Doi: 10.30473/IDEJ.2025.72955.1222 **ISSN:** 2588-4476

Iranian Distance Education Journal

Vol. 6, No. 2, Summer-Autumn 2024 (P 115-129), Payame Noor University

Original Article

The Effectiveness of Flipped Classrooms in Improving Online Learning Self-Efficacy and Academic Engagement

Fariba Dortaj[1], Azad Allah Karami*[2]

1. Assistant Professor, Department of Psychology and Educational Sciences, Payame Noor University, Tehran, Iran.

2. Assistant Professor, Department of educational sciences, Farhangian University, Tehran, Iran. (Corresponding author).

Received: 2024/07/22 **Accepted:** 2024/10/22

Abstract

This research aimed to determine the effectiveness of flipped classrooms in improving online learning self-efficacy and academic engagement among teacher trainees at Farhangian University. The study used a semi-experimental method with a pretest-posttest design and a control group. The statistical population consisted of all Farhangian University students during the 2023-2024 academic year. Using available sampling method, two groups of 36 teacher trainees were selected from the Shahid Modarres Campus of Farhangian University in Sanandaj. One group was randomly designated as the experimental group and the other as the control group. The experimental group participated in flipped classroom sessions, while the control group received traditional teaching methods. Data collection tools included the Online Learning Self-Efficacy Scale (OLSES) by Zimmerman & Kulikowich (2016) with a Cronbach's alpha of 0.88, and the Academic Engagement Questionnaire by Fredricks et al. (2004) with a Cronbach's alpha of 0.86. Both the face validity and content validity of the questionnaires were evaluated by a panel of experts and confirmed. The data were analyzed using SPSS (version 22), employing both descriptive and inferential statistical techniques, including multivariate and univariate analysis of covariance (ANCOVA), at a significance level of α=0.05. The results indicated significant differences between the experimental and control groups in terms of all three dimensions of Online Learning Self-Efficacy: online learning, time management, and technology use. Furthermore, the experimental group showed significantly higher levels of behavioral and motivational engagement compared to the control group, while no statistically significant difference was found in cognitive engagement between the two groups. It is thus recommended that sufficient opportunities and resources be provided for Farhangian University instructors to implement this approach effectively and maximize the use of modern technologies

Keywords

Flipped classroom, Online Learning Self-Efficacy, Academic engagement, Farhangian University.

Introduction

The rapid advancements in technology over the past decades have made significant changes in the way of distribution and access to information. Internet tools have become one of the most common and efficient methods of access to information and have significantly affected educational systems, as well as teaching and learning processes (Mukul & Büyüközkan, 2023). In particular, the expansion of Internet technologies has not only supported the development of distance learning but has also facilitated the emergence of comprehensive online learning platforms (Bawa, 2016).

In this regard, numerous studies have examined the effectiveness of these approaches to fulfill

*Corresponding Author: A.Allahkarami@cfu.ac.ir

emerging learning needs (Koreneva et al., 2023). The increasing use of online education in recent years has gained significant attention due to its offering diverse resources and innovative learning opportunities. Nevertheless, succeeding in an online learning environment requires special skills that may be challenging for some learners (Barrot, Llenares & Del Rosario, 2022). Additionally, the adverse effects of online education, on academic self-efficacy, learner interactions, and commitment levels have been examined (Coso-Calabuig et al., 2018; So et al., 2012). According to studies, learners in virtual settings often experience lower self-efficacy which can result in lower motivation and academic performance, and higher dropout (Tran, 2022). Given the importance of modern technology in education and the growing need for web-based platforms, educational institutions must embrace this space. Consequently, experts are striving to mitigate the potential drawbacks of this approach by leveraging online education and modern technologies.

