



The Effectiveness of Flipped Classroom Technique in Promoting Academic Motivation and Self-Efficacy among Students

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Abstract

A flipped classroom, as one of the participatory learning techniques, is based on group dynamics and social interactions. The present study aimed to investigate the effectiveness of the flipped classroom technique in promoting academic motivation and self-efficacy among high school students. The research method was quasi-experimental with a pre-test and post-test design and a control group. The statistical population included all female high school students in Ahvaz city in the academic year 2019-2020. Using the purposive sampling method, 30 ones were selected and divided into experimental and control groups (n=15 per group). The research instrument included the Academic Motivation Questionnaire and Student Self-Efficacy Scale. The experimental group received the flipped teaching program during eight 90-minute sessions; however, the control group received the traditional teaching method. Analysis of covariance (ANCOVA) was used to analyze the data. The results indicated that there was a significant difference between the flipped and traditional teaching methods in experimental and control groups ($p < 0.0001$). The flipped classroom technique was effective in increasing academic motivation and self-efficacy among students. The study findings indicate that the flipped classroom method can be used to promote academic motivation and self-efficacy and decrease academic failure among students.

Keywords: Academic motivation, self-efficacy, flipped classroom, students

Introduction#

The undeniable significance of motivation in education has always been of concern as research studies in the field of education have recently highlighted the point that motivation is one of the major factors in promoting students' performance (Albrecht & Karabenick, 2018). Motivation is considered as the driving force of individuals' activities or intrinsic states directing behaviors toward a specific goal (Shamsnezhad, Hosseinasab, & Livarjani, 2020; Jones, Byrnes, & Jones, 2019). The term also refers to a process throughout which a person's operation is aroused and maintained until the ultimate goal is reached (Wu, 2019). In this regard, academic motivation in educational settings represents behaviors resulting in learning and

progress among learners. In other words, such motivation represents the learner's desire to do works appropriately, and this individual self-evaluates his/her performance. This thus leads to further learning and progress among learners (Urdan & Bruchmann, 2018). The most common theory in the field of academic motivation is the self-determination theory proposed by Ryan and Deci (2000). According to these researchers, academic motivation is associated with the learner's desire to be involved in learning activities and continuous effort in performing and completing the concerned activity. Considering different types of motivations in individuals about the interaction of these needs with environmental conditions, they introduced three types of motivations: (1) Intrinsic motivation, a stimulus created only for inner pleasure and satisfaction

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and existing during the stages of pursuing and completing a concerning activity; (2) Extrinsic motivation, a stimulus that is only the means to achieve other goals, resulting in no sense of belonging; and (3) Motiveless refers to the lack of desire to pursue an activity or goal, which is aroused by successive failures in achieving the concerned goals (Chon & Shin, 2019). In general, academic motivation is associated with an individual's attitudes, specific goals, and methods to reach individuals' specific goals and beliefs (Jafarkhani, Manzari Tavakoli, Manzari Tavakoli, & Razavi, 2019; Mantasiah & Yusri, 2018).

Academic motivation may promote academic self-efficacy among students, which refers to confidence in accomplishing academic tasks such as reading a book, answering questions in a class, and being prepared for an exam (Hakimi et al., 2019). The high levels of academic self-efficacy lead to higher mean scores and consistency in accomplishing assignments. Accordingly, students with higher levels of academic self-efficacy experience better academic adjustment, adopt more useful learning techniques and have better performance (Drago, Rheinheimer, & Detweiler, 2018; Jahan & Mehrafzoon, 2019). Bandura (2006), regards self-efficacy as the most important and the most effective factor in explaining behaviors. Self-efficacy plays a more remarkable role in individuals' motivation and behavior, in comparison to the other factors. In this regard, individuals with a strong belief in their abilities do their best and insist on doing their tasks. In contrast, the ones who are not sure about their abilities give up their tasks. Accordingly, self-efficacy is considered a driving force in individuals (Ahmadi, Ashrafi, Seyed Fatemi, & Haghani, 2018).

