Original Article

IEEPJ Vol. 5, No. 3, 2023, 245-257

http://ieepj.hormozgan.ac.ir/

Iranian Evolutionary and Educational Psychology Journal

IEEPJ

Presenting the Model of Improving the Lesson Study in Primary Schools

Sanaz Zahedi[1], Hamid Shafizadeh[2]*, Hadi Rezghi Shirsavar[3]

1- PhD student, Educational Management Department, Garmsar Branch, Islamic Azad University, Garmsar, Iran

2- Associate Professor, Educational Management Department, Garmsar Branch, Islamic Azad University, Garmsar, Iran

3- Assistant Professor, Department of Educational Management, Garmsar Branch, Islamic Azad University, Garmsar, Iran

* Corresponding author's Email: hshafizadeh@iau-garmsar.ac.ir

Abstract: The current study aimed to propose an enhancement model for lesson study in primary Schools in Tehran. In this mixed-method study, the research population consisted of academic experts, staff managers, and education specialists in the qualitative segment, as well as primary school teachers from Tehran province (totaling 19,852) in the quantitative segment. The qualitative phase involved 12 participants, while the quantitative phase comprised 377 individuals selected as samples. Data collection methods included semi-structured interviews for the qualitative portion and a researcher-developed questionnaire for the quantitative part. For qualitative data analysis, an open, axial and selective coding approach was applied, while confirmatory factor analysis was employed to analyze the quantitative data. The research findings delineated the principal dimensions of the lesson study enhancement model, which encompassed strategic perspectives, school dynamics, structural and individual factors, research orientation, educational improvement, and educational development. The requisite components for realizing this model comprised foresight, realism, competitiveness, systems thinking, consideration of teachers' abilities, meeting teachers' needs, providing facilities, enhancing organizational communication, motivational factors, organizational elements, embracing participatory management, monitoring and evaluation, organizational well-being, modeling, efficiency enhancement, fostering scientific thinking, and cultivating a culture of learning. Moreover, the fit indices confirmed that the presented model exhibited a robust fit.

Keywords: Lesson study model, elementary schools, strategic viewpoint, mixed-method research

Introduction

Recent international research in the field of professional growth and development of educational agents, especially teachers, emphasizes research in the classroom. In this regard, teachers and educators strive more than ever to participate in decision-making related to improving the quality of teaching in the classroom. In the research-oriented teaching method, teachers and educators seek to enhance their professional competencies during work (action) and pay serious attention to reconstructing their thinking, innovating themselves, and the students in the teaching-learning process. Lesson study is a participatory research model in the classroom that originated in Japan and is designed for the professional development of teachers.

Education is central to development in any country (Lewis, 2018); therefore, the initial steps in development should begin with education. Education is directly involved in the development of sciences, knowledge, and industries, and indirectly influences cultural development. In the eighteenth and nineteenth centuries, renowned economists such as Adam Smith, Alfred Marshall, and John Stuart

Article information: Received: 2023/02/21 | Accepted: 2023/05/28 | Published: 2023/09/01. https://doi.org/10.52547/ieepj.5.3.245

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[DOR: 20.1001.1.25884395.2023.5.3.19.0]

[DOI: 10.22034/5.3.245]

Mill emphasized the importance of education as a crucial national investment (Imamipour and Khakbaz, 2019).

There is evidence that, in comparison, the education system in Iran is not in a favorable position compared to developed countries. Over 40% of primary school teachers, nearing retirement, indicate a historical deviation from the main path of education. Teachers and educators need to update their scientific and professional information, modify their thoughts and behaviors, and enhance their professional skills. The best method and tool for improving teachers' professionalism is lesson study. "Participatory and supportive situations, such as lesson study, can modify teachers' educational experiences and improve their perceived self-efficacy" (Sadati, 2014).

Numerous research studies indicate that promoting "organizational learning" is the starting point for the renewal of education, and the idea of "lesson study" is an effective model for the development of organizational learning in educational institutions. An international project is underway in Singapore, the United States, China, England, Germany, Australia, and Iran to assess the impact of lesson study on enriching learning, fostering teacher professionalism, producing professional knowledge, promoting organizational learning, and transforming schools into "learning organizations." The "International Lesson Study Association" presents some of the achievements of these research projects annually (Amirpour et al., 2018).

