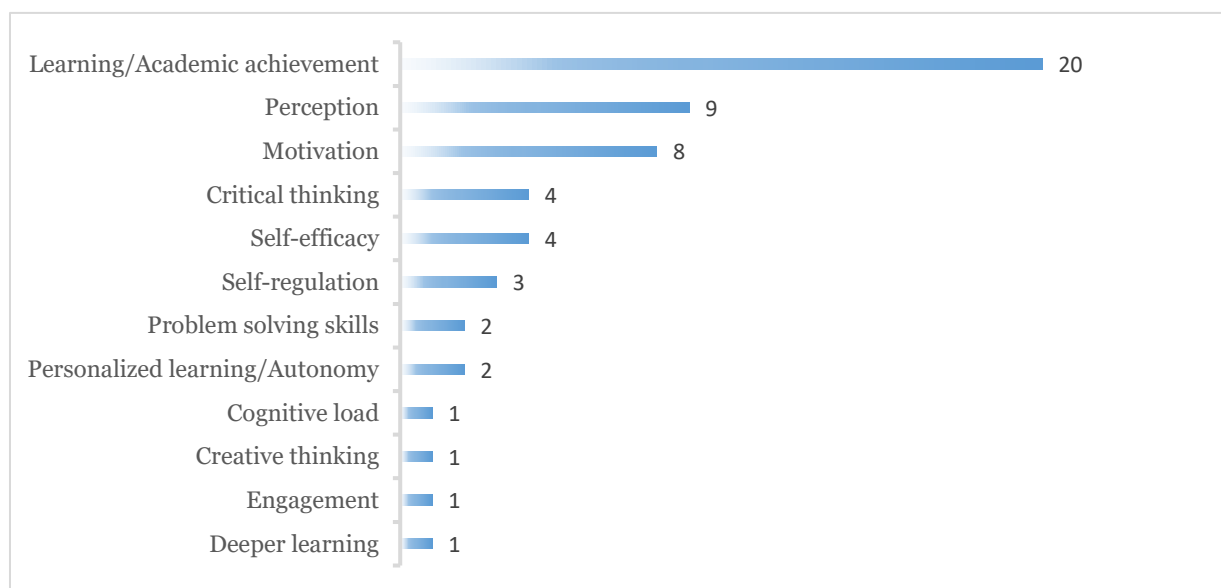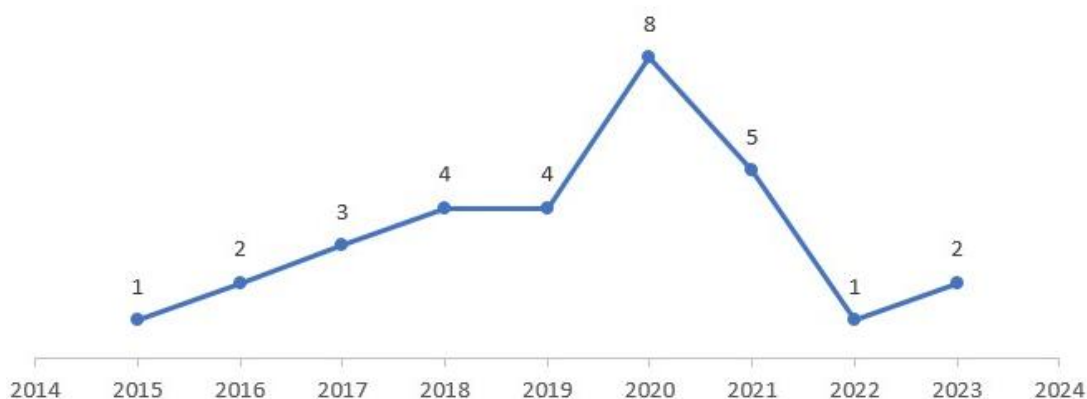

Distribution of Articles on the Use of FCM in Primary Schools by Years

Figure 11 shows that the first study was published in 2015. It reached its highest number with two studies in 2016, three in 2017, 4 in 2018, 4 in 2019, and 8 in 2020, respectively. In 2021, this number decreased to five, with one study in 2022 and 2 in 2023.

