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A Meta-Synthesis Study Concerning Flipped Classroom

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ABSTRACT

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meta-synthesis -Flipped
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The aim of this research was to examine the studies conducted on Flipped Classroom from different perspectives in Iran. A total of 30 studies were included in this research. These studies were accessed through various databases and analyzed using content analysis technique. The findings of this research indicated that there has been an increase in the number of studies on Flipped learning in recent years. Most of these studies are in the form of articles, and the most commonly used research methods and designs were mixed methods and experimental designs. The teaching practices mainly targeted university students, and the studies predominantly employed achievement tests, interviews, and surveys as data collection tools. Out-of-class activities involved the use of videos, presentations, and written documents, while practical activities were conducted in the classroom. The results of the study demonstrated that Flipped classroom had a positive impact on students' academic achievement, motivation, and engagement. Additionally, both teachers and students had a positive attitude toward Flipped learning.

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Introduction

Due to the technological advances in education, significant differences in student characteristics and educational expectations, experts have tried a variety of approaches to make learning more effective and sustainable. This raised questions about the roles of teachers and students in education and led to the advancement of instructional strategies, methods, and techniques that involves empowering students to actively participate in the learning process, extending beyond the confines of traditional classroom settings.

Online learning has become very important recently. Various pedagogical models promoting online learning can be found in the literature. In some of these models, the course is taught entirely online, without face-to-face interaction. Blended learning is a broad term that refers to a learning model that includes multiple models and uses multiple communication channels. Blended learning includes a variety of pedagogical approaches, including student-centered learning, active learning, and problem-based learning (Murray, et al., 2015). Flipped Learning is considered one of the learning models in blended learning. By now, everyone in education has probably heard of “Flipped Learning” and there is an increasing use and interest in Flipped education as a new educational paradigm (Bergmann & Sams, 2012). In the last few years, Flipped Classroom has been one of the new phenomena and has made significant progress, so that educational experts believe that this will revolutionize learning environments. The use of and interest in this approach are on the rise (Bergman & Sams, 2012).

Flipped classroom as a new phenomenon have been used with different names, such as inverted classroom (Bates & Galloway, 2012), blended learning and inverted classroom (Bergman & Sams 2012), backward (McLaughlin et al., 2014), reverse instruction (Halili & Zainuddin, 2015).

Some happenings such as Mazur’s “Peer Instruction Technique” in 1996 (Mazur, 2009), the inverted classroom of Lage, et al. in 2000, Salman Khan’s “Non-profit Web Site” in 2006 which produced educational videos, finally, Bergman and Sams studies in 2012 consolidated the development of the Flipped classroom.

Flipped Learning is formed by several theoretical foundations. The first foundation is blended learning proposed by Abeysekera & Dawson (2015) which

transforms the classroom lectures into online presentations and applies face-to-face classroom practice, instead. Secondly, the Clark's student-centered approach that helps learners to be active in learning environment and helps to change the instructor-centered learning environment into learner-centered environment which is basically based on the constructivist theory of learning (Strayer, 2012). Constructivism means "knowledge is actively constructed by the learner, not passively received from the outside. Learning is something done by the learner, not something that is imposed on the learner". Finally, the last foundation is active learning (Lemmer, 2013) that emphasizes student engagement in the process of learning (Fazlali,2020).

There are different definitions of Flipped learning in literature. Murray et al. (2015) provided an explanation of Flipped learning, stating that it is an approach where students acquire fundamental knowledge through short videos at home and then come to the classroom to gain a deeper understanding of challenging concepts and correct any misconceptions. Similarly, Stone (2012) defined Flipped learning as a model where students watch relevant videos prior to the class and utilize class time to delve into complex topics, answer questions, and establish connections with real-life situations. Gopalan and Klann (2017) described it as a blended educational model that enables student-centered learning by shifting teacher-guided instruction outside the classroom. In this model, videos serve not only as a means of delivering course content but also as a digital learning platform as highlighted by Knight (2016).

According to some teachers, pre-class activities should not be limited to the Internet and videos. Similar goals can be achieved through appropriate educational materials and training (Kim, et al., 2014). Flipped learning can be defined as a learning pattern that involves learning course content and acquiring deeper knowledge within the course. Integrate, question and apply knowledge through class discussions, questions and answers and hands-on activities. In Flipped learning, students use videos, lecture notes, etc. at home. (Murray, et al., 2015).