Smith (2008), in his doctoral dissertation titled "Lesson Study Professional Growth for Teacher Empowerment and Classroom Performance Improvement," examined two groups of fourth-grade teachers who participated in the lesson study process. The results showed that acquiring lesson study skills can enhance the professional performance of students. Introducing programs like lesson study into the education system can eliminate the gap between theory and practice in education and increase the quality of education. However, lesson study in Iran faces three challenges, which slow down its achievement of goals: a) pre-engagement challenges (knowledge of lesson study, formation of motivation, weaknesses in teamwork, and shortcomings in defining members' tasks), b) challenges during engagement (selecting a problem, implementing the lesson, collecting data, criticism, and reviewing teaching), c) challenges after practical engagement (evaluating lesson study plans, publishing lesson study results, and holding lesson study festivals) (Imamipour et al., 2019).

In conclusion, education is the starting point for learning for students, and the competence of teachers in this system, especially elementary school teachers, is of great importance. If teachers at this level prioritize lesson study in their teaching methods, they can strengthen the spirit of research and inquiry from the early years of students' education. Therefore, with these explanations, what is important for the researcher is the promotion of the scientific level and effectiveness of the teaching and research skills

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of elementary school teachers, and to achieve this goal, the researcher is seeking to present a model for the promotion of lesson study in elementary school. Thus, the main question of this research is how to present a model for the promotion of lesson study in elementary school?

Material and Methods

The research methodology employed in this study was fundamentally applied, in line with the research objectives. The data collection process utilized a mixed (qualitative-quantitative) approach of the confirmatory exploratory type. Additionally, the data collection was cross-sectional, considering the time dimension. The method of data collection and the nature of the research were descriptive-survey in nature.

Within the qualitative phase, the target population consisted of experts, academic professionals, and university professors. This population was characterized by individuals who possessed extensive education and experience in the field of elementary education. Specifically, it included academic experts from public universities, staff managers from the Ministry of Education, and subject matter experts in elementary education.

During the preliminary stage, a series of semi-structured interviews were conducted to extract insights from these experts. The interview process involved coding and analysis of the data after each interview, with the aim of identifying the dimensions highlighted by the initial experts. These dimensions were further explored in subsequent interviews. In order to ensure the validity of the findings, additional supplementary interviews were conducted to verify the consistency of responses. Initially, 8 experts were interviewed, but to ensure data saturation, 2 more individuals were included in the interview process. The identification of components and indicators reached theoretical saturation after analyzing the answers. Consultation with the supervisor and consultant confirmed that further interviews were not necessary. Therefore, the qualitative phase of the research included a sample size of 12 individuals.

Moving on to the quantitative section, the statistical population comprised all elementary school teachers in Tehran province who were actively teaching in the year 1400. The total number of teachers in this population was 19,852. In accordance with Morgan's sample size estimation table, the research sample size for the quantitative section was determined to be 377 individuals. To ensure generalizability and prevent potential sample size reduction, an additional 10% of the required sample size was selected. Consequently, the questionnaire was distributed among 415 individuals.

Sampling method in the qualitative section the selection of the research sample in qualitative research adopts a non-probability and purposeful approach. Within this methodology, the researcher possesses knowledge regarding the target population and consciously selects the initial target sample for the

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research. Subsequently, the chain or bullet sampling method is employed. Barfi was utilized to identify and select experts within the field. In this technique, the researcher locates a participant by considering the conditions through other identified experts.

Sampling method in the quantitative section in order to select research samples, the random cluster sampling method was implemented. With this objective in mind, Tehran province was initially divided into 16 main branches based on the number of cities. The names of each cluster (16 cities) were then inscribed on a sheet and placed inside a bag. Subsequently, 4 cards were randomly chosen from within the bag. The extracted sheets contained the names of the cities of Pardis, Varamin, Pakdasht, and Shemiranat. Accordingly, the researcher visited the primary schools in these cities and distributed 377 questionnaires in a simple random manner.