While in-person classrooms face limitations in fully presenting topics and addressing all students' questions, offering learners access to remote educational content—combined with teaching time management and technological skills—can greatly enhance their academic success. This approach allows classrooms to focus on resolving questions and uncertainties. The capacity to master or struggle with such skills can be understood primarily through psychological variables (Yavuzalp & Bahcivan, 2020). Alivernini & Lucidi (2011) argue that in such contexts, self-efficacy strongly predicts academic success and facilitates adaptation to learning environments and maximizing potential. In fact, self-efficacy is an important psychological factor that can change learners' perceptions of their academic settings. The concept of general self-efficacy was first introduced by Bandura within his social cognitive theory framework. This concept refers to an individual's belief in their ability to achieve success in specific situations or accomplish particular tasks (Bandura, 2012). This belief plays a role in an individual's emotions, thoughts, and actions in various situations and significantly affects their performance when facing goals, tasks, or challenges. Self-efficacy also refers to confidence in the ability to control motivation, behavior, and social settings and, as a cognitive self-assessment, can affect all human experiences. Strengthening this belief can change behavioral models and help achieve goals. Research in education highlights self-efficacy's positive effects on learners' motivation, participation, and academic progress (Margahi et al., 2018) and it is regarded as a key to enhancing learner motivation. Therefore, self-efficacy is significantly important in achieving teaching and learning outcomes. Individuals with higher self-efficacy levels are typically more intrinsically motivated (Schunk & Pajares, 2010), set more ambitious goals (Paciello et al., 2016), and remain more committed to their objectives (Dogan, 2015). Additionally, self-efficacy is widely acknowledged as a core cause of motivation and plays a significant role in learners' engagement.

Numerous studies have indicated a strong correlation between academic self-efficacy and academic performance. For example, Honicke and Broadbent (2016) reported effort regulation, deep learning strategies, and goal orientation as factors that mediated the relationship between self-efficacy and academic achievement. Sit et al. (2005) warned that poorly implemented online learning could result in negative learner experiences, as limited human interaction in these settings may prevent the creation of mutual support and constructive discussions. Zimmerman & Kulikowich (2016) emphasized that completing an online course could strengthen learners' confidence in performing virtual tasks but learners without any prior online learning experience might not have high levels of self-efficacy. Given the importance of prior experiences in strengthening self-efficacy, this study examines the effect of flipped classrooms on online learning self-efficacy. It hypothesizes that in-person interactions within the classroom can increase the likelihood of success and create positive experiences, thereby increasing online learning self-efficacy. Online learning self-efficacy is a new concept related to learners' beliefs about their ability to engage in online education. It refers to individuals' assessments of their capabilities in using online learning tools, such as computers, the internet, and web-based educational tools (Lee & Mendlinger, 2011). Studies have found that online learning self-efficacy

plays a key role in the success of computer-based education (Shen et al., 2013) and is considered a major factor in successful online learning experiences (Albelbisi & Yusop, 2019). Zimmerman & Kulikowich (2016) also emphasized that learners with higher online learning self-efficacy were more likely to become efficient learners in blended and online environments. They argued that individuals planning to enroll in online programs could evaluate their self-efficacy to better understand their preparedness and confidence levels. Such evaluations provide valuable insights into learners' current perceptions of online education. Consequently, instructors can design online programs according to learners' interests and abilities. Moreover, these evaluations help identify learners' strengths and weaknesses, enabling educational institutions and educators to focus on fields that require greater attention and support.