Self-efficacy is one of the techniques used by researchers to conceptualize students' motivation and beliefs about their abilities to do their assignments. During the last two decades, self-efficacy has emerged as a key motivational behavior in human behavior research (Hassankhani, Mohajjel Aghdam, Rahmani, & Mohammadpoorfard, 2015). Self-efficacy beliefs determine the extent to which individuals spare their efforts for their activities and tolerate obstacles. Self-efficacy highly affects individuals' behaviors. A student with a low level of self-efficacy may not even prepare himself/herself for an exam or entrance exam since he/she assumes this to be nonsense regardless of how hard he/she tries (Honicke & Broadbent, 2016). In contrast, a person with a high level of self-efficacy is more hopeful and successful in doing tasks. In other words, learning is decreased by low self-efficacy and increased by high levels of self-efficacy (Ghasemizad, Mohammadkhani, & Saadatrad, 2019; Meral, Colak, & Zereyak, 2012). Studies has revealed that students' self-efficacy promotes their academic performance (Hayat,

Shateri, Amini, & Shokrpour, 2020; Kord, 2018). Cross et al. (2019) showed that self-efficacy was one of the factors promoting academic performance in adolescents. In another study, Topcu and Leana-Tascilar (2018) reported that self-efficacy was directly correlated with the level of motivation, academic performance, and academic achievement among Turkish students.

Teachers adopt different teaching methods to promote academic motivation and self-efficacy in students. During the past decades, educational standards have focused on the potential value of inclusive learning contexts where learners are actively involved in high-level learning activities and use inclusive methods such as problem-solving in small groups, self-assessment, peer review, and group discussion in classrooms (Steen-Utheim & Foldnes, 2018). Nowadays, one of the most common inclusive methods is the flipped classroom (O'Flaherty & Phillips, 2015). This technique was first used in higher education as a pedagogical strategy and then developed significantly in schools and high schools (Long, Cummins, & Waugh, 2017). This instructional technique was first proposed by Novak and Patterson (2010), and included the combination of a collaborative classroom with online learning materials and activities to help teachers understand inclusive needs, provide timely feedback, and plan lessons to meet their students' needs (McGee, Stokes, & Nadolsky, 2016).

Using this technique, the teacher provides the lesson content to the learners before attending the class. Learners learn instructional content, including written material, instructional videos, instructional slides, audio files, etc., in a place other than the instructional environment (e.g., home) as such classroom instructions are replaced with these activities. This is why it is called a flipped classroom (Long et al., 2017). This type of training consists of two parts: classroom interaction and communication learning and computer-assisted learning outside the classroom. Accordingly, flipped classroom technique is a combination of traditional and modern teaching techniques, both of which play an effective role in achieving learning goals (Chan, Lam, & Ng, 2020). One of the advantages of this technique is the provision of the grounds for individual learning, access to information at any time and place, repeated observation based on reading speed (Yilmaz, 2017), learning control, the adjustment of reading speed, the selection of study time and place, and continuous access to content (Albert & Beatty, 2014; Evseeva & Solozhenko, 2015). A large number of studies on the effectiveness of flipped classroom technique have reported increased academic self-efficacy and learning in mathematics students (Nazaripour & Laie, 2020), promoted creativity and academic motivation (Amani Saribaglou, Vahedi, Fathi Azar, Abidi, 2019), enhanced academic motivation and

learning in computer courses (Joshaghan Nejhad & Bagheri, 2018), nurtured metacognitive skills and academic motivation (Vahidi & Poushaneh, 2018), promoted self-efficacy beliefs and intrinsic motivation (Thai, De Wever, & Valcke, 2017), improved self-efficacy, academic skills, and creativity (Morton & Colbert- Getz, 2017), and promoted self-regulation and self-efficacy (Sun, Wu, & Lee, 2017).