Information gathering method to collect information, the following two methods were utilized: 1- Documentary (library) method: This method entails gathering information through the perusal of books, publications, internet sources, and databases. Upon selecting the appropriate sources, the desired texts are compiled, scanned, and translated. The outcome of this section is the identification of primary components and indicators that contribute to the improvement of studies in schools within Tehran province, based on theoretical and practical principles. 2- Field method: This segment was approached in two ways. Firstly, a number of educational experts were selectively chosen for exploratory interviews. After making the necessary arrangements, the researcher conducted interviews with these experts at their respective workplaces. Secondly, in order to collect the required data for the quantitative section, questionnaires were distributed and collected among the statistical samples following the requisite arrangements.

Instruments

In the qualitative part of this research, semi-structured interviews were used. In the individual interviews with the interviewees, six general interview questions were used for the preliminary investigation, which are based on the subject and objectives of Bo's research. In the quantitative part of the research, it includes a questionnaire that consists of two sections of demographic information and a researcher-made questionnaire.

A: Demographic information: In general questions (demographic information), the goal is to obtain general and demographic information of the respondents. This part includes two cases and characteristics such as gender, education and work experience are mentioned in it.

B: Questionnaire created by the researcher on the status of the components of the study research: This questionnaire contains 109 questions, which were compiled by reviewing the theoretical and

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practical bases and the results of the exploratory interviews (open and central coding of the interview texts).

Validity and reliability of measurement tools in the qualitative section

Validity: In order to ensure the validity of the tool in the qualitative part of the research and to ensure the accuracy of the findings from the researcher's point of view, valuable opinions of professors familiar with this field and organizational expert who were experts and knowledgeable in this field were used. Also, at the same time, help was taken from the participants in analyzing and interpreting the data.

Reliability: To calculate the reliability of the test, several interviews were selected as samples from among the conducted interviews, and each of them was recoded in a short and specific time interval. Then the specified codes were compared in two time intervals for each of the interviews

Validity and reliability of measurement tools in the quantitative section

Validity: In order to determine the validity of the questionnaire, face, content and construct validity were used. The face validity of the questionnaires was checked by the researcher, several members of the sample and some university experts before distribution. In content validity in the form of a Delphi method and with the help of CVR forms, with the help of ten experts, including interviewed members, educational experts, several subjects, etc., the content of the questionnaire in terms of additional questions or question correction. was examined.

Data analysis in the qualitative section

The method of data analysis in the qualitative part of the theoretical coding was derived from the data theorizing method. Theoretical coding is the process during which the data are analyzed, conceptualized and placed next to each other in a new way, and it is the main process during which the theory is compiled based on the data. In this method, there are three main pillars of "concepts", "categories" and theorems. In this method, theory is formed based on "raw data".

Data analysis is the main axis of the theory arising from the data. In each study as a whole, data collection, data organization and data analysis are interdependent. Three types of coding have been used to analyze the data obtained from the interview as well as the theoretical foundations, which are:

- Open coding
- Axial coding
- Selective coding

Data analysis method in the quantitative section

In the quantitative section, according to the research questions, descriptive and inferential statistics methods have been used.

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A) Descriptive statistics

Percentage, frequency, tables, figures and graphs were used to describe the demographic characteristics, whose data was obtained from the questionnaire, and mean, standard deviation, skewness and kurtosis were used to describe the research variables. It should be noted that operations related to descriptive statistics were performed using SPSS software.

B) Inferential statistics

In the inferential part, to answer the research questions, tests such as the sample T-Tech test using SPSS software and confirmatory factor analysis and modeling using Smart-PLS version 2 software were used. The most important reasons for using this software are:

Use of categorical variables

Convergence check

Testing the theory

Results

The statistical description of demographic information of the interviewees is presented in Table 1

Table 1. Demographic statistics of the interviewees

Variable	Category	Frequency	Variable	Category	Frequency	Variable	Category	Frequency
Job type	University Professors	3	Educational level	Master degree	3	Age	< 39 years	1
	Education assistants	3						
	Education managers	3					40-45 years	2
	Experts with executive experience	3		PhD	9		46-50 years	5
			Gender	Female	3		> 50 years	4
				Male	9	Job experience	< 10 years	1
							11-20 years	4
							> 20 years	7

The first question: What are the causal conditions affecting studying in the primary period of the education system?