Figure 11.
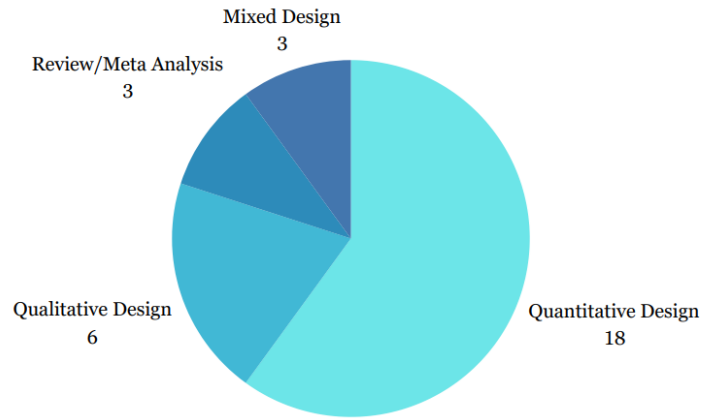
Distribution of Studies by Year

The Method used in the Articles on the use of the FCM in Primary School

The research methods used in the articles analyzed using the FCM in primary schools are presented in Figure 12. According to the findings, the quantitative research method was used the most.

Figure 12.

Research Methods used in the Articles

Sample Size used in Articles on the Use of FCM in Primary Schools

As seen in Table 7, the most preferred sample size is groups of 21-50 people, while the least preferred is groups of 1-20 people.

Table 7.

Sample Size of Studies

Sampling groups	f
1-20	2
21-50	8
51-100	7
101-200	7
201-300	5
Not indicated	1

Data Collection Tools Used in Articles on the Use of FCM in Primary Schools

The data collection tools used in the studies on the use of FCM in primary schools are presented in Figure 13. According to the findings, the most preferred data collection tool is achievement tests, while observations and documents are the most miniature preferred data collection tools.

Figure 13.

Data Collection Tools used in the Articles
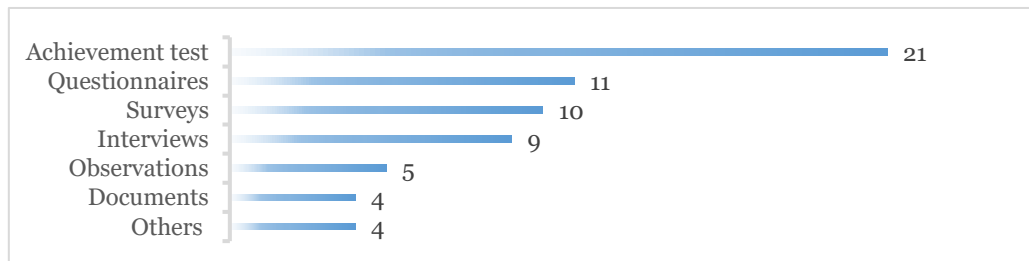
Data Analysis Methods used in Articles on the Use of FCM in Primary Schools

Figure 14 shows the data analysis method. According to the findings, inferential analysis is the most preferred data analysis method.

Figure 14.

Data Analysis Methods used in the Article

Discussion and Conclusion

This study aims to conduct a bibliometric analysis of articles on using FCM at the primary school level and to reveal the methodological research trends of the most cited articles. In this context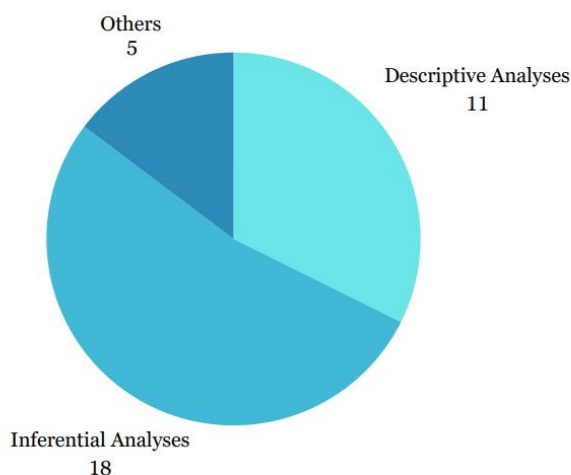, bibliometric mapping and content analysis of the data obtained from the WoS database were conducted. According to the results of the bibliometric analysis, it was found that the most frequently used keywords in articles on the use of FCM at the primary school level were flipped classroom, flipped learning, blending learning, primary school, motivation, and academic achievement, respectively. When the distribution of keywords by year is analyzed, it can be said that augmented reality has become a focal point in recent years. Moreover, Ibáñez and Delgado-Kloos (2018) stated in their study that it would be helpful to investigate how augmented reality learning activities can be part of blended teaching strategies such as flipped classrooms. Since Bergman and Sams (2012) popularized the implementation of flipped classrooms worldwide, there has been an interest in integrating augmented reality technology into FCM in recent studies. However, augmented reality studies on the combination of augmented reality with advanced teaching methods such as flipped and blended learning are still in their infancy (Hung & Yeh, 2023; Khodabandeh, 2023; Khodabandeh & Mombini, 2024; Teo et al., 2022). The utilization of augmented reality tools, identified as one of the most promising emerging digital technologies in education, has sparked innovation and enthusiasm among both teachers and students, encouraging novel approaches to learning (Khodabandeh, 2023). Alongside this trend, flipped learning has gained traction in recent years and is progressively becoming a favored educational methodology (Ekici, 2021). For example, Chang and Hwang (2018) found that the AR-based flipped learning model benefits students by improving their project performance and learning motivation, critical thinking tendencies, and group self-efficacy. The most used words in the abstract were teaching, level, analysis, group, and effect. According to the co-citation analysis, Bergman,