A majority of researchers believe that traditional educational methods do not promote students' creativity and also prevent their progress in this regard (Pang, 2015; Gregory, Hardiman, Yarmolinskaya, Rinne, & Limb, 2013). Accordingly, given that many studies have revealed that the lack of academic motivation and lack of self-efficacy seriously interrupt individuals' development and academic achievements, and given that adolescence and the youth seem to be the most vulnerable groups, we should look for new scientific theories and solutions to promote academic motivation and self-efficacy. Accordingly, the present study sought to examine the effectiveness of the flipped classroom technique in promoting academic motivation and self-efficacy among female high school students. In general, the main objective of this study was to investigate the effectiveness of the flipped classroom technique in promoting academic motivation and self-efficacy among female students.

Methods

The research method was quasi-experimental with a pre-test and post-test design and a control group.

Participants

The statistical population included all female high school students in Ahvaz city in the academic year 2019-2020. Using the purposive sampling method, 30 ones were selected and divided into experimental and control groups (n=15 per group). Among the girls' high schools in Ahvaz city, one school was randomly selected, and among the teachers who volunteered to participate in the research, two teachers were selected and randomly placed in the experimental and control group. Inclusion criteria were being the students of each class at the same level in terms of education, no major disruption in terms of educational status among participants, having proper IQ, lack of severe physical or mental problems, and having written consent from parents. Exclusion criteria were having physical and mental problems and the absence of more than two sessions in class. At the end of the training sessions, the experimental and control groups underwent a post-test in the same conditions. To observe the ethical principles, the participants were informed of the research goals and their procedures.

Also, the researchers received written consent for participation in the research from the participants.

Instruments

Academic Motivation Questionnaire: Harter's (1981) Standard Academic Motivation Questionnaire contains 33 items and is to assess academic motivation among students. The questionnaire measures academic motivation using bipolar questions, one end of which is intrinsic motivation and the other end of which is extrinsic motivation as such the respondents' answer to each question exclusively consists of either an external or an internal reason. The questionnaire is scored based on a five-point Likert scale (1: never; 2: rarely; 3: sometimes; 4: often; and 5: always). The upper and lower bounds of this test are 33 to 165, respectively. The scores 33-66, 66-99, and >99 represent low, medium, and high levels of academic motivation, respectively. In a study, Bahrani (2009) reported a Cronbach's Alpha coefficient of 0.85 for the reliability of this questionnaire. In the current study, the Cronbach's Alpha coefficient for the entire questionnaire was obtained as 0.85.

Student Self-Efficacy Scale: Morgan-Jinks' (1999) Student Self-Efficacy Scale consists of 30 questions and three subscales of talent, effort, and texture. The scale is scored based on a four-point Likert scale (1= strongly disagree, 2= disagree, 3= agree, and 4= strongly agree). Jinks and Morgan, (1999) reported the reliability of this scale equal to 0.82 based on Cronbach's alpha coefficient. Bandak (2015) reported Cronbach's alpha of 0.85 for the scale that indicates the good reliability of the inventory. In the current study, Cronbach's alpha was 0.83 for the scale.

Procedure

Flipped Classroom Technique: Using this technique, before the class starts, the teacher prepared resources and materials, including instructional videos of instructional concepts, pamphlets, Internet blogs, and a virtual group (all students in the class joined the virtual group so that they had access to their teacher at any time and any place to ask questions and solve their problems). Students received instructions for each session beforehand and learned concepts outside the classroom. Later when they participated in the classroom, the classroom environment was just a problem-solving and practice space. Students also determined some projects and performed and presented them in the classroom. This technique was adopted during eight sessions in accordance with the table of contents in the mathematics book. Table 1 presents summary of sessions.