Flipped learning, emerging as an alternative, unlike traditional teaching methods embrace learning outside the classroom while increasing classroom interaction. Flipped learning shifts instructional time to student responsibilities outside the classroom, freeing up time for teachers to use for personal interaction with students and hands-on experiences in the classroom. In this way, class time is spent on discussing, doing

homework, applying content, and involves the achievement of higher levels of cognition taxonomy, such as “application, “analysis, “synthesis, “and “evaluation” by the guidance of a teacher (See & Conry, 2014). As a matter of fact, the lower levels of cognition, such as “knowledge “and “understanding “take place outside the classroom.

To engage in Flipped learning, educators must incorporate the four pillars of F-L-I-P TM model into their practice, i.e. flexible environment is the practice of using a variety of teaching and learning approaches to meet the interests, needs, and expectations of students, learning culture means a shift from a teacher-centered approach to a student-centered approach where learners are actively involved in the process, intentional content focuses on teacher preferences, and the teacher's role in researching and preparing content to meet student needs, and professional educator emphasizes the need for professional and qualified teachers to implement Flipped learning that guides students by observing how they learn and providing the necessary feedback. The pillars free instructional time and lets more dynamic and interactive classroom learning (Fazlali,2020).

From the above explanation, it can be concluded that Flipped Learning is an alternative learning model in that it makes learning interesting and enables effective and continuous learning through hands-on activities. In recent years, the growth of research on Flipped learning in Iran shows interest among educators and practitioners.

This study attempted to review the effects of Flipped learning conducted in Iran. To this aim, this study used meta-synthesis, also known as thematic content analysis. Content analysis research can be divided into three categories: meta-analysis, descriptive content analysis, and meta-synthesis. In meta-analysis studies, only the results of experimental studies are analyzed statistically, and many studies may be excluded from the analysis because they do not meet the standards of meta-analysis. Descriptive content analysis studies require a large number of research studies in a specific field, which limits in-depth analysis and synthesis.

Meta-synthetic research describes a limited number of studies in a given field in terms of similarities and differences, critically synthesizing the results and discussing them in depth (Çalık and Sözbilir, 2014). In this case, meta-synthesis is considered the most appropriate method for this study to identify general trends.

Method

This study is a meta-synthesis research, which falls under the category of content analysis methods which is commonly referred to as thematic content analysis. The main objective of meta-synthesis studies is to combine the findings of similar studies conducted on the same topic, with a focus on qualitative understanding (Çalık & Sözbilir, 2014; Walsh & Downe, 2005). The process of conducting meta-synthesis studies involves several stages, including identifying similar studies on the subject, establishing criteria for selecting studies to be included in the research, comparing the methodologies used in the studies, and integrating the research results (Sandelowski, Docherty and Emden, 1997). Given the aim of analyzing studies conducted in Iran on Flipped learning, in terms of methodology and research outcomes, meta-synthesis is considered an appropriate approach for this study. For this purpose, the seven-step method (Sandelowski & Barroso, 2006) is used, the steps of which can be seen in Figure (1).

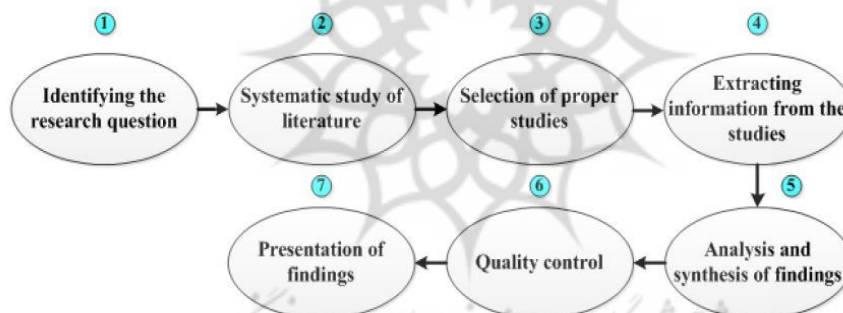


Figure 1. Research synthesis steps. Adapted from *Handbook for synthesizing qualitative research*, by M. Sandelowski and J. Barroso, 2006, Springer Publishing Company.

Step 1: Identifying the Research Question

In the first step, the main research question should be identified. what are the effects of flipped learning on the studies in Iran?

Steps 2 and 3: Systematic Study of Literature and Selection of Relevant Studies

The scope of this study encompasses research conducted between 2017 and 2023, focusing on the effects of Flipped learning. To collect relevant data, comprehensive searches were conducted in major Iranian databases such as CIVILICA, MagIran, Ganj, Noormags, SID and Human Science Portal applying specific keywords related to the

topic: Flipped education & Reverse instruction, Flipped classroom, Backwards classroom, Flipped teaching and Reverse teaching.