Hwang, Zainuddin, Lo, and Bishop are the most cited authors in this field. It can be said that the contribution of these authors to the flipped model in the related literature is undeniable. The most cited journals were Computers & Education, Educational Technology & Society. It can be said that the aim and scope of these journals is to accept publications related to the technology of education. Educational and instructional technology is a relatively young academic discipline, and scientific journals in related fields only started to emerge in the 1970s (Zawacki-Richter & Latchem, 2018). Moreover, the fact that the Computers & Education journal has been published since 1976 can be explained by the fact that it is among the most cited journals in this field.

The content analysis results showed that learning/academic achievement, perception, and motivation variables were mainly discussed in the articles. Considering the related literature, it is understood that learning/academic achievement (Lin et al., 2019; Tutal & Yazar, 2021; Zainuddin, 2018; Zheng et al., 2020; Zhu, 2021); perception (Chang & Hwang, 2018; Chen et al., 2016); motivation (Lee et al., 2021; Yilmaz, 2017; Zhao et al., 2021) variables are studied. In their research, Bishop and Verleger (2013) found that most studies have investigated student perceptions. In addition, Akçayır and Akçayır (2018), in their research on the advantages and challenges of the flipped classroom, found that the most frequently reported advantage of the flipped classroom in their review study was the increase in student learning performance. Moreover, Zheng et al. (2020) found in their meta-analysis that the flipped classroom model has a moderate effect size on learning achievement and learning motivation.

It was found that the most common research trend in the analyzed articles was quantitative design. There are similar studies in the related literature. For example, Bond (2020) found that the most preferred method was quantitative design in his systematic review of K-12 student engagement through flipped learning. On the other hand, in the review study on flipped learning research, mixed-method research design is the most used research design (Birgili et al., 2021; Zainuddin et al., 2019). Moreover, Turan and Akdag-Cimen (2020) stated that mixed and quantitative methods are their study's most commonly used research methods. In the articles examined within the scope of the research, it is understood that achievement tests, questionnaires, surveys, and interviews are the most common data collection tools, respectively. Bond (2020) found that surveys, interviews, and ability tests were the most preferred data collection tools in his systematic review of articles on K-12 student engagement through flipped learning. Zou et al. (2022), in their systematic review of research on flipped language classrooms, found that tests, questionnaires, and interviews were the most used data collection tools, respectively. According to the sample size, it is understood that the sample numbers in which the most data were collected were 21-50, 51-100, and 101-200, respectively. Lo and Hew (2017) found similar results in their review study on FCM at the K-12 level.

Recommendations

As a result, these analyses inform future researchers about the unexplored research content related to FCM and highlight the gaps waiting to be explored in this field using bibliometric techniques. It also offers critical perspectives on the related literature. Some recommendations related to the study are listed below:

FCM and learning/academic achievement, as well as perception and motivation variables, are widely used in the articles. Looking at different variables in future studies is essential for the related literature.

As a result of the analysis, it was revealed that the augmented reality variable has recently been used in keywords related to FCM. In future studies, there may be studies in which inversion and augmented reality variables are carried out together.

The analysis found that achievement tests, questionnaires, and surveys were the most commonly used data collection tools. Different data collection tools can be recommended, especially alternative measurement and evaluation techniques.

