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A review of the theoretical framework of the flipped classroom, with an emphasis on implementation methods in elementary schools in Iran

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Abstract

The present study aimed to provide a theoretical framework and research background on the Flipped classroom, with an emphasis on implementation methods in primary schools in Iran. The present study is qualitative research that has been done in a review manner. Using the keywords Flipped class, flipped teaching, modern education, flipped education and flipped learning, authors have searched the existing scientific sources in the field in question and at the beginning of the work has collected about 80 scientific sources. Then, by reviewing these citations, 30 sources related to the research topic were selected for further analysis. The researchers performed the review study of the available sources by carefully studying the 30 selected sources and taking notes of the contents. Finally, by categorizing the extracted materials and accurately citing them according to APA principles, the results was documented. Based on the research findings, the implementation of Flipped education method will have benefits. The benefits were: motivating and significant learning, controlling stress and providing purposeful assignments. The findings have given practical implications for the implementation of flipped teaching for primary school teachers.

Keywords
flipped classroom, elementary schools, online teaching, learning, motivation

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Introduction

The history of research in the field of educational sciences shows the importance of using innovative teaching methods and their impact on improving the psychological aspects of students' learning. The ultimate goal of scientists in this field is to find solutions to improve education and achieve progress in the cognitive, emotional, and skill areas of students (Samavi et al., 2020).

Undoubtedly, the most appropriate and first formal platform for transformation and growth in the field of innovative educational environments and methods is elementary school. This period prepares children for higher levels, and if presented quantitatively and qualitatively at a higher level, academic decline and dropout in subsequent periods will be less (Hockyoung & Parsons, 2018). All the information and knowledge related to learning can be automatically provided to learners in this environment regardless of the needs and issues that students face, by the teacher. In these situations, learners have less motivation for learning, especially in teaching difficult subjects such as mathematics in elementary school, and the quality of education is always criticized by stakeholders (Mousa Ramzani et al., 2019).

The current era is called the era of information, because the pace of development and progress in science and technology in the present era has been very high and remarkable. Every day, new technologies are produced and made available to the audience. A large part of the knowledge and sciences learned in schools and universities will need to be reviewed after a while due to social and technological changes. In addition, personal and professional situations increasingly depend on continuous learning. In recent decades, with the changes and expansiveness of sciences, the need to improve and update human knowledge and skills, and lifelong learning skills have become one of the primary goals of the education system. With the advent of information technology and the ever-increasing progress of the education system, its activities have been propelled towards the use of e-learning. The general public's interest in this type of education is such that they ignore the advantages of traditional teaching and interaction between teacher and student and consider e-learning as the only way of sustainable learning at the forefront of formal education (Piri et al., 2018).

Lage, Platt, and Treglia (2000) have designed and implemented a method called "flipped classroom" approach. They believe that in an flipped classroom, learners receive their own topics through educational resources, and classroom time is allocated to more difficult concepts or the application of concepts in practice. They stated that an flipped classroom means that the subjects

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taught traditionally and commonly in the classroom are taught outside the classroom, and activities outside the classroom are transferred to the classroom. The use of special technologies such as multimedia educational resources and internet networks has provided suitable opportunities for implementing the flipped teaching method.

One of the questions that is usually important for teachers to answer is how to meet all students' learning needs? Although large classes with different learners and standards and time constraints may prevent teachers from supporting all learners, nowadays, the benefits of technology through the flipped classroom approach can answer this question (Schultz et al., 2014).

In today's world, education and its effects on the behavior and upbringing of students are considered one of the vital challenges facing humanity, to the extent that many advanced countries have based their policies on growth in this area. The main focus of educational scientists and researchers is to provide the best education to students, especially those in the critical primary stage, so that they can have a prosperous and purposeful future, along with healthy citizenship in various dimensions. In this regard, the issue of teaching methods and their impact is one of the most discussed topics in the field of educational sciences and psychology, which, if not addressed properly, will have harmful effects on education, especially primary education.

Today, modern and active teaching methods have attracted the attention of officials and teachers. In these methods, the learner's abilities and interests are at the center of attention, and the teacher tries to enhance the learner's abilities in listening, speaking, reading, writing, reasoning, comparison, analysis, creativity and innovation. Accordingly, the classroom curriculum should be presented (Akbari Sheldarehi, 2010).

One of the most important challenges of education in the 21st century is how to educate learners who are ready to face a society in constant change and the complexities of the information explosion era. Extensive scientific and technological advances, accompanied by the rapid obsolescence of previous findings and information, require a type of education in which learners are constantly engaged in the process of learning and problem solving, and enjoy facing challenges (Karimi et al., 2016).

Many researchers around the world have found that the performance of traditional education reaches the highest quantitative and qualitative level when learning is complemented by the use of mobile communication technologies (Estid et al., 2006).

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To achieve success in education, learners need learning opportunities for specific subjects. Providing such opportunities effectively requires the use of new educational environments and the application of innovative teaching-learning methods, such as mobile learning environments. This is while even with the establishment of smart schools, educators have only minimally surpassed these problems. In this regard, the mobile learning system, using special features such as reducing the time of education, ease of transport, flexibility in the education process, facilitating the transfer of educational content, learner engagement in the learning process, and independent learning regardless of time and place, has provided potential capacities for equal access to education for communities (Mosaramazani et al., 2019).

The continuous advancement of technology in the world has led to traditional teaching methods no longer meeting the needs of students. In this regard, many efforts have been made to provide new and innovative methods based on the individual and social needs of students to promote them as creators and producers of science and to open up new horizons in the field of science and technology (Mirdrikvand et al., 2016).

Flipped classroom is one of the popular technologies that has emerged in recent decades and has strengthened learning patterns (Jensen et al., 2015). This model tries to respond to these challenges by allocating more time to active learning methods in the classroom and providing greater access to advanced technologies to support a blended learning approach (Kim et al., 2014).

The flipped classroom model addresses challenges such as managing classroom time and the lack of face-to-face interactions for completely different subjects and combining audiences. This approach can prepare learners based on their own pace and schedule for speaking. The instructor can also provide more explanation during the classroom time for group and individual feedback for learners (Kakosimos, 2015).

Flipped classroom is a relatively new concept in education and has become increasingly popular. Teachers who flip their classes change the role and task of school and homework and provide their teaching in the form of instructional clips for students to watch and take notes before class, and then students do their assignments and exercises in the presence of the teacher and in the classroom (Bull, 2015).

Flipped classroom is a combination of two fundamental elements of education: lecture and active learning. Before entering the classroom, students have access to instructional videos from the teacher, along with other instructional materials, which provide free time in the classroom for face-

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to-face interaction, collaboration with peers, and performing activities under the guidance and immediate feedback of the teacher (Tetrault, 2013).

In flipped classrooms, the use of videos, animations, computers, and educational software is common, and these tools are effective in achieving the goals of flipped learning. Nowadays, many computer-based educational programs are used in a multimedia format. Computer-assisted learning with multimedia capabilities employs multiple senses at the same time in the learning experience. This method can create learning opportunities for individuals with different characteristics (Noroozi et al., 2011).

In the flipped learning model, teachers change the location of learning from direct instruction and with a large group to an individual learning space with the help of one of several educational tools and technologies. Teachers record their lectures on their computer screens or capture their lessons on video or use visual lessons available on the internet and sites such as TED and Khan Academy. Many coaches have started using materials readily available in their classrooms, such as films and technological tools that allow students to access them at any time and place that is convenient for them, such as hospitals, homes, study halls, buses, and more. In this way, they can review the material multiple times to make them more proficient in class (Masloum, 2010).

According to existing research (Mard Ali and Koushki, 2008), academic progress is one of the most important constructs in educational psychology research, and therefore, conducting research on innovative, practical, and useful teaching methods seems necessary.

Based on the information provided and the research gap in the theoretical and practical framework of the flipped classroom, the researchers have attempted to present a descriptive and analytical framework for the theoretical and research background of the flipped classroom, with an emphasis on the implementation of methods in elementary schools in Iran.

Materials and Methods

This study is qualitative research conducted in a review method. The researcher searched for keywords related to the flipped classroom, flipped teaching, innovative education, flipped learning in the existing scientific resources on the subject and collected about 80 scientific sources. Then, by reviewing these sources, 30 relevant sources were selected for further analysis. The researcher started their review by carefully studying these 30 selected sources and extracting information

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from them. Finally, by categorizing the extracted information and accurately referencing them according to APA principles, the present article was written.

Results

The flipped learning model attempts to address the challenges of active learning methods and increased access to advanced technologies by allocating more time to classroom learning. Kim et al. (2014) state that the model addresses challenges such as time management in the classroom and a lack of face-to-face interactions for completely different subjects and mixed audiences. This approach can prepare learners according to their own pace and schedule for lectures. Teachers, in turn, can provide more detailed explanations during classroom time for immediate group and individual feedback for learners (Kakosimos, 2015).

Litch et al. (2000) provide the simplest definition of the flipped classroom, which includes events that were traditionally located inside the classroom but are now moved outside of it and events that were traditionally located outside of the classroom but are now moved inside of it. In other words, the flipped classroom is based on learner-centered and active learning. Therefore, in a traditional classroom, the discussion is usually teacher-centered, and they control all the conversations in the classroom. But the flipped classroom is student-centered and managed interactively by teachers and learners.

In summary, the flipped classroom consists of two main components: in-class learning activities and individual instruction outside of the classroom. As can be seen from the discussed topics, the in-class teaching component includes learner-centered learning theories and interactive activities, and the out-of-class teaching component includes teacher-centered learning theories and direct teaching (Kavyani et al., 2017).

Bahmani et al. (2017) explain the flipped classroom in a simple way, citing the Flipped Learning website (2014). They state that the flipped learning model transforms traditional teaching methods. In this model, lessons are provided online outside of the classroom, and homework that was previously done at home is now completed in class. The flipped learning approach, as a unique approach, changes the role of assignments and classroom activities. In traditional teaching methods, students learned new material through lectures in the classroom and practiced at home. In the flipped learning model, students learn the material through videos at home and practice skills

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in the classroom. This creates an active and interactive learning environment where the teacher plays the role of a guide and helps students apply the concepts actively and participate in class.

In the flipped classroom, the teacher prepares visual and auditory resources such as videos and audio based on the course content prior to class. These resources are made available to students who can access them at home or outside the classroom. In class, the teacher assigns learning tasks based on the instructional materials that students have previously seen at home, and students practice to deepen their learning in class. In fact, because of the reverse process that occurs in such classes, they are called "flipped classes" (Wolff & Chan, 2016).

The flipped classroom is usually implemented in a standardized way, but some proponents have divided it into various types, which can help in understanding the concept of the flipped classroom. Traditional flipped classroom: Students watch instructional videos before class, and then they do activities and exercises in class, and the teacher helps them understand the learning concepts. **Mastery-oriented flipped classroom**: In this model, students work at their own pace and are evaluated with their classmates and coaches after practicing. If they score 80% or more in the evaluation, they can move on to the next stage, otherwise, they have to review the material and take the test again.

Collaborative flipped classroom: This model was introduced by Majid, a physics professor at Harvard. Students individually answer conceptual questions in class and then try to convince their peers of their answers. In this model, those who answer correctly can convince their peers, and students are evaluated after doing exercises.

Problem-based flipped classroom: In this model, students find a problem, and learning occurs during the process of discovering that problem. In other words, learning takes place as students discover the problem, and watching a video can help with this process.

Question-based flipped classroom: This model is more common in science classes. Students watch a short video, and class time is used to understand and discover the concepts. Then, students discuss phenomena and events that have occurred. Watching the video is effective in resolving problems and misunderstandings.

According to the above categorization, the teaching method in the present research can be classified as a traditional flipped classroom (Fazleali, 2017). Although the flipped classroom is a new topic in education and pedagogy, valuable research has been done on this topic in Iran. Here are some examples of recent research on the topic of flipped learning:

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In a study by Nemati (2019) titled "Investigating the Effect of the Flipped Teaching-Learning Method on the Progress of Reading and Writing Skills of Non-Persian Language Students," the results of the covariance test showed that electronically produced instructional materials prepared by the researcher and the talking book, which were the main focus of the flipped learning process for language learners, led to deep and sustainable learning and 95% student participation, as confirmed by the teacher's objective evidence. This type of learning, influenced by factors such as exploratory learning strategies, independent and deep learning with appropriate time management, led to students' understanding, application, and analysis of course concepts.

This passage appears to be written in Persian. Here is an English translation:

In this regard, Mosi Piray and his colleagues (2018), in a study titled "The Effect of Flipped Classroom on Self-Regulation in Learning English Language", found that the flipped classroom was able to have a significant effect on self-regulation (except for the self-management component) in learning with the help of the pre-test variable. Additionally, the average grades of students in the pre-test and post-test in the experimental group had a significant difference, with the average self-regulation grades of students who learned through the flipped classroom being higher.

Kaviany and his colleagues (2017), in a qualitative study titled "The Theoretical Framework of Flipped Classroom: Drawing on Signposts for Learner-Centered Learning," found that each of the fundamental components of the flipped classroom includes certain elements. For example, the in-class teaching component includes learner-centered learning theories and interactive activities, while the out-of-class teaching component includes teacher-centered learning theories and direct instruction. The flipped classroom responds to the aforementioned challenges by transferring lectures outside the classroom and allocating class time to improve learners' understanding and learning activities for a deeper understanding of the lesson concepts and resolving issues. Furthermore, learner-centered learning activities, including active learning, peer learning, cooperative learning, problem-solving, and collaborative learning, are in line with the theoretical evidence of the flipped classroom.

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Outside the country, pioneers in this field have paved the way for further research and have addressed the topic of the flipped classroom under various research titles. Some of these studies are listed below:

Chang et al. (2018) conducted a study titled "Concept, Design, and Implementation of Flipped Classroom for Preschool and Vocational Teachers for the Implementation of a Flipped Classroom." They found that two fundamental elements, pre-recorded interactive video lectures and interactive learning activities, were identified for the flipped classroom for the first time.

Pickering and Roberts (2018), in a study titled "Flipped Classroom or Active Lecturing," found that the teacher in the flipped classroom, by creating a space to examine the level of understanding and knowledge in the class and making appropriate use of technology, facilitates continuous learning and interaction in the class.

Borman (2015), in a study titled "Investigating the Effect of Flipped Classroom on Student Attention and Progress," found that the flipped classroom has a positive effect on students' attention and academic progress, and it can provide an appropriate situation for students' learning. Additionally, the flipped classroom increases students' activities and prepares them for better learning.

Thompson and Mumford (2014), McClafferty et al. (2013), Murphy (2014), Rao et al. (2013), Strayer (2012), and Tune et al. (2013) conducted similar research on the effect of flipped learning on student participation in the class and found that, from the students' perspective, their participation increased as aresult of changes in the classroom teaching methodology.

Bergmann (2014) conducted a study on the flipped classroom and found that the flipped classroom answers the question of what the best use of face-to-face communication time with learners is. The time spent in the classroom is the most valuable time for a teacher and learners to address any questions they may have. In traditional classrooms, students usually face difficulties at home while doing homework and require more teacher presence. The idea of the flipped classroom can be a suitable answer to this question.

Discussion

According to the research findings, the implementation of the flipped learning method is likely to have the following potential benefits:

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1. Increased motivation and learning: The effectiveness of any educational program largely depends on the learners' inclination towards learning. Some individuals have intrinsic motivation and participate in learning automatically, but for others, creating incentives, rewards, and encouragement for learning is necessary. Therefore, the design of educational programs should be such that motivation and its presence in students are continuously maintained to make the learning effective. Studies have shown that various factors contribute to students' motivation for effective learning, including the use of innovative teaching methods, the design of a novel performance evaluation system, the provision of necessary facilities and equipment in schools, and the expansion and improvement of the learning environment (Seyed Javadin, 2002).

One of the challenges facing students today is the excessive use of everyday technology such as tablets, mobile phones, and virtual space. The flipped learning method, by incorporating recent factors, has been able to direct the said challenge towards optimal learning rather than just filling leisure time. Therefore, flipped learning has been able to use a motivational factor (the use of innovative technology) to promote academic progress.

2. Stress management and increased learning: Evidence shows that one of the factors affecting learning and memory is stress and emotional events, the effects of which are well-preserved. Physiological studies have shown that under basal conditions, glucocorticoids secretion is pulsatile and dependent on the circadian rhythm, but in stressful situations, this pattern changes, and the secretion of these hormones increases (Vafaei and Rashidipour, 2009).

In a part of the flipped learning method, the student learns in an intimate and informal home environment, and in a safe and peaceful state, away from stress, they engage in learning when they choose to do so. This factor leads to optimal and more enduring learning and will have a greater impact in promoting educational and developmental goals.

3. Targeted assignments and increased learning: Many studies have shown that students' valuation of coursework will also have a significant impact on their academic performance. Valuation of an assignment refers to the individual's beliefs about the importance of completing a specific task in a desirable way. According to the Linnenbrink and Pintrich model, progress motivation, interest, value, and affection are important motivational components that directly affect students' learning and academic progress. In this model, personal interest is defined as the student's internal interest in a specific subject or task. The value component in this model is defined

as the value-benefit and refers to the benefit that a student derives from learning the course content or completing a task (Linenbrink and Pintrich, 2003).

Flipped learning requires learners to be proficient in the foundational knowledge before class, and during class time, they are expected to practice high-level learning exercises. Active learner-centered learning activities in the classroom are designed to enhance learners' participation in complex lesson discussions and promote collaborative and interactive learning skills through peers and instructors. This allows instructors to contribute to learners' progress by monitoring their performance on coursework and controlling their learning practices. When this happens, the elements of forgetting in students will be eliminated, and learning in students will occur.

In flipped learning, learning takes place outside the classroom, and targeted and high-level assignments are carried out in the classroom. This feature provides an opportunity for the teacher to monitor coursework and control the learning practices of students. When this happens, the elements of forgetting in students will be eliminated, and learning in students will occur.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

AS and ZS contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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