	Researcher	Year	Type	Grade	
1	Khalifeh, Ahmad	1402/2023	Article	Q2	ISC
2	Ebrahimzadeh shirvani, Fatemeh	1402/2023	Article	Q1	ISC
3	Noredin, Parvin,et al..	1401/2022	Article	Q2	ISC
4	Jafari, Esmail.et al..	1401/2022	Article	Q2	ISC
5	Bayat, Parviz,et al..	1401/2022	Article	Q2	ISC
6	Rezaei,Mahdieh	1401/2022	Article	Q2	ISC
7	Samiei zafarghandi, Morteza	1401/2022	Article	Q1	ISC
8	Khazaei,Azar	1401/2022	Article	Q2	ISC
9	Rezaeifard, Zahra	1401/2022	Article	Q1	ISC
10	Soleimani, shila	1401/2022	Article	Q1	ISC
11	Ghartali, Ahmad	1401/2022	Article	Q1	ISC
12	Moradi, Rahim	1401/2022	Article	Q2	ISC
13	Askari,Farzaneh	1401/2023	Article	Q2	ISC
14	Froutan,Khalil	1401/2022	Article	Q2	ISC
15	Ahraf,Hamid	1401/2022	Article	Q2	ISC
16	Saheb yar,Hafez	1400/2021	Article	Q2	ISC
17	Soleimani, Habib	1400/2021	Article	Q1	ISC
18	Khazaei, Saeed	1400/2021	Article	Q2	ISC
19	Khoshnood, Hooshang	1399/2020	Article	Q2	ISC
20	Javadi, Nahid	1399/2020	Article	Q2	ISC
21	ghartalebi,Ahmad et al..	1399/2020	Article	Q2	ISC
22	Alipour, Mohammad et al..	1399/2020	Article	Q2	ISC
23	Fazlali, Fatemeh	1399/2020	Article	Q1	ISC
24	Parvaneh, Hamid et al..	1399/2020	Article	Q1	ISC
25	Ghasemtabar, Dr.s.Abdollah et.a.	1399/2020	Article	Q2	ISC
26	MirzaeiMatin, khatoon	1399/2020	Article	Q2	ISC
27	Toofani nejad, Ehsan et al..	1398/2019	Article	ISC	ISC
28	Badeleh, Alireza et al..	1398/2019	Article	Q2	ISC
29	Rajaeian, Neda et al..	1397/2018	Article	Q1	ISC
30	Kaviani,Hasan et al...	1396/2017	Article	Q1	ISC

selection process for the studies included in the research was based on specific criteria. These criteria required the studies to be printed in Journals of Ministry of Education with the grade of Q1 or Q2 and ISC. Only the studies that met these criteria were

included in the research. Therefore, the data analyzed in this study consisted of a total of 30 studies conducted in Iran.

Steps 4 and 5: Extracting Information from Research and Analyzing and Synthesizing Findings

When conducting a synthesis study, it is essential to analyze previous studies and findings in the relevant field using qualitative analysis. Content analysis, which involves coding, is a highly effective method for this purpose. By coding the data, researchers can identify patterns and establish a framework. Hsieh and Shannon (2005) emphasize the significance of coding in this process. There are three coding techniques proposed by Corbin and Strauss (2008): open coding, axial coding, and selective coding. Open coding involves identifying concepts and exploring their features and dimensions within the data. Axial coding focuses on linking categories to subcategories and establishing connections at the attribute and dimension levels. Selective coding, on the other hand, involves integrating and refining categories. Lee (2001) also highlights the importance of selective coding in the research synthesis process.

The analysis of qualitative data in this study was conducted using MAXQDA 10, a software program, in conjunction with the three-step encoding method developed by Corbin and Strauss. Initially, the content relevant to the research question was identified in the selected studies, and through repeated reviews, the initial open codes were extracted. Subsequently, similar codes with the same connotation were classified as axial codes to establish connections between the open codes. Finally, the data were selectively coded, and axial codes with similar connotations were grouped into categories or dimensions. The content analysis form was prepared by identifying various themes such as publication year, publication type, research method, design, target population, data collection instruments, teaching practices (including content subject/discipline, duration of application, activities, etc.), and research results.

