Original Article

The Effectiveness of Blended learning on students' academic Motivation in multi-grade classes

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Abstract

Multi-grade classes are one of the realities of our educational system. Academic motivation is known as a challenge for educational systems in developing countries. According to the rapid advances in science and technology, the utilization of blended learning seems to solve this challenge. This study aimed to investigate the effectiveness of blended learning on students' academic motivation in multi-grade classes. The study was quasi-experimental with a pre-test-post-test design with the control group. The statistical population was all students of primary multi-grade classes in Ghaen (n=2200 with 160 classes). The statistical sample was 28 multi-grade students selected using the two-stage cluster sampling method. Also, to collect data, Harter's academic motivation questionnaire was used with Cronbach's alpha of 0.92. The SPSS application and covariance test used to analyze the data. The results showed that academic motivation scores in the experimental group were more than the control group ($p \leq 0.05$, $f(25.1) = 4.23$). According to ETA squares, the blended approach explains 37% of the variance of academic motivation post-test scores ($p < 0.05$, $\eta2 = 37\%$). According to the findings and the challenges of teaching in multi-grade classes, this method is not just one option but seems to be the best solution for resolving multi-grade problems.

Introduction

Today's There are different conditions in education; one of them is the existence of multi-grade classes exist in most countries (Hyry-Beihammer & Hascher, 2015). In Iran, there are 52,456 multi-grade classes(Moslehabady et al., 2013). Multi-grade classes in rural areas of developing countries are mainly open for children's access to primary education (Aksoy, 2008). In these classes, the teacher works with students of different grades and curriculums (Duarte & Fernandes, 2005). Teaching in these classes is a practice in which students of different ages, skills, and grades take part in a training position in the same class (Gürel et al., 2014).

Although, the lack of time is the biggest problem with multi-grade classes(Liter, 2015). But, these classes deal with more serious problems: such as the low academic motivation, the lack of

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information about the students and their parents, facilities and equipment, parental cooperation, educational space, student participation in classroom activities, staffing services, the inadequacy of their age composition, difficulty in the planning of teaching and so on(Engin, 2018; Mortazavizadeh & S., 2010). The academic achievement in these classes is lower compared to independent schools due to the problems that exist with multi-grade classes(Blum & Diwan, 2007; Soleimani, n., Hadadian, A and shahrayi, 2010). In addition, teaching in these classes encounters many problems, if educational programs are not supported by the necessary resources and teacher training is not done correctly, Students' academic achievement and motivation stagnate(Mason & Burns, 1994).

There are different methods to cover the problems of multi-grade classes; one of them, which can be a valuable contribution for students, is the use of educational technology(Samadian, 2008) so that it becomes part of everyday life. The use of information and communication technology in all areas of human life, especially in education and its integration with teaching and learning, can have positive effects on the quality and richness of learning, as well as on the student's participation in the teaching-learning process(Ajam et al., 2023; Islam et al., 2018). This has led to the formation of a new approach in learning, which is referred to as Blended learning. Blended learning is an approach that has come to the aid of multi-grade classes by using new educational technologies.

Relatively different definitions of this learning approach have been used depending on the teaching methods and their designers. For example; Blended learning can be broadly defined as a combination of learning methods, strategies, and models, but most definitions seem to be a combination of traditional (face-to-face)(Johnson et al., 2016) learning methods with online learning(A. Y. Ibrahim, 2019). Combined learning is a situation in which traditional classrooms are interwoven with online learning and in-person learning (Figure1). Blended learning is combination of direct learning and e-learning(M. M. Ibrahim & Nat, 2019; Rafiola et al., 2020). In other words, it tries to create diverse opportunities for learning by using multiple

Figure 1. The definition of Blended learning

resources and The blended learning approach has several benefits: such as ease of access, interactive training(Rostaminezad et al., 2019), efficient and flexible features(Kumar & Pande, 2017) and developing teachers' roles as leaders(Oweis, 2018). Blended learning reflects the strengths of both on-site and online learning(Garrison & Kanuka, 2004); this approach provides many opportunities for recognizing the talents and broader personal growth, providing a kind of learning style that will climb people and connect them to global classes(Thorne, 2003). It is a formal student-centered learning approach that combines the best practices of traditional and modern education(Vasileva-Stojanovska et al., 2015). Based on Graham (2018) definition, the combination is based on three levels: 1) Combining online activities and face-to-face activities 2) Combining media in educational activities 3) Combining educational methods.