The data for this study were obtained from the Web of Science database based on specific criteria. Although PRISMA guides the study's criteria, it has limitations in some aspects. Moreover, different criteria or databases will produce different results with the data obtained. Therefore, different studies can be designed for different databases or criteria. In addition, certain studies' titles, abstracts, or keywords may not contain words that match the search strings we used to perform this systematic review (Cevikbas & Kaiser, 2023). This may be another limitation of the study.

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BIOGRAPHICAL NOTES

Contribution Rate of Researchers

Author 1: 25%

Author 2: 25%

Author 3: 25%

Author 4: 25%

Conflict Statement

It is stated that the authors did not declare any conflict of interest within the scope of this research and that the research was carried out in accordance with the principles of impartiality and honesty.

Notice of Use of Artificial Intelligence

The authors did not utilise any artificial intelligence tools for the research, authorship and publication of this article.

İlkokulda Ters Yüz Sınıf Modelinin Kullanımına İlişkin Yapılan Çalışmalardaki Eğilimler: Bibliyometrik ve İçerik Analizi

Özet

Son zamanlarda yapılan birçok çalışma, Ters Yüz Sınıf Modelinin [FCM] öğrencilerin öğrenme süreçlerine önemli ölçüde fayda sağladığını göstermiştir. Bu çalışmada, ters yüz sınıf modelinin ilkokul düzeyinde kullanımına ilişkin mevcut çalışmaları geniş bir perspektiften değerlendirmek için bibliyometrik analiz kullanılmıştır. Bibliyometrik analiz sonuçlarına göre, FCM'nin ilkokul düzeyinde kullanımıyla ilgili makalelerde en sık kullanılan anahtar kelimelerin sırasıyla ters yüz sınıf, ters yüz öğrenme, harmanlayarak öğrenme, ilkokul, motivasyon ve akademik başarı olduğu bulunmuştur. Ortak atıf analizine göre, Bergman, Hwang, Zainuddin, Lo ve Bishop bu alanda en çok atıf alan yazarlardır. En çok atıf alan dergiler ise Computers & Education, Educational Technology & Society'dir. İçerik analizinde araştırmacılar, ilkokulda FCM kullanımına ilişkin çalışmalar arasında en çok atıf alan 30 makaleye yer vermiştir. Bulgular, bu alandaki çalışmaların sayısının 2014-2021 yılları arasında arttığını ancak daha sonra azaldığını ortaya koyuyor. Öte yandan sonuçlar, FCM'nin ilkokul öğrencilerinin akademik başarılarını, eleştirel düşünme, motivasyon, öz yeterlilik ve öz düzenleme becerilerini geliştirebileceğini gösteriyor. Veriler, ters yüz sınıf modelinin ilkokul düzeyinde etkili olabileceğine dair umut verici kanıtlar sunmaktadır. Bu çalışma, ilgili bölümde çalışma yapacak araştırmacılar için genel bir bakış açısı sağlamaktadır.

Anahtar Kelimeler: Ters yüz sınıf, ilkokul, bibliyometrik analiz, içerik analizi.

Giriş

20. yy.ın başlarında gelişen dijital bilgi toplumuna paralel olarak eğitim sürecine farklı bir bakış açısı öneren çağdaş bir pedagojik model ortaya çıkmıştır (del Arco vd., 2022). Bu model, Bloom taksonomisinde öğretme ve öğrenme sürecinin basit becerilerini içeren bilme ve anlama aşamalarını sınıf dışına taşıyan "Ters Yüz Sınıf" modelidir (Anderson & Krathwohl, 2001; Campión, 2019). Bloom'a göre insanlar doğuştan öğrenmeye hazırdır ve öğrenme kapasiteleri sınırsızdır. Ancak bu donanımların ve sınırların kullanımını belirleyen eğitim süreçleridir (Bloom, 1976). Bu noktada Ters Yüz Sınıf Modeli [TYSM] öğretme ve öğrenme süreçlerini dönüştürme potansiyeli ile dikkat çekmektedir (Flipped Learning Network [FLN], 2014; Hamdan vd., 2013; Phillips & Trainor, 2014). TYSM, sınıf içi etkinliklerin sınıf dışı etkinliklerle birleştirilmesidir. Burada doğrudan öğrenme genellikle bilgi teknolojileri kullanılarak sınıf dışında, etkileşimli öğrenme ise sınıf içinde gerçekleştirilmektedir (Cui & Coleman, 2020). Diğer bir ifadeyle TYSM, grup halindeki sınıf içi öğrenme sürecinin teknolojik araçlarla bireysel öğrenme deneyimine dönüştüğü bir öğrenme yaklaşımını temsil eder. Bu modele göre, öğrenciler ders öncesi zamanlarını içeriğe yönelik materyal ve etkinliklerle geçirip temel bilgileri edinerek sınıf içi zamana hazırlanırlar. Ders öncesi sunulan içerikler, eleştirel düşünme ve sınıf içi anlamlı öğrenmeyi teşvik eden önemli unsurlardandır (Abeysekera & Dawson, 2015; FLN, 2014; McLaughlin vd., 2016).