And by linking the codes (open coding), the concepts (axial coding) were determined. The results of the analysis of question number 1 of the interview (causal conditions) show that 4 components including

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realism, systemic thinking, competitiveness and foresight can be identified. These 4 components form the causal conditions affecting the study.

The second question: What is the basic and influential category of research in the elementary period of the education system?

By linking the codes (open coding), the concepts (core coding), the results of the analysis of question number 2 of the interview (core category) show that it is possible to identify 3 components of continuous learning, the effectiveness of training and the improvement of training, and these 3 components are the dimensions of the category. influences on the study.

The third question: What are the necessary facilities that affect studying in the primary period of the education system?

And by linking the codes (open coding), the concepts (axial coding) were determined. The results of the analysis of question number 3 of the interview (phenomenon platform) show that there are 4 components including attention to the teachers' abilities; He identified meeting the needs of teachers, providing facilities and improving organizational communication, and these 4 components make up the necessary facilities affecting the study.

The Question 4: What are the inhibiting factors affecting study in the primary period of the education system?

By linking the codes (open coding), the concepts (axial coding) were identified. The results of the analysis of question number 4 of the interview (inhibiting factors) show that 3 components can be identified, including insufficient knowledge of course research, organizational factors, and motivational factors. and these 3 dimensional components constitute the inhibiting factors affecting the study.

The Question 5: What are the effective strategies for studying in the primary period of the education system?

By linking the codes (open coding), the concepts (axial coding) were identified. The results of the analysis of question number 5 of the interview (strategies) show that there are 4 components, including skill enhancement, emphasis on collaborative management, monitoring and evaluation, and organizational health. identified and these 4 dimensions constitute the strategies influencing the study.

The Question 6: What are the effective consequences of studying in the primary period of the education system?

The linking of codes (open coding), concepts (axial coding) were determined. The results of the analysis of question number 6 of the interview (results) show that 4 components including modeling, increasing efficiency, establishing scientific thinking and creating a learning culture can be identified and the next 4 components form the consequences affecting the study.

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In the proposed model, 3 components (organizational factors, improvement of education and effectiveness of education) have a factor loading less than 0.50 and 19 components have a factor loading above 0.50. In order to generalize the model and make it operational, 3 components with a factor load less than 0.50 were excluded from the model, and the final model was drawn based on 17 components affecting teachers' lesson research. Also, the overall RMSEA coefficient for the proposed model was found to be 0.071, which is an acceptable coefficient. The analyzed model is presented in diagram 1.