Zimmerman & Kulikowich (2016) identified three dimensions of online learning self-efficacy: (1) Online learning self-efficacy: It evaluates learners' confidence and capability to communicate effectively with instructors, peers, and technical support in virtual environments. It also assesses their ability to engage in independent and collaborative learning without requiring physical presence. This dimension is similar to the concept of "social presence" in online self-regulated learning frameworks, and its importance depends on communication quality and quantity, and collaboration. (2) Technology use: It refers to the evaluation of learners' confidence and ability to use various technological tools for online learning, such as conducting internet searches or managing educational platforms. This dimension also measures their skill in resolving technical issues and adapting to new technologies, which significantly affects their interaction and performance in online learning settings. (3) Time management: It reflects learners' confidence and ability to effectively manage their time to complete assignments and adhere to deadlines. It also includes balancing academic responsibilities with personal obligations and plays a vital role in promoting self-discipline and maintaining motivation in online learning (Panergayo & Mansujeto, 2022). Self-efficacy, or the belief in one's ability to succeed, plays a crucial role in how students approach and engage with the learning process. When individuals are confident in their capacity to perform academic tasks successfully, they are more likely to take on challenges and persist through difficulties that in turn enhance their academic engagement. Academic engagement refers to emotional, cognitive, and behavioral participation in the learning process and directly affects academic performance. Studies indicate that self-efficacy not only directly affects engagement but also indirectly fosters it by encouraging behaviors such as perseverance, goal-setting, and resilience. This dynamic relationship creates a positive feedback loop where increased engagement strengthens self-efficacy, which further boosts participation in learning activities (Shao & Kang, 2022). Academic engagement reflects students' intrinsic motivation in a supportive educational environment. In higher education, it is a significant predictor of academic achievement and learning outcomes. However, a persistent challenge in higher education systems is students' lack of interest and engagement, which often leads to academic failure and burnout, particularly among undergraduate students (Eslami et al., 2016). Fredricks et al. (2004) classified academic engagement into three main dimensions: Emotional engagement which relates to students' positive or negative feelings toward teachers, peers, educational staff, and the school environment; Behavioral engagement which involves active participation in academic and extracurricular activities; and Cognitive engagement which focuses on the intellectual effort and mental involvement in learning. The researchers also emphasized that the level and type of engagement depend on both the learner and the educational content and arise from interactions between the individual and their educational environment. In this regard, Harrington, Oliver, and Reeves (2003) argue that educational environments designed to strengthen self-efficacy can significantly enhance student engagement. This indicates the importance of designing learning settings that not only build individual skills but also improve motivation and active involvement in learning.

Unpleasant experiences in fully online courses can negatively affect students' self-efficacy and

academic engagement. Research highlights that challenges such as inadequate interactions, technical difficulties, or unclear instructions can diminish students' confidence in their abilities (self-efficacy) and reduce their active participation in academic activities (academic engagement) (Gok et al., 2021; Hong & Wang, 2023). Therefore, it is essential to adopt approaches that leverage modern technology while addressing these challenges in fully online courses. The flipped classroom model has been taken into consideration in recent years, particularly within blended learning frameworks. Flipped classroom instructional designs have become increasingly popular among educators and researchers in higher education (Dusengimana, Munyemana & Mugabe, 2023; Bristol, 2014; McLaughlin et al., 2014). This approach reorganizes educational activities by delivering preparatory materials and assignments through online platforms before in-person sessions. Different models of flipped learning can be tailored to meet learners' needs and fit the classroom context. El Miedany (2019) classified flipped classroom models into standard flipped classrooms, discussion-focused flipped classrooms, demonstration-based flipped classrooms, quasi-flipped classrooms, group-based flipped classrooms, virtual flipped classrooms, and teacher-flipped models. This focused on learners' perceptions of the virtual flipped classroom model, in which content and lecture videos were shared with students, and their activities were collected asynchronously via a learning management system. The findings of research by Moafian et al. (2014), which compared nursing students' learning and self-efficacy through blended and traditional teaching methods, indicated that the blended learning group achieved higher self-efficacy scores. Similarly, Aftabsavar and Mahmouei Momeni (2014) found that the blended learning approach positively affected learners' self-efficacy.