Table 1.*Summary of Flipped Classroom Sessions*

| Session | Content |
|----------------|---|
| First | Online teaching, including sending educational videos and images related to the lesson topics in the class group in WhatsApp and Shad applications. |
| Second | Evaluate the topics of the previous session and answer students' questions, conduct brainstorming discussions. |
| Third | Online teaching, using educational clips and pictures in teaching. |
| Fourth | Send short and attractive educational videos. Encourage students to ask questions related to the topics |
| Fifth | Perform assigned tasks, questions and answers, provide functional assignments. |
| Sixth | Online teaching, sending short texts with pictures. |
| Seventh | Online teaching, sending pictures and presenting practical problem |
| Eighth | Evaluation of the topics of the previous sessions, presenting the students' reports about solving the assignments, and final review of the reports and feedback of the previous sessions. |

Statistical Analyses

Data were analyzed by descriptive and inferential statistics such as mean, standard deviation, analysis of covariance (ANCOVA). The Kolmogorov-Smirnov test was used to examine the normality of distribution of pre-test and post-test; and the Levene's test was utilized to investigate the equality of variances. SPSS version 24.0 was used to analyze the data. The significance level of the research was considered to be $\alpha=0.05$.

Findings

The mean age and standard deviation (SD) of participants were 15.33 ± 3.18 years. Table 2 presents

the mean and standard deviation of the pre-test and post-test scores of academic motivation and self-efficacy for the experimental and control groups. The mean pre-test scores of academic motivation and self-efficacy for the experimental group were 67.55 ± 9.03 and 60.40 ± 9.11 respectively. The mean post-test score of academic motivation for the experimental group was 105.00 ± 19.81 , which increased compared to the post-test (71.40 ± 10.59) of the control group. Also, the mean post-test score of the self-efficacy for the experimental group was 86.15 ± 17.48 , which increased compared to the post-test (63.65 ± 8.61) of the control group.

Table 2.*Mean and Standard Deviation of the Variables in Experimental and Control Groups in Pre-test and Post-Test*

| Variables | Phase | Experimental group | Control group |
|---------------------|-----------|--------------------|-------------------|
| | | M \pm SD | M \pm SD |
| Academic motivation | Pre-test | 67.55 \pm 9.03 | 69.10 \pm 9.23 |
| | Post-test | 105.00 \pm 19.81 | 71.40 \pm 10.59 |
| Self-efficacy | Pre-test | 60.40 \pm 9.11 | 61.55 \pm 8.36 |
| | Post-test | 86.15 \pm 17.48 | 63.65 \pm 8.61 |

Before analyzing the data to test the research hypotheses, the underlying assumptions of covariance analysis were examined. To test the normality of the collected data with regard to the significance of Z value, Kolmogorov-Smirnov test revealed that the research variables had normal distribution (academic motivation: $Z = 0.750$; $P = 0.341$ and academic self-efficacy: $Z = 0.583$; $P = 0.467$). To test the homogeneity of variances (for the same variances of the experimental and control groups), Levene's test was used, and Box test results were obtained ($p = 0.475$, $F = 0.652$ and $\text{Box's} = 5.307$) for academic motivation ($F = 0.672$ and $P = 0.296$) and academic self-efficacy ($F = 0.807$ and $P = 0.367$). The

analysis of variance was also used to examine the homogeneity of the regression line slope for academic motivation ($F = 0.620$ and $P = 0.544$) and academic self-efficacy ($F = 0.782$ and $P = 0.465$). To compare the experimental and control groups with regard to the post-test scores, after controlling the effect of pre-tests, ANCOVA was used to examine the effect of flipped classroom intervention on motivation and academic self-efficacy among female students. Table 3 presents the result of Levene's test on the assumption of equality of variances in the scores of the variables in the three groups.

Table 3.*Levene's Test Results on the Assumption of Equality of Variances in the Scores of the Variables in the Three Groups*

| Variables | F | df1 | df2 | p |
|---------------------|-------|-----|-----|-------|
| Academic motivation | 0.672 | 2 | 42 | 0.296 |
| Self-efficacy | 0.807 | 2 | 42 | 0.367 |

The F-ratio of univariate ANCOVA for the dependent variables indicated a significant difference

between the two groups in terms of motivation and academic self-efficacy (Table 4).