Blended learning has a solid theoretical foundation. Also, blended learning is an effective approach in motivating students(Rostaminezad et al., 2019). It improves students' communication skills by improving their motivation(Islam et al., 2018), increases their creativity and collaboration and the ability to use digital technologies(A. Y. Ibrahim, 2019). In addition to the theoretical bases of constructivism and other learning theories, the first principles of instruction, which are also advocated by Merrill, give rise to blended learning. According to him, learning is promoted when learners are engaged in solving real-world problems, when existing knowledge is

activated as a foundation for new knowledge, demonstrated to the learner, applied by the learner and integrated into the learner's world(Huang et al., 2008).

In educational settings, emotional needs must be solved for learning. Academic motivation is one of the variables directly related to academic performance(Hunkins & Ornstein, 2016). In education process, motivation is a vital element. It is a pre-requisite for students to be engaged in the learning process(Sugano & Mamolo, 2021). Motivation is powering people to achieve high levels of performance and overcoming barriers in order to change(Tohidi & Jabbari, 2012). It is a drive or control of a person that strengthens, guides, enhances or maintains their behavior(Sugano & Mamolo, 2021).Also, the introduction of technology in education increases the positive attitude and improves the student's academic motivation, and as a result, leads to academic achievement. Recent studies have shown blended learning has a positive impact on reducing drop-out rates and improving student grades(López-Pérez et al., 2011). Also, it enhances the learning of the students(AbdullahZadeh, 2013). It improves students' motivation and Students' satisfaction (Burgon & Williams, 2003). The presence of technology affects the education and academic performance of the learners and plays an important role in the student's tendency to education and learning(Tataroğlu & Erduran, 2010).

Studies in this area confirm the role of motivation in blended learning. Ibrahim(2019) divides the factors affecting motivation in blended learning into two categories; 1) Intrinsic factors (attitude and beliefs of teacher, instructor learning) and 2) extrinsic factors (interactions with technology, academic work hold, institutional environment, interactions with students). The role of academic motivation is principal in achieving academic success. So, many studies have reported the effectiveness of blended learning in improving motivation and academic performance (Huang et al., 2008). Islam et al. (2018) in their study compare two groups of students with two models of learning. Experimental group learned by blended learning and the others with the direct model. The result showed the blended learning model can boost students' academic motivation and their achievements. Rafiola et al (2020) studied the effect of learning motivation, self-efficacy, and blended learning on students' achievement. In this study, the results showed that the motivation and blended learning had a positive and significant effect on students' achievement. Also, the Oweis study(2018) was a pilot case study research strategy. These studies are effective research strategies for investigating educational issues in real life situations. The results showed that between the experimental and control group were significant in respective groups' motivation. Rostaminejad et al..(2019) investigated the effectiveness of humorous electronic content on students' attention, motivation and learning. This study was quasi-experimental, the students were divided into experimental and control groups, and the findings showed a significant difference in the scores of the experimental group in the post-test. The results showed that blended learning improves students' attention and learning.

Many rural schools are multi-grade, which has many problems. The centralized education system, the multiplicity of education levels, the lack of facilities, and worn-out teachers are among these items. Due to the high number of multi-level schools, effective and appropriate actions have not been taken. Therefore, the research aim is to investigate the effectiveness of blended learning on the academic motivation of students in multi-grade schools. Yet, according to the studies conducted in the background section, no study has been done in this field in multi-grade schools. Therefore, the principal research hypothesis is as follows:
Blended learning improves the student's academic motivation in multi-grade classes.

Methodology
Design
The present research is applied in terms of purpose. It is quantitative research using experimental research method. The research design used in this research is Quasi-Experimental with pre-test-post-test design. The data collection instrument is a questionnaire sheet for student motivation.

his tool was given before and after the learning in each sample group which lasted 8 meetings. The data obtained were then analyzed and tested with covariance test using SPSS v.20 application

Participant
The statistical population of this study is all students of elementary multi-grade classes in the city of Ghaen, Iran (N= 2200 students and 160 schools). Then, the villages with a student population of fewer than 14 students were removed. By using the two-stage cluster sampling method, 2 multi-grade classes with 14 students (Control and experimental group) were selected. The combination of homogeneity of strong, moderate and weak students in fourth, fifth and sixth grades was selected randomly from rural areas of Paskooh Ghaenat. Qualified villages were randomly assigned two multi-grade classes in Islamabad and Chahkazeh.