Step 6: Quality Control

To ensure the quality of the study, research papers were evaluated based on various indices such as publication year, publication type, research methods, design, target population, data collection instruments, teaching practice (subject/matter). duration of use, activity, etc. and research results. Only papers that scored highly on these criteria were selected for further analysis. Additionally, to ensure the reliability of the coding process, the intra-thematic agreement method was employed, where two coders independently assessed the data. An expert researcher also re-encoded the data to enhance reliability. In order to establish internal reliability, the examination of 40 studies in this research employed the use of two separate coders. The calculation of the correspondence between these coders was carried out using the formula proposed by Miles and Huberman (1994), which determined that the percentage of agreement was 94%. Consequently, it can be concluded that the coding exhibits a satisfactory level of reliability (Miles & Huberman, 1994). To ensure internal validity in this particular study, the data obtained from the studies was consistently reviewed to maintain integrity and consistency. Furthermore, detailed explanations were provided regarding the various processes involved, such as the determination of the study population, coding, and data analysis, in order to establish external validity.

Step 7: Presentation of Findings

The following section provides an overview of the findings obtained from the studies analyzed in this research. These findings are presented in relation to the year of publication, type of publication, research methodology, study design, target population, data collection instruments, teaching practices (including content subject/discipline, duration of application, activities, etc.), and research outcomes.

Publication Year and Type

Upon analyzing the research conducted on Flipped learning in Iran, it was discovered that there were no studies conducted prior to 2016. However, in 2016, two studies were conducted. In the subsequent years, there were 6 studies in 2017, 27 studies in 2018, and 31 studies in 2020. Consequently, it is evident that there has been a significant rise

in recent years in the quantity of studies conducted on Flipped learning, in Iran. The majority of the studies analyzed in this research were articles, followed by master's theses, PhD theses, and papers.

Research Method and Design

More than half of the studies on Flipped learning employed quantitative and a mixed method approach. while others were qualitative methods. The majority of studies adopted an experimental design, while a smaller number of studies conducted survey, case study, phenomenological design or meta-synthesis methodologies.

Target Population of the Studies

In the research analyzed, it was discovered that Flipped learning was implemented in various sample groups or study groups. The majority of studies conducted in Iran on Flipped learning focused on university students. Out of these studies, some of them were conducted with university students from other faculties. Additionally, four studies were conducted with high school students, four studies with secondary school students, and three study with teachers for professional development.

Data Collection Instruments

The majority of studies conducted in Iran employed interview forms and achievement tests. In addition to these, the studies also employed scales, surveys, observation forms, various tests, and document analysis.

Differences and Similarities Concerning Teaching Practices

The research examined various studies that implemented Flipped learning in different disciplines. The findings revealed that the majority of flipped learning practices were implemented in English courses and courses related to Information Technologies, such as programming, computer, and information technologies. Additionally, the effectiveness of flipped learning practices was explored in teacher education, medical education, fine arts courses, as well as various numerical and verbal courses. In the studies conducted the duration of the practices varied. Some studies implemented Flipped learning for 4-7 weeks, while others for 8 to 10 weeks and over. Overall, it was observed that most studies implemented flipped learning for a minimum of eight weeks.

The extracurricular activities involved sharing teaching materials like videos, quizzes/homework, attendance sheets/written documents, presentation files, and audio files with the students. The aim was to provide students with theoretical knowledge of the course content before the actual class. In-class activities, on the other hand, focused on practical activities such as summarizing the topic, question-answer/discussion, exercise, demonstration, group work, and problem-based learning. These activities aimed to encourage students to engage in discussions and apply their knowledge through hands-on activities related to the topic.

Research Results of the Studies

The findings of the research indicated that Flipped learning has a positive impact on various aspects of students' academic performance and learning experience. These include their academic achievement, engagement, motivation, meta-cognitive awareness, self-learning ability, attitudes, and retention of learning. Additionally, using Flipped will reduce the level of stress and anxiety associated with homework and tasks. However, there are some variations in the results across different studies. One study revealed no significant difference between the experimental and control groups in terms of readiness for self-directed learning and self-efficacy perceptions.

Teachers and students have identified several benefits of flipped learning. They have highlighted its ability to promote active participation among students, facilitate effective and long-lasting learning, boost motivation, create a positive and enjoyable classroom atmosphere, offer flexibility and self-paced learning opportunities, encourage classroom interaction and sharing, foster students' sense of responsibility, cultivate higher-order thinking skills, provide easy access to learning materials, instill self-confidence in students, and alleviate anxiety.

Discussion and Conclusion

This research was conducted with the aim of qualitatively analyzing the effects of flipped learning in Iran's educational system. Based on the results and codes obtained, findings are presented in relation to the year of publication, type of publication, research methodology, study design, target population, data collection instruments, teaching practices (including content subject/discipline, duration of application, activities, etc.), and research outcomes.