Bergmann ve Sams (2015), ise ilkokuldaki öğrencilerin yetenekleri ve eğitim ihtiyaçları diğer eğitim kademelerindeki öğrencilerden farklılık gösterdiği için TYSM'nin ilkokulda kullanılmasının; öğretmen eğitimi, video kullanımı ve velilerin sürece dahil edilmesi gibi konularda diğer kademelere göre farklılıklar içerdiğini belirtmiştir. Bu çalışmanın, TYSM'nin ilkokulda kullanımına ilişkin çalışmaların içerik ve bibliyometrik analiz yöntemi ile mevcut eğilimlerini ortaya koyarak literatürdeki boşlukları doldurmak adına gelecekteki çalışmalara yön vereceği düşünülmektedir. Bu nedenle bu çalışmada, ilkokul düzeyinde TYSM'nin etkilerini içerik ve bibliyometrik analiz yöntemiyle inceleyerek bu modelin ilkokul eğitimine etkilerinin daha iyi anlaşılmasına katkı sağlamak amaçlanmaktadır. Bu amaçla aşağıdaki araştırma sorularına cevap aranmıştır:

1. İlkokulda TYSM ile ilgili makalelerin yıllara ve atıf sayılarına ilişkin dağılımı nedir?

2. İlkokulda TYSM ile ilgili makalelerde en çok atıf alan yazarlar kimlerdir?

3. İlkokulda TYSM ile ilgili makalelerde en çok atıf alan dergiler hangileridir?

4. İlkokulda TYSM ile ilgili makalelerde en çok kullanılan anahtar kelimelerin dağılımı nedir?

5. İlkokulda TYSM ile ilgili makalelerin özetlerinde en çok kullanılan kelimelerin dağılımı nedir?

6. İlkokulda TYSM ile ilgili makalelerde incelenen değişkenler nelerdir?

7. İlkokulda TYSM ile ilgili makalelerin yıllara göre dağılımı nedir?

8. İlkokulda TYSM ile ilgili makalelerdeki metodolojik eğilimler nelerdir?

9. İlkokulda TYSM ile ilgili makalelerde en çok tercih edilen örneklem büyüklükleri nelerdir?

10. İlkokulda TYSM ile ilgili makalelerde en çok tercih edilen veri toplama araçları nelerdir?

11. İlkokulda TYSM ile ilgili makalelerde en çok tercih edilen veri analiz yöntemleri nelerdir?

Yöntem

Bu çalışma, TYSM kullanımının bibliyometrik ve içerik analizi yöntemleriyle sistematik bir şekilde değerlendirmesini sunmaktadır. Günümüze kadar yapılan çalışmaları dikkate alarak alana geniş bir perspektiften bakma imkânı sağladığı için çalışmada bibliyometrik analiz yöntemi kullanılmıştır. Bibliyometri, çalışmaların bibliyografik bileşenlerinden elde edilen bilgilerin nicel analizler ve istatistikler aracılığıyla incelenmesidir (Zan, 2019). Bibliyometrik analiz, ele alınan konunun zaman içindeki gelişimini ortaya koyma imkânı sunmaktadır (Pinto vd., 2019). Bu sayede araştırmacıların alandaki gelişmeleri daha kapsamlı bir şekilde anlamalarını sağlamaktadır (Zupic & Čater, 2015). Çalışmada alanın genel çerçevesi belirlendikten sonra ilkokulda TYSM kullanımı alanındaki araştırma eğilimlerini ortaya koymak için içerik analizi tercih edilmiştir. Böylece bu alandaki nicel ve nitel çalışmalar incelenerek alanla ilgili araştırma yapan veya yapmak isteyen araştırmacılara mevcut çalışma

eğilimleri sunulmaktadır. Çalışmada Sistematik İnceleme ve Meta-Analiz Protokolleri için Tercih Edilen Raporlama Öğeleri kullanılmıştır (Page vd., 2021). Çalışmanın verileri ise Web of Science [WoS] veri tabanından seçilmiştir.