In flipped classrooms, fundamental cognitive skills and essential knowledge are acquired by learners before class, typically through video lessons or web-based materials (Missildine et al., 2013). This approach provides opportunities for deeper discussions and hands-on practice during classroom sessions, fostering more meaningful learning. Studies indicate that this teaching method enhances learner participation (Connell et al., 2016), enriches the overall learning experience (Chiang, 2017), strengthens problem-solving abilities (Morin et al., 2013), and helps students develop advanced cognitive skills (Lai & Hwang, 2016). Along with content interaction, the engagement of learners with their peers and instructors plays a crucial role in the learning process (Battalio, 2007). A lack of face-to-face interaction in distance education settings can lead to learner frustration (Xu & Jaggars, 2013). Initially, the quality of these interactions was often overlooked in e-learning but flipped classrooms, by promoting student-teacher and peer interactions during in-class activities, address this gap and enhance the learning quality. Research suggests that interactive environments significantly improve learner satisfaction and motivation (Holmes & Benders, 2012). Discussions of online learning frequently highlight the importance of factors such as self-efficacy, motivation, learner autonomy, and self-regulation (Chuang, Weng & Chen, 2018; Hsieh, Wu & Marek, 2017). In flipped classrooms, self-efficacy acts as both an initial catalyst and an eventual outcome and plays a key role in the dynamic of flipped learning settings (Chiu, 2022).

Furthermore, developing high-quality instructional materials for flipped classrooms can increase costs (Cheng et al., 2019). For example, creating a 10-minute instructional video may take two to three hours of preparation by the instructor (Altaii et al., 2017). Other challenges include the need for advanced computer systems and reliable internet, difficulties in verifying whether students watch the course videos[1], the inability of students to ask questions during video lessons, the absence of immediate feedback for misconceptions, and a potential decline in the perceived value of in-class sessions by some learners (Bergmann & Sams, 2012; Enfield, 2013). O'Flaherty & Phillips (2015) point out that these challenges discourage some educators from adopting this model in their teaching.

1 .In the present study, it was possible to track the viewing of educational content by students via the e-learning system of Farhangian University.

Considering the range of teacher competencies and the goals of teacher training programs, using innovative and effective methods like flipped learning can be significantly beneficial for teacher trainees. Numerous studies highlight the advantages of flipped classrooms in teacher education (Nikitova et al., 2020; Lee & Martin, 2019). Given the role of face-to-face interactions in reducing student anxiety in online learning environments and their contribution to improving self-efficacy, this study investigates the effect of flipped classrooms on two key variables: online learning self-efficacy and academic engagement among teacher trainees. It is hypothesized that providing more opportunities for interaction through this model can enhance learners' confidence and self-efficacy, ultimately leading to greater academic achievement in online settings. Therefore, the aim of the current study is to examine the impact of flipped classrooms on online learning self-efficacy and academic engagement among teacher trainees.

Research Method

This research adopted a semi-experimental method using a pretest-posttest design with a control group. The statistical population consisted of all teacher trainees at Farhangian University during the 2023-2024 academic year. Available sampling method was used due to research limitations related to the control of influential variables and administrative regulations. To eliminate bias, two groups of 36 teacher trainees from Shahid Modarres Campus, Farhangian University, Sanandaj, were randomly assigned to the experimental and control groups.

The inclusion criteria were being an enrolled teacher trainee at Farhangian University, willingness to participate, and consistent attendance in the training sessions. Exclusion criteria were defined as unwillingness to continue participation and absence from more than three sessions. Data were collected using the 22-item Online Learning Self-Efficacy Scale (OLSES) and the Academic Engagement Questionnaire developed by Fredricks et al. (2004).