Research tools
Harter's standard questionnaire used to measure academic motivation with 33 items, whose purpose is to investigate academic motivation among students. This tool is a modified form of Harter's scale (1981) for measuring academic motivation. Harter's main scale measures academic motivation with bipolar questions. one pole is internal motivation, and the other is external motivation. The subject's answer to each question can only include one of the external or internal reasons. Since intrinsic and extrinsic motivations play a role in many academic subjects, Lepper et al (2005) converted Harter's scale into a usual scale, where each question only addresses one of the reasons for intrinsic and extrinsic motivation. This questionnaire is designed on the Likert scale. The validity of the questionnaire has been well evaluated and confirmed employing the opinion of the professors. Zahiri Navi, Bijan, & Rajabi (2009) measured its reliability with Cronbach's alpha test, and reported its reliability coefficient as 0.92

Process
At first, the researcher distributed an academic motivation questionnaire to each group. Then, in 8 weeks, the blended learning method was performed in the experimental group. In intervention sessions in the experimental group, students used headphones to listen to audio. Also, there was a monitor for each group of students. The teacher taught with the help of audio and animation files. In the literature lesson, the teacher played the audio files, and the students listened to them using a headset and then followed the text from their book. Also, during the spelling lesson, the teacher played the recorded audio file to the students, who had to put the text on the sheet after hearing it, and the teacher corrected them at the end of the session. Teachers for learning other topics such as; linguistics, Science or Social studies used animation. Table (1) summarizes the content produced by citing sources and objectives.

Table 1. some of the content produced by citing sources and objectives

The type of media	Educational objectives	source
• Audio file with book (CD)	• To develop reading skills	the ministry of education
• Animation	• Develop reading skills: Understanding questions, right and wrong. • Developing writing skills: Write Persian language book knowledge and book spelling and composition exercises	Tutorial CD Www.roshd.ir
• Audio file (Recorded spelling file by teacher)	• Strengthen spelling • Evaluation of students' writing	Teacher

In the end, the researcher measured motivation with an academic motivation questionnaire. Then, data were analyzed by SPSS.

Results and Discussion

After collecting data, descriptive and inferential statistics were used. For descriptive statistics, mean & standard deviation was calculated. Statistical analysis of covariance was used to analyze the meaningful difference between the two groups. Table (2) shows the pre-test and post-test scores of academic motivations by groups.

Table 2. Descriptive statistics indices for assessing the two groups of tests and controls in the academic motivation

	Stage	group	Average	The standard deviation	Number
Academic motivation	Pre-test	Control	95.42	1.4	14
	Post-test	Test	95.7	1.3	14
	Pre-test	Control	103.57	1.90	14
	Post-test	Test	108.71	2.0	14
Marginal means		Control	103.41		
		Test	108.78		

Based on the results, the mean scores of the educational motivation in the experimental group increased from 95.07 (SD = 1.3) in the pre-test to 108.71 (SD = 2.3) in the post-test. Similarly, in the control group, the mean of 95.42 (SD = 1.4) in the pre-test increased to 103.53 (SD = 2.3) in the post-test.

Hypothesis

Blended learning improves the student's academic motivation in multi-grade classes.

To analysis the data, covariance analysis used. Before analyzing, some assumptions of covariance examined. To evaluate the distribution of data normality, Skewness and Kurtosis were calculated, which for pre-test was -.5 and -1.03 for post-test -.59 and 0.1. Since they are in the range (+2 and -2), they are likely to have a normal distribution. Using the Levine test, the hypothesis of homogeneity of variances was investigated. Levin's statistic for the pre-test is 0.01 at a significance level of 0.99, and for the post-test, it is 0.36 at a significance level of 0.54, so this assumption is also established. Also, the (F) value of the effect of the pre-test variable is 11. 2 significant (sig<0.05), so it concluded that the correlation between the pre-test and independent variables was observed. Therefore, the assumptions of the covariance test are valid. The result of covariance analysis is shown on the table (3).

Table 3. Results of covariance analysis of combined learning on academic motivation

Source	Type III Sum of Squares	DF	Mean Square	F	Sig.	eta
Corrected Model	746.83	2	3741	7.59	0.003	0.37
Intercept	39.47	1	39.47	0.80	0.37	0.031
Pretest	561.68	1	561.68	11.42	0.002	0.31
Group	208.22	1	208.22	4.23	0.05	0.14
Error	27.12	25	49.14			
Total	317432	28				
Corrected Total	1975.43	27				

The results show that there is a difference between the academic motivation scores of the experimental group and the control group ($p \leq 0.05$, $f_{(25.1)} = 4.23$). Squared Eta is 0.37, ($p < 0.05$, $\eta^2 = 37\%$). So, 37% of the variance in academic motivation scores is relevant to group membership. Also, by assessing the marginal means of the moderated educational motivation variable, it can state that the academic motivation score of the experimental group after applying the change of independent variable was more than the control group. In other words, the effect of the independent variable is significant. Therefore, the effectiveness of blended learning on academic motivation was confirmed.