The findings of this investigation have led to the conclusion that in the majority of studies focusing on flipped learning, researchers tend to favor qualitative and mixed method approaches. Mixed -method studies are preferred due to their ability to offer a more comprehensive comprehension of research problems and inquiries. By amalgamating the limitations of one approach with the advantages of another, these kinds of studies are able to create a more robust foundation for investigation (Creswell, 2014). Moreover, it has been ascertained that the predominant research design employed in the studies was an experimental design.

The utilization of experimental design has become increasingly prevalent due to advancements in technology within the realm of education, as well as the implementation of student-centered learning models and approaches. This is done with the purpose of scientifically substantiating the efficacy of these approaches in comparison to traditional methods (Ross & Morrison, 1996). Consequently, it can be stated that in the majority of the studies analyzed in this research, the investigation of the impact of Flipped learning on variables like academic achievement, attitude, engagement, motivation, anxiety, and so forth necessitates the utilization of experimental design.

Although the implementation of flipped learning practices can occur at various educational levels, such as primary school, secondary school, high school, and higher education (Yoshida, 2016), there is a dearth of studies that examine the effectiveness of flipped learning practices in primary and secondary schools (Mohanty & Parida, 2016). The scarcity of research conducted with these age groups may be attributed to the increased challenges that primary and secondary school students encounter in engaging in extracurricular activities. Consequently, it becomes evident that there is a need to

implement flipped learning practices in primary, secondary, and high school classrooms, while concurrently evaluating the outcomes.

The studies analyzed in this research have determined that the predominant data collection tools were the achievement test, interview form, and survey. Moreover, it has been concluded that, in addition to the interview form, the survey and achievement test, various data collection instruments such as scales, observation forms, various tests, inventories, diaries, and document analyses were mostly utilized in the respective studies.

Based on the findings of this study, it has been concluded that, apart from being applied in various courses, the majority of flipped learning practices in Iran were predominantly implemented in English courses and courses related to Computer/Information Technologies. in Mathematics, Science Education courses.

Flipped learning encompasses various practices. According to some educators, pre-class activities should not be restricted solely to the internet and video resources. They argue that similar learning objectives can be attained through appropriate learning materials and guidance (Kim et al., 2014). Furthermore, it has been ascertained that the teaching based on Flipped learning was conducted for a minimum duration of eight weeks in the majority of the studies examined in this research.

It has been determined that the implementation of Flipped learning yields a positive impact on various aspects of students' academic performance. Specifically, it enhances their academic achievement, engagement, motivation, metacognitive awareness, self-learning abilities, attitude, critical thinking skills, information literacy, and retention of acquired knowledge. Additionally, flipped learning alleviates the students' burden of homework and reduces levels of stress and anxiety associated with academic tasks. It should be noted that individual studies indicated that Flipped learning did not have a significant impact on students' epistemological beliefs, transfer of learning, mental risk-taking skills, computer thinking skills, and learner autonomy scores.

One could assert that flipped learning produces favorable outcomes in students' educational journeys. This is evident through the improvement in their academic achievement, engagement, overall performance, motivation, metacognitive awareness, self-learning capabilities, attitude, critical thinking aptitude, information literacy, and retention of acquired knowledge. This model ensures a flexible and self-paced learning

environment, fosters increased interaction within the classroom setting, promotes students' responsibility, cultivates higher-order thinking skills, enhances students' background knowledge, facilitates easy accessibility to learning materials, instills self-confidence, and effectively mitigates anxiety. Moreover, the implementation of flipped learning offers several benefits, including enhanced teacher-student and student-student interaction, personalized learning experiences aligned with individual learning pace, time-saving for teachers, improved preparedness for class, enjoyable and adaptable learning experiences, increased access to diverse information resources, and overall effectiveness in the learning process.

SUGGESTIONS

In order to achieve progress in social, cultural, and economic fields, it is crucial to implement innovative and qualified practices in all areas of education. Flipped learning has been recognized as an innovative approach in educational settings, with a positive impact on both the cognitive and affective objectives of students. Therefore, it is recommended to apply this model to various groups of students across different disciplines and educational levels, particularly in primary, secondary, and high school classes. It is important to evaluate the research findings in order to assess the effectiveness of Flipped learning. Furthermore, incorporating Flipped learning as an alternative in existing programs can enhance learning outcomes by taking education beyond the confines of traditional school institutions. This approach creates student-centered learning environments, aligning with the constructivist approach and promoting more effective and lasting learning experiences.

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