Table 4.*The Results of Univariate ANCOVA for Post-test Scores of the Dependent Variables.*

| Dependent variables | SS | df | MS | F | p | Partial η^2 |
|---------------------|-----------|----|-----------|--------|--------|------------------|
| Academic motivation | 12464.792 | 1 | 12464.792 | 91.706 | 0.0001 | 0.761 |
| Self-efficacy | 5297.502 | 1 | 5297.502 | 27.780 | 0.0001 | 0.612 |

Discussion and Conclusion

The present study aimed to investigate the effectiveness of the flipped classroom technique in promoting academic motivation and self-efficacy among high school students. According to the findings, the flipped classroom technique was effective in promoting academic motivation and self-efficacy. The first finding revealed that the flipped classroom technique was effective in promoting academic motivation. This finding is consistent with the research results of Joshaghan Nejjhad and Bagheri, (2018), Vahidi and Poushaneh, (2018), and Thai et al. (2017). In this regard, a majority of experts consider the role of teaching technique and the prevailing educational atmosphere in the classroom as a critical and effective factor in nurturing these talents. The flipped classroom is an instructional and learning approach, which changes the traditional classroom in the first place. In other words, activities that were traditionally performed inside the classroom are now conducted outside the classroom, and this is in contrast with traditional teaching methods. In the flipped classroom technique, teachers convert the learning space of large groups into an individual learning space using several technologies. The growth of online educational resources, in terms of the popularity and prevalence of technology in daily life, makes students be inclined to the flipped classroom technique (Vahidi & Poushaneh, 2018).

In this approach, sometimes referred to as an inverted classroom, the reversal of activities that are traditionally done outside the classroom occurs with things that are traditionally done in the classroom. A flipped classroom technique is a teaching-learning approach that changes the traditional classroom in the first place. In other words, activities that were traditionally done inside the classroom are now done outside the classroom and are the opposite of the traditional way. In this regard, a series of lectures in the form of audio, images, and videos are presented by the teacher (Thai et al., 2017). The flipped

classroom technique is considered an important factor and source in promoting students' academic motivation and learning due to its diversity and attractiveness for students. In other words, the more active the learner is, the better learning is, and thus the higher the student's motivation and academic achievements will be.

According to the findings, the flipped classroom technique is effective in promoting academic self-efficacy among female students. This finding is consistent with the research results of Nazaripour and Laie, (2020), Thai et al. (2017), Morton and Colbert-Getz, (2017), and Sun et al. (2017). In this regard, it can be acknowledged that one of the effective methods in teaching various concepts to students is to use active teaching methods. In other words, teaching methods provide teachers with tools, by careful and rational selection of which they can present various educational concepts (Thai et al., 2017). In general, the flipped classroom technique has an educational and constructive aspect. In some cases, the child's use of special tools having their own appeal and also activating him by using flipped classroom technique is of a greater value than reading a book (Nazaripour & Laie, 2020). During the flipped classroom, students use active learning strategies such as discussion about current topics, case studies, case analysis, concept map development, problem-solving, short lectures, and small group discussions. This approach allows teachers to engage learners at a higher level of Bloom's cognitive classification, including application, analysis, and combination (Lento, 2016). During this process, students, especially when using educational software, have access to new mental concepts and achieve more and better skills. Using these tools, they gain valuable experiences, and learning materials are learned with no pressure and willingly. Regarding its nature, this method employs students' different senses and makes the lesson diverse and appealing for them; hence, it seems to improve students' self-efficacy (Sun et al., 2017).

The statistical population of the study encompassed female high school students in Ahvaz; thus, there should be caution in generalizing the findings to students in other grades, students in other cities, and male students. Accordingly, similar studies are suggested to examine students from other grades, other cities, and another gender and to compare the study findings. Teachers should also offer more opportunities for students to learn by providing the appropriate grounds for motivation and academic self-efficacy and a more appropriate learning environment for them to achieve this goal. Furthermore, with the advent of information and communication technology in the field of education, the flipped classroom technique became more highlighted, however, this method is not well known to Iranian teachers. Further studies are recommended to be conducted on different grades to explore the effects of this technique on various components. Moreover, the implementation of this method needs some prerequisites such as learners' access to the Internet, computers, smartphones, and so on; hence, such prerequisites need to be observed before adopting this technique.

Conflict of Interest

None to declare

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