Curriculum Research

Volume 3, Issue 1
January 31, 2022

Investigation of the Causal Relationships between the Effective Factors of Participatory Learning in Primary Schools

Article info

Article Type:

Original Research

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Article Cite:

Badri Ghorishi, Parivash Jafari, Mehdi Bagheri, Nader Gholy Ghorchian, Investigation of the Causal Relationships between the Effective Factors of Participatory Learning in Primary Schools. Curriculum Research, 2022:3(1): 36-46

Article History:

Received: 2021/05/24
Accepted: 2021/10/04
Published: 2022/01/31

Abstract

Purpose: Learning is an important factor in life on which the survival and success of organizations depends. The purpose of this survey study is to investigate the causal relationships between the effective factors of participatory learning in primary schools in Bandar Abbas, Iran. The research is applied in terms of purpose.

Methodology: The participants of the study consisted of 35 experts who were selected by purposive sampling. A researcher-made pairwise comparison questionnaire consisting of 5 influential factors of student, teacher, school principal, school atmosphere, and curriculum was used to collect data. The collected data were analyzed by DEMATEL technique.

Findings: The results of the analysis based on ranking showed teacher factor at the top of ranking following with the student factor in the second rank; the third rank belonged to the school atmosphere factor, the curriculum factor was ranked fourth; the principal factor fifth. The results also showed that the teacher factor (R+J=23.91; R-J=0.35) had the most interaction (impact / influence) and then respectively, the student (R+J=23.87; R-J=-0.35), the school atmosphere (R+J=23.85; R-J=1.00), the curriculum (R+J=22.88; R-J=-0.71), and, the principal factors (R+J=22.53; R-J=-0.30) considered the most interacting of all. The school atmosphere (R=12.42) was the most influential factor on the other factors, then the teacher (R=12.13) was the next influential factor, which according to the R-J value of these two influential factors are pure. The most influential factors were the curriculum, the student and the principal, respectively.

Conclusion: According to the results, the content of textbooks should be written and compiled with a special focus on this method of teaching and learning. Also, new determining scales of the correct performance of participatory learning should be developed and used.

Keywords: Participatory learning, Teacher, Curriculum, School Atmosphere, Student, Principal

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Introduction

Undoubtedly, one of the goals of education is to prepare students to accept and understand the scientific developments of the world to come. However, it's most important goal is the full flourishing of students' personalities and the cultivation of transcendent values (Kadivar, Nejad, & Emamzade, 2005). One of the key missions of any educational system is to educate useful citizens and prepare people for the whole trends of life. One of the most important competencies needed for the job market today is the ability to work with others and engagement in collective activities. Therefore, cooperation and participation count as one of the most important work and life skills required in the 21st century that students must acquire. Hence, participatory learning considers a key approach of teaching and learning to acquire this skill (Brandt, 2020). Collaborative learning is an educational approach that uses groups to reinforce learning by working together. That is, groups of two or more individuals work together to solve problems, complete assignments, or learn new concepts (Srinivas, 2011). Collaborative learning is one of the new approaches to teaching and learning that is recognized in some educational systems of the world as an alternative to ending the rule of traditional methods. In this method, students work in groups to perform joint tasks, and in which they add effectively to their practices (Davoodi, 2011). Meeting this need, which is not an easy task, requires the expansion of education and the use of methods based on scientific, intellectual, and principled findings to train the specialists needed by society. The future of any society depends upon the quality and efficiency of education in that society, mutually the efficiency of the education system of each country depends upon discovering effective factors in the quality of teaching along with the use of new teaching methods (Danaei, Zarshenas, Oshagh, & Khoda, 2011). Therefore, learners need to upgrade their skills and improve their learning as a necessity in order to be prepared for the existing global challenges. They should also spend their time interacting with their coaches and peers by practicing collaborative learning, as well as applying the new knowledge and skills they acquire (Scott, 2015).