Araştırmanın Etik İzinleri:

Bu çalışmada "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında uyulması gerektiği belirtilen tüm kurallara uyulmuştur. Yönergenin ikinci bölümü olan "Bilimsel Araştırma ve Yayın Etiğine Aykırı Eylemler" başlığı altında belirtilen eylemlerin hiçbiri gerçekleştirilmemiştir. Bu araştırmanın verilerinde etik izin alınacak bir durum olmadığı için etik izin alınmamıştır.

Etik Kurul İzin Bilgileri:

Araştırma verileri, çevrim içi olarak erişilebilen bir veri tabanındaki dokümanların incelenmesiyle elde edildiği için etik kurul izni gerektirmemektedir.

Bulgular

Elde edilen sonuçlar, TYSM'nin yıllara göre yayın ve atıf sayılarına dair önemli bulgular sunmaktadır. İlk makalenin 2006 yılında yayımlandığı ve ardından yayın sayısının artarak 2021 yılında en yüksek değere (f=25) ulaştığı gözlemlenmiştir. En fazla atıf alan dergiler arasında sırasıyla Computers & Education (125 atıf), Educational Technology & Society (55 atıf) ve Journal of Chemical Education (42 atıf) öne çıkmaktadır. Ters yüz sınıf modelinin kullanımı ile ilgili makalelerde en çok tercih edilen anahtar kelimeler arasında "ters yüz sınıf" (f=25), "ters yüz öğrenme" (f=7), "harmanlanmış öğrenme" (f=5), "ilkokul" (f=5), "motivasyon" (f=4) ve "akademik başarı" (f=4) bulunmaktadır. Ters yüz sınıf modeli ile ilgili en fazla atıf alan makalelerin yapıldığı ülkeler arasında Tayvan (386 alıntı), Avustralya (250 alıntı), İspanya (99 alıntı), Yunanistan (98 alıntı) ve Çin (94 alıntı) ilk sıralarda yer almaktadır. Yapılan içerik analizi, makalelerde ters yüz sınıf modelinin ilkokul eğitiminde farklı değişkenlere bağlı olarak incelendiğini ortaya koymaktadır. En çok incelenen değişkenler arasında öğrenme/akademik başarı, algı ve motivasyon dikkat çekmektedir.

Tartışma ve Sonuç

Bu çalışma ilkokul düzeyinde TYSM'nin kullanımına ilişkin makalelerin bibliyometrik analizi ve en çok atıf alan makalelerin metodolojik araştırma eğilimlerini ortaya koymak amaçlanmıştır. Bu kapsamda WoS veri tabanından elde edilen verilerin bibliyometrik haritalama analizini ve içerik analizi gerçekleştirilmiştir. Bibliyometrik analiz sonuçlarına göre ilkokul düzeyinde TYSM'nin kullanımına ilişkin makalelerde en çok kullanılan anahtar kelimelerin sırasıyla ters yüz sınıf, ters yüz öğrenme, harmanlanmış öğrenme, ilkokul, motivasyon ve akademik başarı olduğu bulunmuştur. Anahtar kelimelerin yıllara göre dağılımı incelendiğinde, son yıllarda artırılmış gerçekliğin odak noktası haline geldiği söylenebilir. Dahası İbáñez ve Delgado-Kloos (2018) yaptıkları çalışmada artırılmış gerçeklik öğrenme etkinliklerinin ters çevrilmiş sınıf gibi harmanlanmış öğretim stratejilerinin nasıl bir parçası olabileceğini araştırmanın faydalı olacağını belirtmişlerdir. Bergman ve Sams (2012) ters yüz sınıf modelinin uygulanmasını dünyaya yaygınlaştırdığından beri, artırılmış gerçeklik ile ters yüz ve harmanlanmış sınıflar gibi ileri öğretim yöntemlerinin birleşimine yönelik artırılmış gerçeklik çalışmaları henüz başlangıç aşamasında olmasına rağmen son zamanlarda yapılan

çalışmalar, artırılmış gerçeklik teknolojisinin ters yüz sınıf modeline entegrasyonunun araştırıldığını ve bu konudaki literatürde çeşitli bulguların yer aldığını göstermektedir (Hung & Yeh, 2023; Khodabandeh, 2023; Khodabandeh & Mombini, 2024; Teo vd., 2022).