The Online Learning Self-Efficacy Scale, developed by Zimmerman and Kulikowich (2016), consists of three subscales: Online Learning (with 10 items and a Cronbach's alpha of 0.90), Time Management (with 5 items and a Cronbach's alpha of 0.89), and Technology Use (with 7 items and a Cronbach's alpha of 0.86). The scale is scored using a Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree) for each item. A study by Barani et al. (2024), which evaluated this scale among high school students in Bandar Abbas, found that the overall Cronbach's alpha was 0.95, and the test-retest reliability was 0.79. In addition, Ahmadipour (2022) reported an acceptable Cronbach's alpha of 0.89 for the scale. In this study, the overall reliability of the questionnaire was 0.80. The Student Engagement Questionnaire, designed to measure academic participation, consists of 15 items structured using a 5-point Likert scale (ranging from "strongly agree" with a score of 5 to "strongly disagree" with a score of 1). The questionnaire includes three main dimensions: behavioral engagement (4 items), motivational engagement (6 items), and cognitive engagement (5 items). This design was based on the work of Fredericks et al. (2004). To assess the validity of the questionnaire, Fredericks et al. (2004) used principal component analysis with varimax rotation, with factor loadings ranging from 0.58 to 0.67. The reliability of the questionnaire was calculated using Cronbach's alpha, which was 0.86. Talebi et al. (2014) showed that the questionnaire is both valid and reliable for Iranian students and can be used to measure student engagement. Both the face validity and content validity of the questionnaires were evaluated by a panel of experts and confirmed. In this study, both the experimental and control groups received media literacy education. The experimental group followed a flipped classroom model, where media literacy content was provided through videos, articles, and interactive slides in the university's e-learning system[1]. Students were required to independently study the materials before attending class. In-class time was dedicated to group activities, interactive discussions, and practical exercises related to media literacy.

1lms.cfu.ac.ir

Students worked in small groups, guided by the instructor, to solve practical problems based on the materials they had studied. They were encouraged to ask questions and clarify any doubts during discussions. Students' participation in the e-learning system was monitored, ensuring they engaged with the content. The control group, on the other hand, was taught in a traditional lecture format, focusing primarily on content delivery and individual learning. The instructor utilized PowerPoint presentations to explain media literacy content, allowing students to ask questions. However, the primary focus remained on the transmission of information from the instructor to the students. The flipped classroom model was implemented for one academic semester (12 weeks), where media literacy content was provided through videos, articles, and interactive slides in the university's e-learning system. After completion of the study, the collected data were analyzed using SPSS 22. Furthermore, analysis of covariance (ANCOVA) was applied for hypothesis testing.

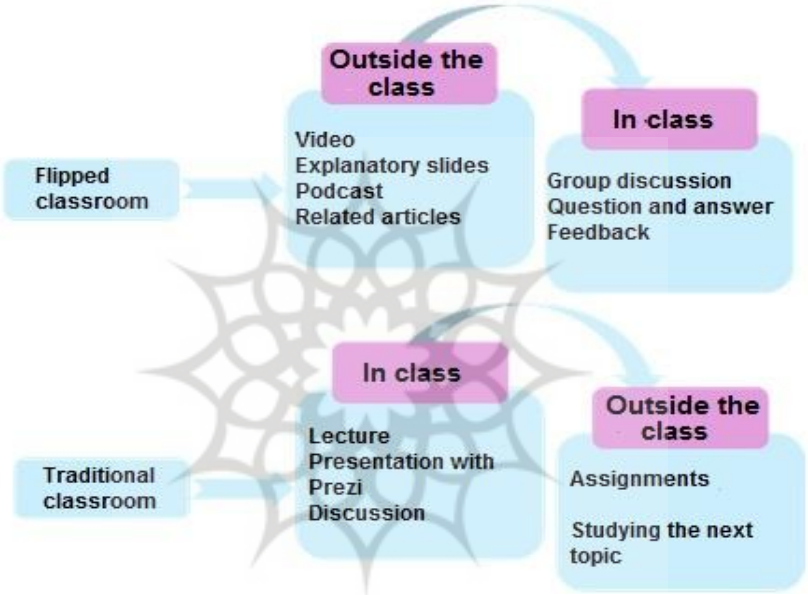

Figure 1. Diagram of the procedure

Findings

For data analysis, descriptive statistics were first used, followed by inferential statistics using multivariate and univariate analysis of covariance (ANCOVA).