A participatory learning approach actively engages learners in the processing and synthesis of information and concepts instead of memorizing contents; it allows students to take responsibility for their own learning and be prepared for the future. Despite the many benefits of collaborative learning for students, implementing that practice is an important challenge ahead of both teachers and students. The conducted studies on this ground have verified that there are challenges ahead both teachers and students while implementing collaborative learning (Bay & Çetin, 2012; Gillies & Boyle, 2011; Le, Janssen, & Wubbels, 2018). The positive effect of interaction and cooperation between students on decision-making skills in achieving their common goals (Asha & Al Hawi, 2016; Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). The benefits of participatory learning are not only achieved by exposing students to collective activities, but also through the use of many factors and elements in a coordinated and cohesive manner. For example, teachers and students have to take on new roles, textbooks have to be organized differently and the school environment has to be prepared to embrace the changes.

It is argued that the successful restructuring of the world education system relies on changes in education and redesigning of educational subjects (Keramati, 2020). Increasing the learner's independence and creativity is part of this solution. He also emphasizes that learning strategies for this century will not be limited to school, but will include peer education and intergenerational partnerships as well as social interactions. Therefore, creativity will not come into practice as long as educational environments fail to provide opportunities as a connection with new knowledge and eliminating complex problems through participation and collaboration. In this regard, what is of interest to experts and researchers today is the use of active methods instead of inactive and traditional approaches. In traditional teaching methods, teachers are often the speakers, and students are expected to listen

Group discussion in the classroom is neglected, and if the question is asked, it does not make students think about the curriculum, rather the goal is to prepare students for the exam in this way. In contrast, students who learn through active learning, learn better and enjoy the learning experience (Keramati, 2020). Marcos et al. (2020) investigated children's creative thinking through reading and writing in a collaborative learning classroom. The results showed a positive and significant increase between creative thinking and academic achievement in students who participated in participatory learning classes. Therefore, collaborative learning

has a significant effect on academic achievement and creative thinking (divergent thinking) in students. Tadesse Gillies and Manathunga (2020) studied the relative impact of participatory teaching and learning compared to traditional instruction and lecture-based instruction on improving teaching and learning processes on 347 graduate students in Ethiopia. The results showed that participatory teaching and learning increases learning, positive relationships, interaction, and satisfaction in students with a positive effect on learning compared to the lecture method.

The study of Zhang and Chen (2021) on the effect of participatory learning on nursing students' critical thinking in clinical practice indicated that participatory learning contributes to intensive thinking in nursing student. Likewise, it was unfolded that teaching and learning in a participatory way has a positive and significant effect on the development of critical thinking skills in nursing students. Sirias (2002) conducted a study entitled Writing Cases for Information Management Systems to Enhance Collaborative Learning and found out that collaborative learning is one of the appropriate strategies for training information management systems. In fact, with this method, students can work together as a team to solve problems. Sirias (2002) studied the interaction between self-regulated learning, collaborative learning, and academic self-efficacy in high school students where the findings showed that participatory learning has a significant effect on students' academic self-efficacy.

in a study entitled "Perception of first-year students in the field of participatory learning in the classroom", Keramati (2020) showed that participatory learning not only facilitates the learning process of counseling students in primary and secondary education and improves the quality of their learning, but also strengthens self-confidence and positive emotions, critical thinking (emotion control and mood , discussion, brainstorming and proper self-assessment), effective interaction and cooperation, and fostering a sense of responsibility and leadership. Abbaszadeh Diz, Rashid Kolvir, and Rezaeisharif (2020) in a study to identify the components of the physical environment of schools with an approach of participatory learning in the boys' secondary schools of Tabriz showed that the more the physical environment of the school has suitable conditions for participatory learning, the proper level of satisfaction and interest in learning will be realized. Noorani, Manshaei, Mahmoudzadeh, and Montazeri (2020) investigated the discovery of repetitive patterns of learners in a dynamic participatory learning environment based on game theory. The results showed that considering the personality traits of individuals and providing educational services in accordance with the characteristics of learners is one of the effective factors in increasing learning and analysis of group change/non-change behavior can be used to increase the efficiency of the educational system. The findings of showed that the types of interaction (teacher-student, student-student, student-content, teacher-content, and teacher-professor) have a significant and direct relationship with the quality of participatory learning in e-learning (Masoomifard, 2019). Despite the great emphasis on the benefits and necessity of using this educational approach in educating the new generation, still this method of learning in the country and especially in Hormozgan province has not been considered as expected where the dominant educational approach is traditional mode. Solving this problem requires comprehensive studies in this field. Studies show that most of the researches conducted in the country in the field of collaborative learning has focused on the benefits, results and the impact of using this method on various areas.

Therefore, the questions that this research has followed are: What are the causal relationships between the factors affecting participatory learning in primary schools in Bandar Abbas? And, what is the priority of influencing and influenced factors?

Methodology

The present study is an applied research in terms of purpose and a survey study in terms of strategy in which a researcher-made paired comparisons questionnaire has been used to collect data. Participants consisted of 35 experts who were selected by the purposeful sampling method. The criteria for selecting participants were having a PhD degree in educational sciences, and teaching and research experience in areas related to collaborative learning. DEMATEL (decision making trial and evaluation laboratory (technique was used to analyze data related to determining the pattern of causal relationships between factors through paired comparisons. DEMATEL technique provides a hierarchical structure of the factors presented in the system

along with the interactive relationships of the mentioned elements. In such a way that the intensity of the effect of the mentioned relations is quantitatively determined.
The questionnaire consisted of six tables. A table to compare the main factors (5 * 5) Teacher operating table (18 * 18), student (13 * 13), school atmosphere (13 * 13), school principal (6 * 6), curriculum (5 * 5). The respondents were asked to show the intensity of the influence and influence of the factors by comparing each of the factors and sub-factors.

Findings

In this study, 9 steps of DEMATEL technique have been used to analyze the factors affecting participatory learning in primary schools.
Step one: obtaining the main criteria and sub-criteria affecting participatory learning
In step one, using the methods that have been fully done in the qualitative sections of the (previous) research, 56 sub-criteria have been identified as factors affecting participatory learning, and classified into 5 main categories as follows: curriculum dimension (4 components), teachers' dimension (18 components), school atmosphere dimension (13 components), students' dimension (15 components) and principal dimension (6 components).
Step two: Drawing a diagram of relationships:
The intensity of the effect of zero (0) indicates the lack of direct relationship in the pair comparison and in return no arc is drawn. Teacher factor, Principal factor, School atmosphere factor, Curriculum factor and, Student factor.

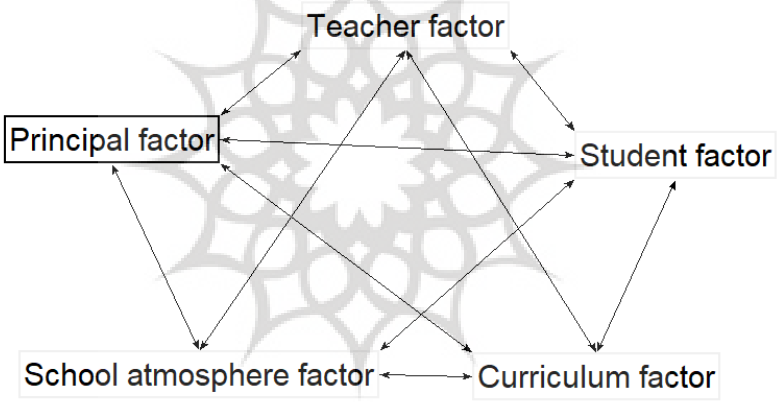

Figure 1. The relations of main indicators.

Step three: The decision-making law the collective agreement of the experts' judgment on the possible relationship between both elements A and B of is the median of the scores.
Step four: the outline of this diagram is shown as follows:
N = {Teacher, Principal, School atmosphere, Curriculum, Student}
Step five: Formation of the Matrix X (Score Median)
According to the third and fourth steps, the X matrix is formed. In this step, the diagram corresponding to the X matrix can be plotted as the initial diagram, so that its vertices are the same components of the system and its arc is the degrees of direct relations between both criteria of the system and the intensity of the effect of each direct relation on the arc corresponding to it.

Table 1. X Matrix for the main criteria.

Factors	Teacher	Principal	School atmosphere	Curriculum	Student
Teacher	0.00	3.50	4.00	3.50	3.50
Principal	3.50	0.00	3.50	3.00	3.00
School atmosphere	3.50	4.00	0.00	3.50	4.00
Curriculum	3.00	3.00	3.00	0.00	4.00
Student	4.00	3.00	3.00	4.00	0.00

Step six: M Matrix formation

Each input of the X matrix is multiplied by the "inverse of the largest sum of rows of that matrix (λ)" to obtain the "M matrix", which represents the intensity of the relative effect of the direct relationships in the system:

$(M = \lambda * X)$

Table 2. M matrix for the main criteria.