The advancement of science, information, and communication technology has transformed the

world of education. To use these capabilities, the teacher must be creative in using learning models, strategies, and media to prevent students from getting tired. Blended learning is one solution to address the various educational needs throughout the world. It is one of the new ways of learning that has many advantages. In this learning model, the teacher tries to integrate two-way communication and face-to-face education with various capabilities of electronic learning and achieve higher levels of academic motivation(Rafiola et al., 2020). Color, image, visual animations, sound and movement, and other potential improve the internal students' motivation and cause strongly attracted to the learning content. The teacher's use of these blended learning capabilities increases the learners' motivation. Studies show the use of images enhanced with sounds attracts students' attention to the details of course materials and improves their performance. It also helps students to use the two hemispheres of the brain at the same time, which in turn has a direct effect on improving their academic performance and motivation. It is more flexible and helps prevent student boredom(Rafiola et al., 2020). Not only that, but it will bring a kind of novelty and strengthen the communication and interactions between teachers and students. This approach affects the interactions between the teacher and the student.

On the other hand, a blended learning model can be effective in the improvement of academic motivation. Motivation plays a very necessary role in students' academic success. It is a prerequisite for students to be engaged in learning(Sugano & Mamolo, 2021). Motivation is the first component of behavior, and the most influential agent considered as the main highways of learning(Rostaminejad et al., 2019). It is a psychological factor that plays a role in growing the spirit of learning for individuals. It has provided opportunities for independent learning, teaching styles and content design in various ways. This results agreed with the results of Rostaminejad et al. (2019). Motivation is the main issue in doing learning activities, and without it someone will not do learning activities. It attracts the learners' attention, improves students' learning, concerns them actively with content, and causes learners to act more meaningfully(Rafiola et al., 2020; Rostaminejad et al., 2019). When the learner has high educational stimulation, he is encouraged to achieve higher academic success with better results and more favorable performance. Motivated students have more energy and power. therefore, they act differently and creatively(Francis, 2017). This results are in line with the results of (Islam et al.(2018), Sugano & Mamolo (2021).

Also, the social presence of the teacher in the classroom environment and the use of blended learning motivates the students to raise their questions, and while actively and dynamically participating in the learning process, ambiguous issues become clear to them(Garrison & Kanuka, 2004; A. Y. Ibrahim, 2019; Oweis, 2018; Puspitasari, 2012). The results of the present study are in line with the results of Owise (2018), Francis (2017) and Sugano & Mamolo (2021). In these studies, the effect of combined learning refers to improving the motivation level of students and its impact on academic achievement. Students who actively participate and are highly motivated in education will learn effectively and have higher academic performance(Francis, 2017).
The blended approach will help teachers by creating an attractive and stimulating learning environment to manage multi-grade classes, save teaching time, improve students' motivation level, make diversity in content presentation, evaluate the learning and academic performance of learners and their attainment of educational goals which are in line with the results of Oweis (2018), (Rafiola et al.(2020). So, teachers must be attentive to the type of teaching method because motivated students will have better academic performance, more interactions, and more cooperation with other students to achieve their educational goals and will avoid poor results themselves(Islam et al., 2018). Also, open communication, active and meaningful practice, appropriate conditions, and novelty are among the most substantial factors influencing students' academic motivation(Islam et al., 2018)

Conclusion and suggestions

Motivation is a vital element because it relates to students' academic performance. This study investigates the effectiveness of blended learning on students' academic motivation in multi-grade classes. In the current study, Students' academic motivation in multi-grade classes (Blended learning method) is compared with Students' academic motivation (the conventional way). The results showed that academic motivation scores in the experimental group were more than the control group.in other words, the group trained with the blended learning method has better grades in academic motivation.

One of the limitations of the current research is the non-cooperation of colleagues in multi-grade schools due to many grades, sometimes the number of students and educational materials, which sometimes puts severe pressure on the administrators. Providing hardware facilities for independent variable intervention was also one of the other limitations of the current research. It recommended holding blended training courses for teachers to use the capacity of blended learning to eliminate the shortcomings of education during the Corona era. It suggested conducting new research in the domain of blended learning according to the experience of virtual education during the corona pandemic.

Ethical considerations

In conducting and implementing the current research, the principles of professional ethics related to the study have been observed.

Sponsor

This study has not any sponsor. All the costs have been provided by the authors.

Conflict of interest

According to the authors' statements, this article has no conflict of interest. It has not been published before in any domestic or foreign publication, and it has been sent to the Iranian journal of distance education only for review and publication.
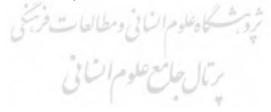
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