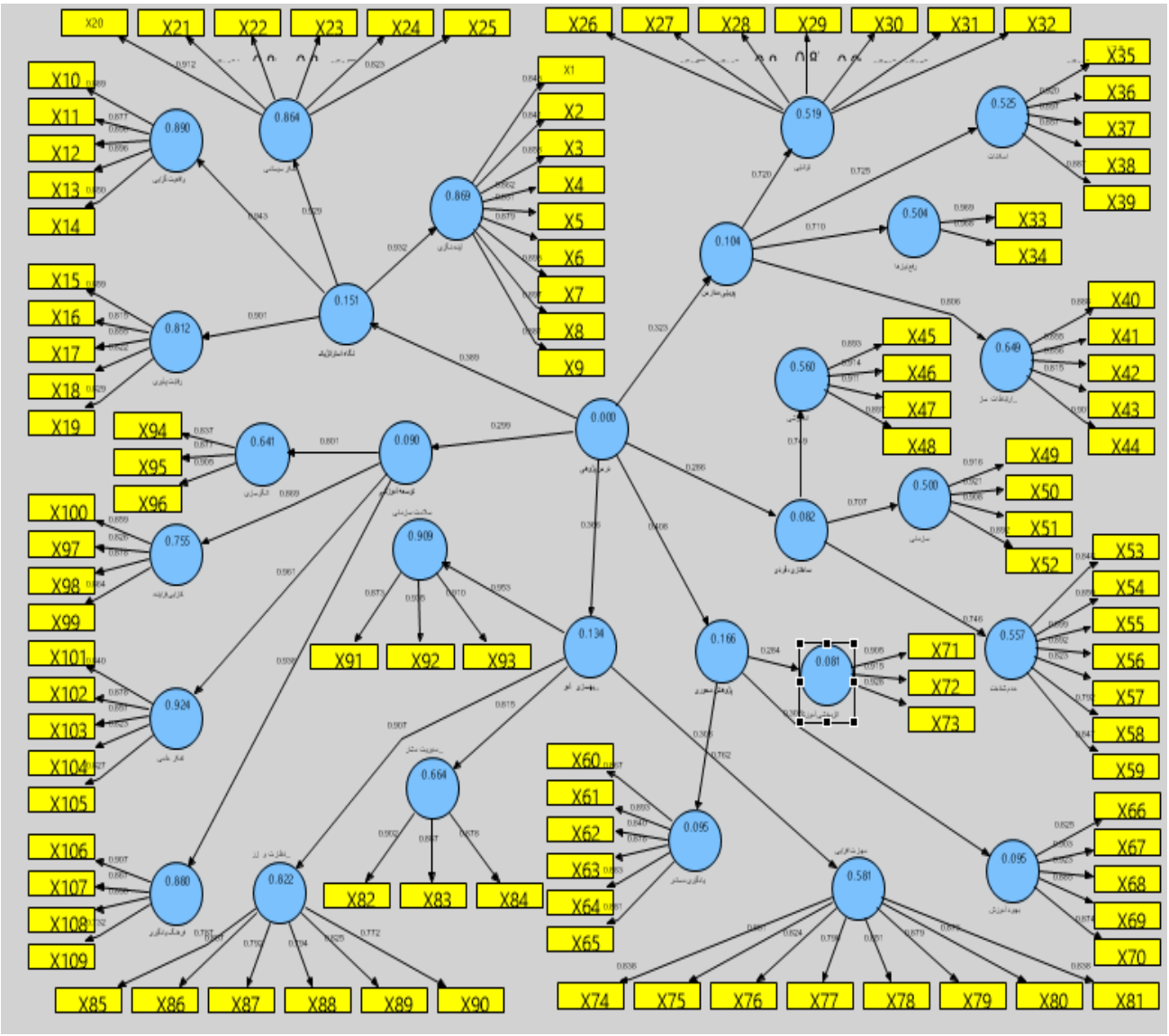

Figure 1. Factor analysis model of course research components

After the interviews and the code process of load, core and final compilations, the final model was presented (Figure 2).

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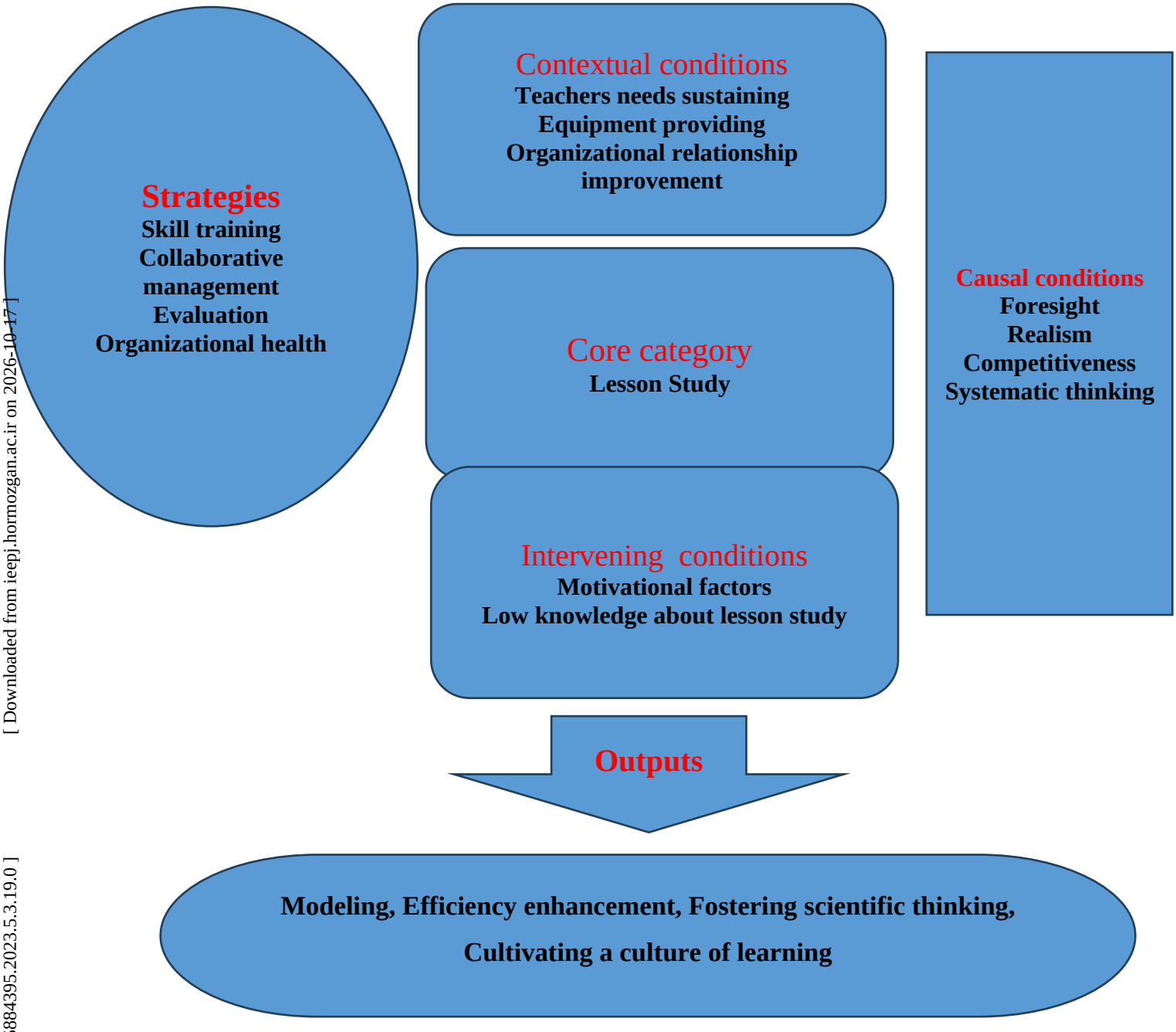

Figure 2. The final model for the promotion of lesson study in the elementary school

Discussion

Factor analysis method was used to investigate and determine a suitable model for study in the primary period of the education system. In order to solve problems such as reducing the number of variables or forming a new structure for them, the factor analysis method is used. Factor load is a value between zero and one. If the factor load is less than 0.3, the relationship is considered weak and it is ignored. A factor between 0.3 and 0.6 is acceptable, and if it is greater than 0.6, it is very desirable. (Klein, 1994). As it

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was observed in the results section, due to the fact that 4 components were excluded from the model due to having a factor load of less than 0.5, that means eighteen components remained out of twenty-two components and under the title of the dimensions and components of the lesson research model presentation in elementary schools of Tehran province. was accepted, whose titles are: foresight, realism, competitiveness, systemic thinking, paying attention to teachers' abilities, meeting teachers' needs, creating facilities, improving organizational communication, motivational factors, organizational factors, insufficient knowledge of lesson study, continuous learning, improving education, making education more effective, increasing skills, emphasizing on collaborative management, monitoring and evaluation, organizational health, modeling, increasing efficiency, establishing scientific thinking and creating a learning culture.

Then he prioritized the identified components based on factor loads, which was presented as follows: 1-Establishment of scientific thinking 2-Organizational health 3-Realism 4-Foresight 5-Systemic thinking 6-Skill enhancement 7-Monitoring and evaluation-Integration of learning culture 9 -Competitiveness 10-Increasing efficiency 11-Emphasis on collaborative management 12-Improving organizational communication 13-Modeling 14-Motivational factors 15-Inadequate knowledge of course research 16-Developing possibilities 17-Attention to teachers' abilities 18-Meeting teachers' needs.

As it was said, from the summation of previous studies and researches, the factors, dimensions and components of the study improvement model in primary schools of Tehran province were obtained, out of 22 components, 4 should be removed from the analysis path. Therefore, to check the fit of the model, 2χ test was done. The appropriate fit of the model is the presence of low 2χ and the ratio of chi-2 to the degree of freedom less than three indicates the appropriate fit of the model. In this research, according to Smart PLS output, 2χ was calculated for the entire structure. In the end, it is necessary to explain that the calculated 2χ value, as well as RMSEA and RMR less than 0.8, GFI and AGFI above 90% and close to one, all indicate the validity of the model. All these indicators have favorable values.