Table 1. Descriptive Indices for Pre-test and Post-test Scores in Experimental (36 Participants) and Control Groups (36 Participants)

Variable	Status	Group	Mean	Standard Deviation (sd)	Kolmogorov-Smirnov Statistic	p-value
Online Learning	Pre-test	Experimental	27.92	4.01	0.126	0.7
		Control	26.61	3.3	0.14	0.87
	Post-test	Experimental	32.31	3.6	0.111	0.66
		Control	27.05	3.2	0.116	0.761
Time Management	Pre-test	Experimental	16.01	2.9	0.139	0.827
		Control	14.82	3.21	0.127	0.354
	Post-test	Experimental	18.69	4.8	0.167	0.723
		Control	14.22	4.5	0.129	0.45

Variable	Status	Group	Mean	Standard Deviation (sd)	Kolmogorov-Smirnov Statistic	p-value
Technology Use	Pre-test	Experimental	20.90	4.1	0.115	0.714
		Control	19.78	2.4	0.12	0.7
	Post-test	Experimental	25.53	2.9	0.21	0.33
		Control	23.49	3.6	0.109	0.74
Behavioral Engagement	Pre-test	Experimental	16.37	2.04	0.134	0.104
		Control	16.05	2.1	0.133	0.110
	Post-test	Experimental	18.62	2.07	0.130	0.132
		Control	16.38	2.11	0.147	0.55
Motivational Engagement	Pre-test	Experimental	19.49	1.6	0.143	0.823
		Control	19.55	1.84	0.11	0.34
	Post-test	Experimental	23.16	1.99	0.127	0.723
		Control	21.43	2.05	0.114	0.45
Cognitive Engagement	Pre-test	Experimental	16.54	2.07	0.116	0.707
		Control	18.64	2.3	0.145	0.876
	Post-test	Experimental	18.15	1.92	0.131	0.69
		Control	19.51	2.48	0.120	0.76

In this section, the results of evaluating the online learning self-efficacy of students in both experimental and control groups are analyzed using the Online Learning Self-Efficacy Scale (OLSES) and the Academic Engagement Scale. The table presents the mean, standard deviation, Kolmogorov-Smirnov test results, and significance levels for pretest and posttest scores in each component. For the experimental group, the online learning environment component showed significant progress, with the mean pretest (26.2) and posttest (40.8) scores. In terms of time management, the mean score improved from 14.3 in the pretest to 21.7 in the posttest, indicating enhanced ability among students to organize their time and plan their learning effectively. Similarly, the technology use component demonstrated growth, with scores rising from 19.5 in the pretest to 30.2 in the posttest, reflecting an improved capacity for utilizing learning technologies. The overall online learning self-efficacy score also increased substantially, climbing from 60.0 in the pretest to 92.7 in the posttest. The control group also exhibited improvements in all measured components, including the online learning environment, time management, technology use, and overall self-efficacy. However, these gains were relatively modest compared to those observed in the experimental group. Furthermore, the Kolmogorov-Smirnov test was used to examine the normality of the score distributions. In all components, the p-values were above 0.05, indicating that the data followed a normal distribution. Moreover, the Kolmogorov-Smirnov values were within acceptable limits (less than 0.10), further validating the normality of the scores. In summary, the results demonstrate the positive impact of the flipped classroom teaching method on improving the online learning self-efficacy of students in the experimental group relative to the control group.

Table 2. Results of Multivariate ANCOVA for Investigating the Effect of Teaching Method on Dependent Variables

Effect	Test	Value	F-value	P-value	Effect Size
Group	Pillai's Trace	0.97	380.06	0.001	0.975
	Wilks' Lambda	0.025	380.06	0.001	0.975
	Hotelling's Trace	38.65	380.06	0.001	0.975
	Roy's Largest Root	38.65	380.06	0.001	0.975

Multivariate analysis of covariance (MANCOVA) was used to examine the effectiveness of the flipped classroom on online learning self-efficacy and academic engagement. The results of

the test for homogeneity of regression slopes for pretest and posttest scores in the experimental and control groups indicated that the regression slopes were equal in both groups ($F=1.4$, $p>0.05$). Additionally, