Designing a Flipped Learning-Based Education Model (Case Study of Education in the Districts of Tehran Province)

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ABSTRACT

Objective: This research aimed to design a flipped learning-based education model (case study of education in the districts of Tehran province).

Method: The study was developmental-applied and mixed-method (qualitative-quantitative) in nature. In the qualitative part, thematic analysis was used to identify dimensions, components, and influential factors, while a descriptive-survey method was employed in the quantitative part. The qualitative sample comprised university faculty members in the fields of educational management and primary education, curriculum and instruction, as well as primary school administrators and teachers, reaching theoretical saturation after 19 interviews. In the quantitative section, 379 primary school teachers from Tehran's districts were selected as the sample using Cochran's formula.

Findings: In the qualitative part, 45 indicators, 9 components, and 3 dimensions were identified. The questionnaire's validity was confirmed using the CVR method. A Cronbach's alpha coefficient of 0.802 indicated high reliability of the questionnaire. According to the research model's results, among the dimensions, the teaching and learning process, with a coefficient of 0.700, was found to be of greater importance in the flipped learning-based education model. Additionally, the model's validity was assessed through internal and external validation.

Conclusion: This study successfully developed a flipped learning-based education model for primary schools in Tehran's districts, highlighting the significant role of the teaching and learning process in this context. The model's validity and reliability were rigorously established, marking a substantial contribution to the field of educational management and primary education.

Keywords: Flipped Learning, Education, Flipped Learning Education, Primary Schools, Districts of Tehran City.

1 Introduction

Today, in most human societies, educating and training individuals is one of the important programs of families. The complexity of social life and the urgent need for education in various fields in every society make it evident that, in addition to the family, a significant part of the responsibilities arising from serious educational affairs falls on governments (Tajri, 2021). In our country, according to the general principle of Article 95 of the Constitution, the compulsory nature of public education, the responsibility of the government, and its free provision are justified.

Lawmakers, for the administration of society, are compelled to compensate for the damages incurred by judicial policies. Therefore, educational guardians are responsible for student activities in terms of judicial responsibility according to their job descriptions, and the government is also actually responsible for compensating for damages in cases of accidents and damage to student activities (Sadeghzadeh & Ramazani, 2021; Shomalizadeh & Barkhordari Ahmadaabad, 2022). The expansion of education and its effectiveness in actualizing talents requires understanding the educational process and awareness of learning styles. Styles that facilitate the use of a vast volume of information and its application in all areas of life. In recent years, it has been supported from this perspective that knowledge constructed by students and teachers is beneficial and transferable to other learning situations. Individuals, according to their individual differences, utilize different learning styles, and teachers should consider students' learning needs in the educational process (Abdelraheem & Ahmed, 2018). Education and learning are like two sides of a coin and have a strong connection. One of the important factors that help teachers prepare conditions for effective learning is paying attention to the students' learning styles. Accordingly, the adaptation or divergence of teaching methods with learners' learning styles is of special importance; not every teaching necessarily leads to learning, so it is necessary to identify facilitating and inhibiting factors of learning (Kiss, 2022). The factors affecting learning and academic progress are very extensive, and identifying these factors is important in addressing the problems and deficiencies in the educational system. One of the factors leading to academic progress and increased educational efficiency is creating internal motivation in individuals for learning. Therefore, paying attention to individual differences, recognizing their learning styles, and offering an educational program tailored to the characteristics of the learners makes them learn better and feel satisfied with learning. The blended learning style can be defined as a method by which individuals process new information and experiences in their minds (Mousavi, 2019). Blended learning is called the third generation of distance education systems (Hajji et al., 2021). Since the time when traditional and virtual education were researched by educational system experts and the challenges of each were established, blended learning came into play. Blended learning is also known as mixed learning, combined teaching, and integrated education (Maraghi et al., 2022). Blended learning is actually a combination of face-to-face and electronic education. This method aims to facilitate content learning by utilizing various resources and tools such as multimedia software, simulations, conferences, CDs, books, exercises outside the book, traditional classrooms, virtual classrooms, internet laboratories, groups, and inclusive forums (Zabihi Kolkanari et al., 2022). The flipped learning model is part of the rotational teaching model. In flipped learning, teachers produce educational content using software and make it available to students, who then watch this content at their convenience and may review it several times for better learning. In other words, in the flipped classroom, direct instruction is provided to each individual outside the class, and class time is strategically used for group work and addressing individual needs (Delfan Azari et al., 2022). Flipped teaching has two principles: 1- Moving away from direct teaching, which is often lecturing in a group educational setting. 2- Engaging in a variety of activities that allow students to practice learned concepts and employ higher-level thinking skills (Forootan et al., 2022).

Our educational programs have taught us that elementary school children are at a different developmental stage compared to older children, a concept rooted in the research by Jean Piaget. Piaget's theory of cognitive development states that the ages of 7 to 11 years or early adolescence involve the third stage of development, namely the concrete operational stage (Yaghoubi & Vaghef, 2020). Simply put, this means that at this stage, students think concretely but begin to use logic, deductive reasoning, and problem-solving (Syarifuddin et al., 2023). This indicates that the abilities and educational needs of elementary students differ from those of middle and high school students, who can think abstractly. Therefore, a flipped classroom in elementary school would look different from one in high school (Gholami et al., 2023). From about 6 to 11 years old, roughly the years of primary or elementary school, children become proficient in basic skills such as reading, writing, and arithmetic, show interest in discovering and understanding their surroundings, and their personal control increases (Ladachart et al., 2022). Children are the most valuable human assets of any society and play a significant role in shaping the future of any country, but they can only fulfill this role properly if they are empowered with the necessary capabilities. Providing children with the right to education, especially quality education, is one of the fundamental ways of empowering them. Quality education ensures comprehensive and integrated growth and development. Achieving quality education requires a correct program and competent instructors to implement it (Mahmodi et al., 2023).

We must accept the fact that in the 21st century, chalk and talk classrooms and teacher-centeredness are outdated beliefs. The flipped learning approach should be focused on developing skills that lead to higher levels of Bloom's revised taxonomy. The flipped classroom approach requires the instructor to be more active than in traditional classrooms and demands more effort from the instructor (Kheneyfar et al., 2021). In traditional education, content from textbooks is generally taught by the teacher through lectures, and teachers continue this method based on experience. "In this method, teachers do not engage themselves in learning and consider themselves self-sufficient in terms of current knowledge and science. Effective teaching is lost in budget allocations, with constraints of time, old teaching methods, and adherence to centralized directive frameworks being the usual modes of this model of teaching" (Sadeghzadeh & Ramazani, 2021).

Ignoring the individual differences of students, focusing on memory accumulation and one-sided reinforcement from texts, focusing on task completion rather than quality enhancement, and parental communication limited to reporting student performance are some of the shortcomings observed in traditional education. Bergmann and Sams believe that there are four major barriers to flipping: flipping one's own thinking, which is among the most significant barriers to overcome, with other barriers related to technology, finding time, and educating students, parents, and oneself (Henrekson & Wennström, 2022). Traditional education has positive social aspects that are missing in virtual education, but opportunities can be created to reduce these negative impacts in virtual education, with teachers playing a crucial role in creating these opportunities (Fang et al., 2022).

In centralized education systems, all educational activities and the roles of individuals are dictated within the framework of circulars and instructions, and everyone is obliged to comply. Centralized functioning can make everyone uniform, but in the current era's transformations and crises where structural change is necessary, it has created challenges and sometimes led to crises (Arnold, 2022). One of the factors that makes the educational system of any country efficient and effective is revising the process of implementing plans and modern methods being implemented, to strengthen the strengths and reconstruct the weaknesses and problematic areas. Nowadays, considering that virtual education has become an integral part of educational systems and that blended and hyper-blended education is ahead for the world's educational systems, it is necessary to have a fresh look at the teacher as one of the influential components of learning in the new generations of education systems (Hojati et al., 2021).

In this context, research questions were raised: What are the dimensions and components of flipped learning-based education in the primary stage? On the other hand, what is the current state of the dimensions and components of flipped learning-based education in the primary stage? Also, what is the appropriate model for flipped learning-based education in the primary stage?

2 Methods and Materials

2.1 Study Design and Participants

This study is a mixed-method (qualitative and quantitative) research. In the qualitative phase, initial components were identified using semi-structured interviews and thematic analysis. The participants in this research were experts, including faculty members knowledgeable in the field of primary education, curriculum, and educational management who had written articles, books, or other works in this area and also had teaching experience in this field. The criteria for inclusion in the study were experts with a minimum of three years of university experience in education and learning, specialists with at least a doctorate in educational management, curriculum, and primary education, as well as primary school managers and teachers. The sampling method was purposive, with 19 experts participating in the qualitative section. The thematic qualitative analysis process was used to determine the most important constructs of the flipped learning-based education model (case study of education in Tehran province). Data collection methods for gathering quantitative data included a questionnaire on the current situation with 45 Likert-scale questions ranging from very high to very low. The statistical population in this part were primary school teachers in Tehran's districts, determined to be 379 individuals based on Cochran's formula as the population was unknown.

2.2 Data Collection and Analysis

After transcribing the interviews, the thematic analysis method was used concurrently with data collection. Initially, the tapes' transcripts were transcribed. Then, a copy of the extracted codes was sent to the interviewees for confirmation. To familiarize and immerse themselves with the data, the data were read multiple times, leading to the identification of initial codes and similar initial codes being

grouped together to form preliminary categories. These categories were merged and formed themes. Moreover, there was prolonged and deep engagement with the data for accuracy assurance. In addition to the main researchers, two other researchers participated in the data analysis. The researchers read the manuscripts for coding and categorization confirmation. To increase the confirmability, participants were revisited. Maximum variety in sampling and long interviews were other ways to increase data credibility. From the initial interview, codes and subcategories were formed, and data reduction continued in all analysis units (codes) until themes emerged. Interviews continued until theoretical saturation of data. Qualitative content analysis was performed using MAXQDA12

software. Structural equations were presented using smart pls3 software, and SPSS25 was used for model validation. In this research, obtaining informed consent, maintaining identity information, and adhering to confidentiality in the implementation of interview content were considered ethical considerations.

3   Findings and Results

Initially, the dimensions, components, and factors constructing the flipped learning-based education model (case study of education in Tehran province) were identified, ultimately consisting of 9 components, 3 dimensions, and 45 indicators (Table 1).

Table 1

Qualitative Findings

Row	Abbreviation Codes	Interviewee Code	Indicators	Components	Dimensions	Main Construct
1	1A	I5, I12, I8, I3,I18	Motivation	Learner	Inputs	Flipped Learning-Based Education
2	2A	I1, I10, I6, I5	Attitude	Learner	Inputs	Flipped Learning-Based Education
3	3A	I14, I15	Learning Style	Learner	Inputs	Flipped Learning-Based Education
4	4A	I4, I14, I15	Personality Traits	Learner	Inputs	Flipped Learning-Based Education
5	5A	I3, I4, I11	Prior Knowledge	Learner	Inputs	Flipped Learning-Based Education
6	6A	I16, I18	Technology Readiness	Learner	Inputs	Flipped Learning-Based Education
7	7A	I5, I12, I8, I3	Attitude	Instructor	Inputs	Flipped Learning-Based Education
8	8A	I16	Teaching Style	Instructor	Inputs	Flipped Learning-Based Education
9	9A	I3, I4, I11, I5	Motivation	Instructor	Inputs	Flipped Learning-Based Education
10	10A	I14, I2, I11	Technology Readiness	Instructor	Inputs	Flipped Learning-Based Education
11	11A	I3, I4, I11, I5	Selected Content	Instructor	Inputs	Flipped Learning-Based Education
12	12A	I12, I5, I14, I2, I11	Use of Educational Technology	Equipment	Inputs	Flipped Learning-Based Education
13	13A	I3, I11, I10	Online and Offline Education	Equipment	Inputs	Flipped Learning-Based Education
14	14A	I3, I4, I11, I5	Design of Educational Content	Equipment	Inputs	Flipped Learning-Based Education
15	15A	I12, I8, I3	Equipment Support	Equipment	Inputs	Flipped Learning-Based Education
16	1B	I12, I19, I14, I2, I11	Determination of Prior Knowledge	Learner Preparedness	Teaching and Learning Process	Flipped Learning-Based Education
17	2B	I5, I12, I8, I3	Creating Learning Opportunities	Learner Preparedness	Teaching and Learning Process	Flipped Learning-Based Education
18	3B	I16	Application of Knowledge	Learner Preparedness	Teaching and Learning Process	Flipped Learning-Based Education
19	4B	I3, I4, I11, I15	Group Activities	Learning Activities	Teaching and Learning Process	Flipped Learning-Based Education
20	5B	I12, I15, I14, I18, I11	Individual Activities	Learning Activities	Teaching and Learning Process	Flipped Learning-Based Education

21	6B	I13, I12, I10	Knowledge Acquisition	Learning Activities	Teaching and Learning Process	Flipped Learning-Based Education
22	7B	I3, I4, I11, I15	Knowledge Understanding	Learning Activities	Teaching and Learning Process	Flipped Learning-Based Education
23	8B	I12, I8, I14	Knowledge Application	Learning Activities	Teaching and Learning Process	Flipped Learning-Based Education
24	9B	I12, I5, I14, I12, I13	Synthesis of Knowledge	Learning Activities	Teaching and Learning Process	Flipped Learning-Based Education
25	10B	I3, I4, I11, I5	Evaluation of Knowledge	Learning Activities	Teaching and Learning Process	Flipped Learning-Based Education
26	11B	I14, I2, I11	External Evaluation	Learning Activities	Teaching and Learning Process	Flipped Learning-Based Education
27	12B	I3, I4, I11, I15	Learner-Learner Interaction	Interaction	Teaching and Learning Process	Flipped Learning-Based Education
28	13B	I12, I15, I14, I18, I11	Learner-Support Interaction	Interaction	Teaching and Learning Process	Flipped Learning-Based Education
29	14B	I13, I12, I10	Learner-Instructor Interaction	Interaction	Teaching and Learning Process	Flipped Learning-Based Education
30	15B	I3, I4, I11, I15	Learner-Content Interaction	Interaction	Teaching and Learning Process	Flipped Learning-Based Education
31	16B	I12, I8, I14	Instructor-Content Interaction	Interaction	Teaching and Learning Process	Flipped Learning-Based Education
32	17B	I12, I5, I14, I12, I13	Instructor-Support Interaction	Interaction	Teaching and Learning Process	Flipped Learning-Based Education
33	1C	I3, I19, I11, I5	Academic Progress	Tangible Results	Output	Flipped Learning-Based Education
34	2C	I12, I19, I3	Time Management Skills	Tangible Results	Output	Flipped Learning-Based Education
35	3C	I3, I4, I11, I5	Development of Thinking Skills	Implicit Results	Output	Flipped Learning-Based Education
36	4C	I12, I5, I14, I2, I11	Positive Attitude and Satisfaction	Implicit Results	Output	Flipped Learning-Based Education
37	5C	I3, I4, I11, I5	Improvement in Communication Skills	Implicit Results	Output	Flipped Learning-Based Education

As shown in Table 1, after the interviews, 3 dimensions, 9 components, and 45 indicators were identified. Answer to the second question: What is the appropriate model for flipped learning-based education? To answer this question, questionnaires were distributed to a main sample of 379 individuals, and the results were presented using structural equation methods.

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Figure 1

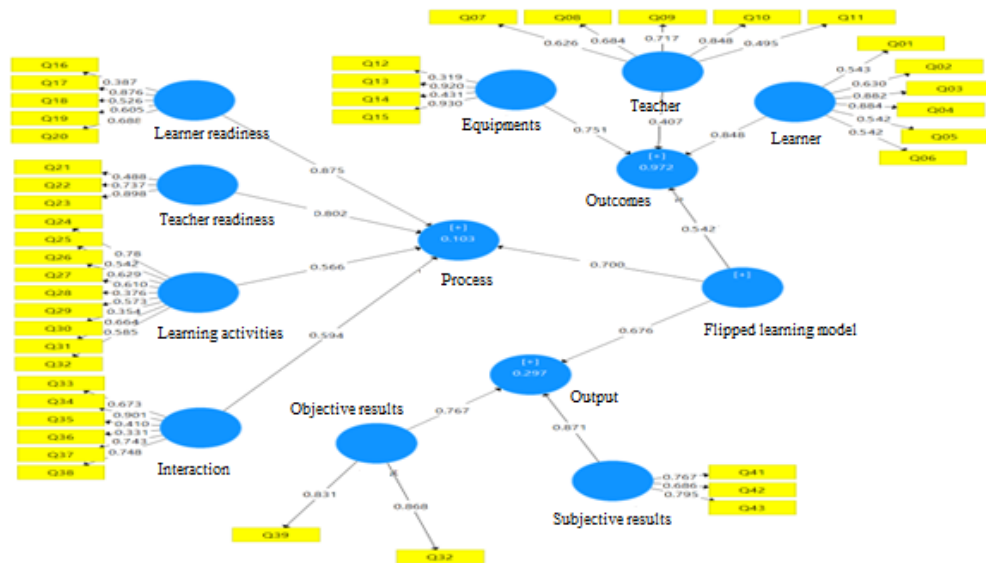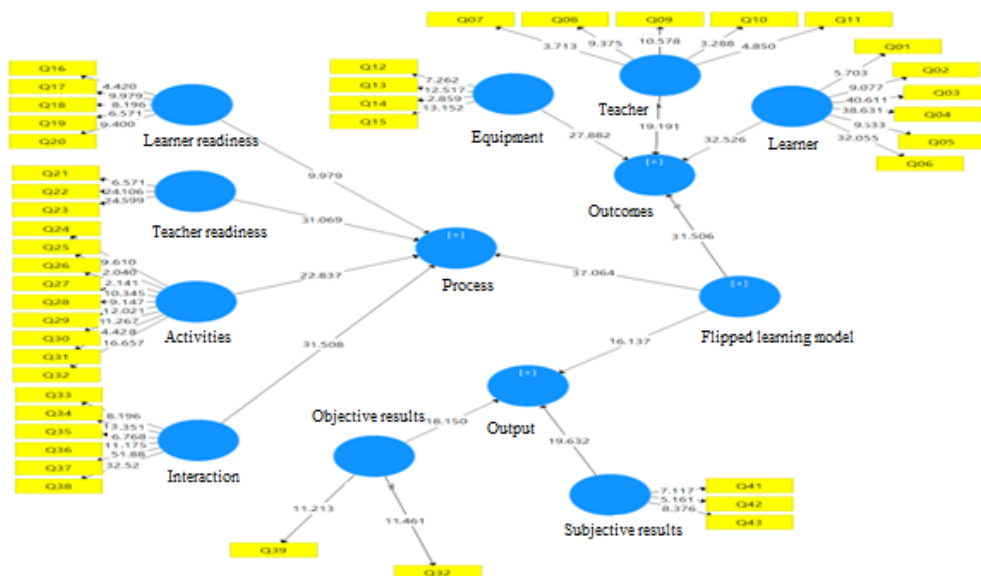*The Model with Standard Estimations*

Figure 2

The Model with T-Values

The results in Figure 1 and Figure 2 indicate the confirmation of all dimensions and components impacting flipped learning-based education. Ultimately, the results led to the proposal of the final model. For model validation, the researcher used the following four dimensions: A. Philosophy and overall objectives of the flipped learning-based education model in primary education. B. Theoretical foundations of the flipped learning-based education model in primary education. C. Evaluation system of the flipped learning-based education model in primary education. D. Mechanisms for enhancing the flipped learning-based education model in primary education. Based on these 5 dimensions, a questionnaire was sent to 30 experts (19 from the interview section and 21 faculty members), and the results are presented in Table 2.

Table 2

Validation of Model (Average = 3.00)

Component	Mean Difference	Standard Deviation	T	Df	Sig
Philosophy and Objectives	0.93	0.609	3/18	29	0.000
Theoretical Foundations	0.75	0.757	4/95	29	0.000
Execution Principles of the Model	0.68	0.834	5/193	29	0.000
Evaluation System of the Model	0.81	0.426	5/06	29	0.000
Implementation Mechanism of the Model	0.85	0.365	4/98	29	0.000

Based on the results of Table 2, it can be seen that the dimensions of philosophy and objectives with a mean of 3.93, implementation mechanisms with a mean of 3.85, evaluation system with a mean of 3.81, theoretical foundations with a mean of 3.75, and operational principles with a mean of 3.68 are considered the most important dimensions of the model (in terms of validation).

4 Discussion and Conclusion

Considering that significant research on flipped learning-based education in the primary stage has not been conducted in our country, this study aimed to identify the effective factors on flipped learning-based education in the primary stage and to design a model for it. This was done by reviewing existing research in other countries on flipped learning, utilizing the experiences and methods employed by various researchers, and incorporating the views of academic and practical experts. This research identified 3 dimensions, 9 components, and 45 indicators, ultimately leading to the creation of a conceptual model for this study. In the second part, using structural equation modeling, the impact of each dimension and component on flipped learning-based education in the primary stage was determined. Ultimately, the dimension of the teaching and learning process had the most significant impact with a coefficient of 0.700. The findings of this study are in line with the previous research (Chatziralli et al., 2021; Nasrollahi et al., 2021; Nobakht et al., 2022; Veisi et al., 2021; Yaghoubi & Vaghef, 2020).

Learning is directly related to the developments in various systems of any country. Today's students are future citizens, workers, parents, employees, teachers, and leaders (Mousavi, 2019). Nowadays, it is no longer feasible to view a student's mind as a reservoir that needs to be filled with information within a specific time frame, especially with access to the internet, computers, and virtual spaces, obviating the need to memorize information. The pace of world changes is such that learning is not confined by time, place, or individuals and should not be limited to one method

(Delfan Azari et al., 2022). The skills required for students in the 21st century include the ability to communicate with others, create high-quality works and products, work collaboratively, think creatively, possess information technology literacy, and accept responsibility for their own learning (Abdelraheem & Ahmed, 2018). Therefore, the role of teachers is not merely the transfer of information, but as effective and decisive individuals in creating, strengthening, and enhancing these skills (Torbatinezhad et al., 2022; Turan, 2023). With a review of the learning process by experts, we have moved from traditional teaching to flipped learning. Flipped learning, introduced by Bergmann and Sams, is a method where learning is entrusted to the student, allowing teachers to facilitate learning according to the individual differences of students (Syarifuddin et al., 2023). This research is essential as global developments, often accompanied by crises, directly impact educational systems and lead to changes like school closures. We need to understand and adapt modern learning methods to our educational structure to keep up with global developments and manage challenges, enabling the change of thinking, knowledge enhancement, and flipped teaching (Gholami et al., 2023; Mahmodi et al., 2023; Turan, 2023). Initially, during the COVID-19 pandemic, teachers in our country used non-native virtual spaces like WhatsApp and Telegram, but eventually, a different virtual space named "Shad" was launched by relevant authorities. Despite the local benefits of this program, there were challenges like internet speed and connection issues, outdated phones, related costs, some families' lack of access to these facilities, unsuitable infrastructure, teachers' skills and abilities to adapt to changes, and their use of personal resources in teaching and content production, leaving them to use trial and error with their own and others' content (Maraghi et al., 2022). Such issues have challenged the flipped learning model in our country. This research is important because, given the global developments often accompanied by crises that directly affect educational systems and lead to changes such as

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school closures, we need to understand and align with modern learning methods in a way that keeps us abreast of global developments. By managing these challenges, we hope to facilitate a shift in thinking and knowledge enhancement and apply appropriate educational and learning models. Therefore, this research is significant from three perspectives. Firstly, it proposes theoretically significant hypotheses for the development of the flipped learning model. Secondly, it identifies practical components, and thirdly, it offers an applicable model that can advance the educational system of the country.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Authors Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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