Factors	Teacher	Principal	School atmosphere	Curriculum	Student
Teacher	0.00	0.23	0.27	0.23	0.23
Principal	0.23	0.00	0.23	0.20	0.20
School atmosphere	0.23	0.27	0.00	0.23	0.27
Curriculum	0.20	0.20	0.20	0.00	0.27
Student	0.27	0.20	0.20	0.27	0.00

Step seven: S matrix formation

The formation of S matrix represents the intensity of the relative effect of direct and indirect relationships:

$S = M(I - M)^{-1}$

Table 3. S matrix for the main criteria.

Factors	Teacher	Principal	School atmosphere	Curriculum	Student
Teacher	2.48	2.59	2.61	2.67	2.74
Principal	2.46	2.20	2.39	2.44	2.50
School atmosphere	2.73	2.67	2.46	2.73	2.82
Curriculum	2.43	2.36	2.36	2.27	2.54
Student	2.61	2.49	2.50	2.62	2.47

Steps eight and nine: calculations and results

In the S matrix, the row sum of the entry (element) (R), the column sum of the entry (J), the sum (R + J) and the difference (R-J) were calculated. The value (R) for each factor indicates the degree of influence of that factor on other factors of the system and the corresponding value (J) indicates the influence of the said factor on other factors of the system. Therefore (R + J) specifies the sum of the influence and influence of the desired factor in the system, in other words, the factor that has the highest value has the most interaction with other factors in the system.

The final value of the effect of each factor on all other factors of the system is also obtained from the difference (R-J). Such a way that:

If $R > J \rightarrow R-J > 0$ then the factor in question is a definite influence.

If $R < J \rightarrow R-J < 0$ then the desired factor is a definite influence.

The values of (R), (J), (R + J) and (R-J) are obtained by calculating through EXCEL software (Table 4).

Table 4. Values of (R), (J), (R + J) and, (R-J).

Factors	R	J	R+J	R-J
Teacher	12.13	11.78	23.91	0.35
Principal	11.12	11.41	22.53	-0.30
School atmosphere	12.42	11.42	23.85	1.00
Curriculum	11.09	11.79	22.88	-0.71
Student	11.76	12.11	23.87	-0.35

According to Table 5, the teacher factor has the most interaction (impact / effectiveness) followed by the student factor, school atmosphere factor, curriculum factor and, principal factor, respectively. In terms of interaction with other factors, the school atmosphere was the most influential factor on the other factors, then the teacher was the next influential factor, which according to the R-J value of these two influential factors are pure. The most influential factors were the curriculum, the student and the principal, respectively.

Table 5. The order of final impact of each criterion on other criteria and the order of their final importance in the system.

No.	Weight priority based on interaction	R+J	Priority based on net impact / effectiveness intensity	R-J
1	Teacher factor	23.91	School atmosphere	1.00
2	Student	23.87	Teacher factor	0.35
3	School atmosphere	23.85	Principal	-0.30
4	Curriculum	22.88	Student	-0.35
5	Principal	22.53	Curriculum	-0.71

Final ranking of sub-criteria in terms of (R + J)

In this section, according to the information obtained from the implementation of the previous steps, the criteria affecting participatory learning are ranked in terms of (R + J).

First rank: Teacher factor (R+J=23.91; R-J=0.35), Second rank: Student factor (R+J=23.87; R-J=-0.35),, Third rank: School atmosphere factor (R+J=23.85; R-J=1.00) , Fourth rank: Curriculum factor (R+J=22.88; R-J=-0.71), and Fifth rank: Principal factor (R+J=22.53; R-J=-0.30) .

After the analysis of each of the causal relationships of the factors affecting participatory learning in schools in Bandar Abbas, the following results were obtained:

The horizontal axis of the chart (R + J) shows the degree of interaction of the factors (importance of the factors) and the vertical axis of the chart (R-J) shows the net impact / influence of the factors and the direction of the impact arrow.

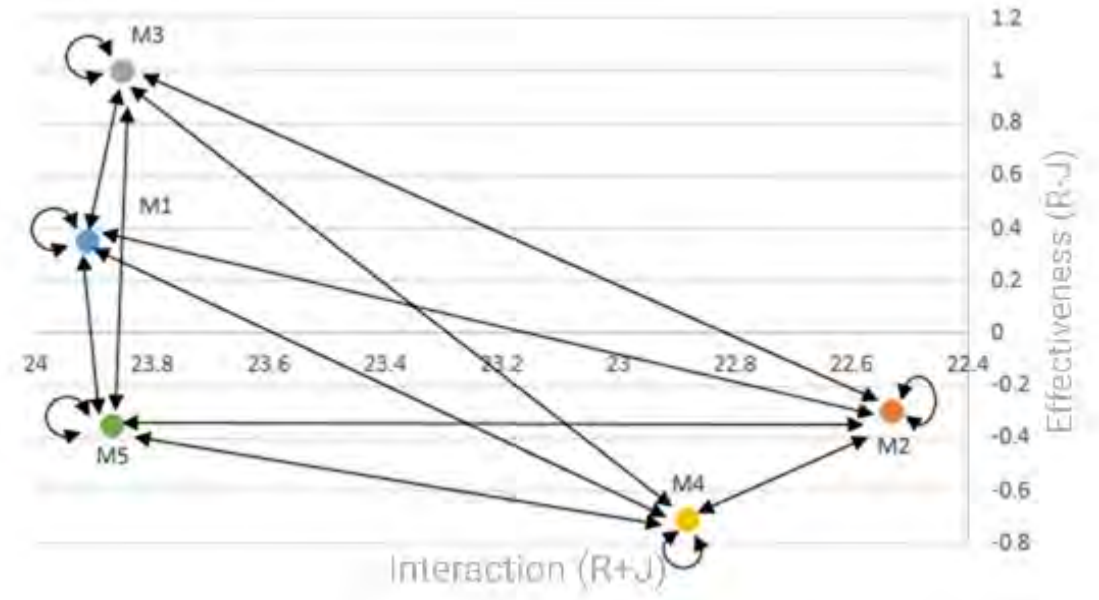

Figure 2. Cause and effect relationships and network map of relationships.

Discussion

Based on the results obtained for the factors related to teachers, it can be put that:

One of the important factors that can affect the success rate and academic achievement of students is the teaching methods of teachers. Situation, facilities and equipment can be effective in learning when the teacher organizes the educational environment and facilities and creates the appropriate educational situation, identifying the talents, interests and abilities of the students, they are guided in the right way of learning. The study of Sirias (2002) has considered participatory learning as one of the appropriate strategies for training information management system. Dukuzumuremyi showed that teachers have an important role in creating interaction in participatory learning. Based on this, it can be said that in order to increase students' motivation and academic achievement, teachers should pay attention to the role of motivational factors in participatory learning and teaching in the conceptual map of individual education (Dukuzumuremyi and Siklander, 2018).

Based on the results of the factors related to the principal, it can be said that: school principals have several duties to achieve the goals of their schools. Supervising the teaching process is the main task of educational administrators. Also, the enthusiasm and desire of the principal toward performing group activities in the school and the interest and motivation of the principal toward improving the performance and quality of the school are the most important factors of the principal. Without proper and systematic planning, time and effort are wasted and the intended goals are not achieved.

NikPay found that to achieve the goals of the school the principal should work to meet the personal needs of his staff and create a collaborative and cooperative relationship between them (NikPay, Farahbakhshs, & Yousefvand, 2017). Basically, one of the most important roles of the principal is to establish good human relations with school staff, and especially in two areas, namely raising the morale of teachers and creating a humanistic atmosphere in the school as an important factor. Also, school curricula should be changed to meet the changes and developments in society and to meet the needs of students. Therefore, school principals need to review the goals of their school once again to achieve the desired education and learning, and by creating favorable teaching conditions for teachers, the necessary areas for students to learn and thus change the appropriate behavior with social and cultural needs, and provide economic community.

Based on the results of school atmosphere factors, it can be said that: school and classroom atmosphere, positive interpersonal relationships and better learning opportunities for students in all demographic environments increase the level of success and behaviors at the same time reduce antisocial behavior. It can also affect many departments and individuals in schools. In addition, participatory learning can improve the situation in the classroom; highlight students' attention to the teaching and learning process, sharpen their

responsibility for the involvement in group activities aiming at problem solving in writing which increases and their self-confidence to express their opinions. It was shown that the more suitable the physical environment of the school conditions for participatory learning, the more the level of satisfaction and interest in learning which results in properly realization of education (Abbaszadeh Diz et al., 2020). The elements of the physical environment of schools such as furniture, green space, color, geometry and space were also recognized as one of the most important factors in participatory learning in schools.

it has been indicated that that the situation of school is varied between primary and secondary school and participatory learning is far more effective in improving children's learning progress and adaptation to school; it is much more effective than interpersonal competition and individual effort, since it boosts social and emotional competence and self-confidence (Babalis, 2013). Noorani found that considering the personality traits of individuals and providing educational services in accordance with the characteristics of learners is one of the effective factors in increasing learning and analysis of group change / non-change behavior can be used to increase the efficiency of the educational system (Noorani et al., 2020).

Based on the results related to curriculum factors, it can be said that: According to the study literature, what has made the Iranian education system inefficient is the use of traditional teaching methods instead of new and active learning methods. The traditional method focuses more on strengthening the memory and the mere transfer of learners' information, while school curricula should focus on ways in which students learn how to learn through thinking rather than learning and remembering. Therefore, it is necessary to correct this inefficiency by formulating a curriculum based on new principles of teaching and learning. There have been a bulk of researches on this ground that present the new principles and foundations of educational and learning programs. Azhir (2011) identified such factors as performance, acceptance and resources, acceptability, sharing the amount of discussion and exchange in the education environment, quality of education system and facilities, motivation, awareness and knowledge of participation, multi-layered participation, having past experience and a background of participation in learning, etc. these factors affecting participatory learning in the e-learning environment.

Based on the results of student-related factors, it can be said that the situation and conditions that distort the learning process to achieve the goal, the implementation of a new mental strategy in the classroom can affect students' critical thinking. Collaborative learning can be effective in strengthening thinking and promoting meaningful student learning. Collaborative learning is a situation in which two or more people learn together or try to learn something. Smith (2012) found that collaborative learning represents a dramatic shift from teacher-centered or lecture-centered in college classrooms. In participatory classes, the process of lecturing / listening / taking notes may not disappear completely, but will be seen alongside other processes involved in student discussion and active work with the curriculum. At best, participatory classes stimulate students and teachers. Lin, Yen, and Wang (2018) found that learning motivation is an important modulator of the effectiveness of the learning method, and that learning motivation comes from students makes more attempts and gain satisfaction in the learning process, and this makes them set higher goals and perform better with higher motivation to learn. Collaborative learning seems to result in more positive effects on students, which is reflected in their academic achievement. It increases students' critical thinking as well as their learning progress and also encourages students to participate in learning.

Conclusion

If the goal of the educational system is to train capable students, citizens and people useful to society, it should provide a suitable environment for the growth and promotion of scientific insight, creative thinking, problem-solving skills and participation in aspects of social life. Accordingly, school curricula should focus on ways in which students learn the skills of how to learn through thinking and dealing with issues and problems on a regular basis, rather than learning and remembering. Achieving such goals is not made possible using mere passive teaching methods, rather it requires the use of active teaching methods. In this study, the researcher investigates the causal relationships between the factors affecting participatory learning (teacher factor (M1), principal factor (M2), school atmosphere factor (M3), curriculum factor (M4) and student factor (M5) in primary schools in Bandar Abbas, Iran.

Based on the research findings, suggestions can be made:

- That the School Renovation Organization design and build newly established schools, taking into account the use of this educational method, in such a way that the creation of classes is such that when using this new educational method, teachers and students face no problems or challenges ahead.
- That the content of textbooks is written and compiled with a special focus on this method of teaching and learning.
- The new scales determining the proper functioning of participatory learning be developed and used.
- That in the academic year, for the better understanding of this new educational method, scientific and practical workshops be held for teachers so that they become familiar with all aspects and effects of this educational method.
- That school principals have a significant role in carrying out and completing this educational style. It is suggested that different meetings are held to describe and explain the necessity of using this method for this group of training staff.

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