The present study examines the effects of using lesson research - as an example of collaborative research in the classroom - on the professional development of mathematics teachers. The data of this research were collected in the participatory research method with the participation of two groups of five and ten people of mathematics teachers. The data were collected using questionnaires, participatory observation, field notes of group members, notes and comments of external observers, interviews with teachers and students, audio recordings, films and photos, and were analyzed by coding and categorizing. The results of the data analysis showed that lesson research can be proposed as a good model in the professional development of teachers. Although the use of lesson study is faced with implementation problems and obstacles, solutions can be mentioned for each of them. Dudley (2017) showed that lesson study was

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useful in the following cases: improving lesson plans; more motivation to teach; Participation and exchange of ideas with colleagues; changing the attitude of teachers towards the teaching-learning process; Improving professional relationships. Alvarez (2018) stated that. This research is a part of the project that the University of Delaware did to improve the professional development of teachers in line with academic research. In this project, 10 features were considered for efficient professional development, which are as follows: Adjust according to the content of the curriculum. to continue Be collaborative. Be related to everyday life experience. to grow and progress. be consolidated Be organized based on research. Involve the teacher. It should be formed based on the students' work. Be self-evaluative. In the lesson research section, which is one of the three parts of the mentioned project, teams of teachers worked collaboratively to determine the goals, organize the lesson plan, teach, observe and analyze the students' learning. Then they presented the lessons publicly to the other teams and announced the results. Inprasita and Changseri (2017) stated that teachers with their participation on the topic or content led to a better understanding of the concepts that the students have problems with. They eat and become. One of the first schools that used learning in America was Patterson in New Jersey (Liffen et al., 2017).

In explaining this finding, it can be stated that lesson research is a practical model of continuous review of mental patterns and collaborative rethinking of educational agents. This model is based on collaborative research in the classroom and is considered an effective model for continuous improvement of education and teaching. As a new method of research in practice and small cores of transformation in education, it helps to expand research and produce professional knowledge in school. In addition to the process of group learning and continuous improvement of program formulation, implementation, review, rethinking, learning and promotion of findings) is concrete and provides an opportunity for educational agents to share in each other's experiences.

The study of the fundamental core of the transformation of schools from educational institutions (school as a result-oriented educational organization) to learning schools (school as a learning organization - school as a learning-process organization) is an example of a study of a systematic approach to study. is the development and improvement of teaching and learning, in other words, it is a cycle of research about students' learning that is implemented in order to improve teachers' learning and improve education and upbringing, which is the effort of teachers to "learn better" for students. Lesson research is the research model of teachers in school and classroom for continuous improvement of education, enrichment of learning, professional development of teachers and production of professional knowledge (Mayakawa and Winslow, 2017).

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Lesson study helps to expand the culture of teaching and learning in school and provides an environment for teachers to learn from each other, improve their professional knowledge, reflect on their behavior and participate in the continuous evolution of education. In this model, the school and the classroom become a community Learning becomes and teachers get an opportunity to talk to each other and have a professional dialogue, the idea of lesson research helps teachers, researchers and professors to increase their abilities through learning from each other and in a group process, qualitatively and contribute to the production of professional knowledge (Saito and Attention, 2017). Although the cultural differences of schools and complex social relations in each society, effective methods and tools are recommended for applying the lesson study model, especially elementary lesson study. The research lesson is the application of the scientific method in the school and the teaching and learning process, in such a way that the teachers collaboratively form a hypothesis about the best method of teaching a subject, then they try to base on the observations of the reasons, evidences and documents that The group members have collected, express this hypothesis in front of the students, and as a result, it is determined what successes have been achieved and what parts need to be corrected. After some reflection, reflection, thought and conscious thinking. They make the necessary corrections and then test the revised hypothesis again, and this process continues like this.

Conflict of interest: The authors have no conflicts of interest relevant to the content of this article.

Financial sources: This research has received no financial support from any organization.

Acknowledgment: The authors would like to express their gratitude to all the participants and esteemed education officials who helped them in the research process.

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