İncelenen makalelerde en çok kullanılan araştırma yönteminin nicel yöntem olduğu olduğu ortaya çıkmıştır. İlgili alan yazında benzer çalışmaların olduğu görülmektedir. Örneğin, Bond (2020) tarafından gerçekleştirilen ters yüz öğrenme yoluyla öğrenci katılımını inceleyen K-12 yönelik sistematik bir inceleme çalışmasında, en yaygın olarak tercih edilen nicel yöntemlerin kullanıldığı belirlenmiştir. Diğer taraftan, ters yüz öğrenme üzerine yapılan araştırmalarda, sistematik inceleme çalışmalarında en sık karşılaşılan yöntemlerin karma yöntemler olduğu görülmüştür (Birgili vd., 2021; Zainuddin vd., 2019). Dahası, Turan ve Akdag-Cimen (2020) ise yaptıkları çalışmada karma ve nicel yöntemlerin en yaygın kullanılan araştırma metotları olduklarını belirtmişlerdir.

Araştırma kapsamında incelenen makalelerde en çok akademik başarı testi kullanıldığı anlaşılmaktadır. Bond (2020), ters yüz öğrenme yoluyla öğrenci katılımını inceleyen K-12 odaklı sistematik bir incelemesinde, en sık kullanılan veri toplama araçlarının anketler, görüşmeler ve yetenek testleri olduğunu ortaya koymuştur. Zou vd. (2022) ters çevrilmiş dil sınıfları üzerine yapılan araştırmaları sistematik inceledikleri makalelerde en çok sırasıyla test, anket ve görüşme veri toplama araçları kullanıldığını bulmuşlardır. Örneklem büyüklüğüne göre en çok verilerin toplandığı örneklem sayılarının sırasıyla 21-50, 51-100, 101-200 olduğu anlaşılmaktadır. Lo ve Hew'in (2017) K-12 düzeyinde ters çevrilmiş sınıflarıyla ilgili yaptıkları çalışmada benzer sonuçların çıktığı görülmektedir.

Öneriler

Araştırmada elde edilen sonuçların, gelecek araştırmacılar için ters yüz sınıf modeliyle ilgili keşfedilmemiş araştırma içeriği hakkında bilgi sunduğu, bibliyometrik teknikler kullanılarak bu alanla ilgili araştırılmayı bekleyen boşlukları vurguladığı ve ilgili alan yazına yönelik eleştirel bakış açıları sunduğu düşünülmektedir. Çalışma sonuçlarından hareketle bazı öneriler aşağıda sıralanmıştır:

Ters yüz sınıf modeliyle ilgili çalışmalarda öğrenme/akademik başarı, algı ve motivasyon değişkenlerinin sıklıkla incelendiği bulgulanmıştır. İleride yapılması planlanan araştırmalarda farklı değişkenlere bakılmasının ilgili alan yazın açısından önemli olduğu söylenebilir.

Ters yüz modeli ile ilgili son zamanlarda artırılmış gerçeklik değişkenin anahtar kelimelerde kullanıldığı yapılan analizler sonucunda ortaya çıkmıştır. İleride yapılacak olan çalışmalarda ters yüz ve artırılmış gerçeklik değişkenlerinin birlikte yürütüldüğü çalışmaların yapılması önerilmektedir.

Bu çalışma verileri, Web of Science veri tabanında belirli kriterler göz önüne alınarak gerçekleştirilmiştir. Çalışma Sistematik İnceleme ve Meta-Analiz Protokolleri için Tercih Edilen Raporlama Öğeleri rehberliğinde yapılsa da bazı yönlerden kısıtlılığı olduğu söylenebilir. Dahası farklı kriterler veya veri tabanlarından elde edilen verilerle farklı sonuçlar çıkacağı düşünülmektedir. Bu yüzden farklı veri tabanları veya kriterlere yönelik faklı çalışmalar tasarlanabilir. Buna ilaveten belirli çalışmaların başlıkları, özetleri veya anahtar

kelimeleri bu sistematik incelemeyi gerçekleştirmek için kullandığımız arama dizeleriyle eşleşen kelimeleri içermemiş olabilir (Cevikbas & Kaiser, 2023). Bu da araştırmanın diğer bir sınırlılığı olabilir.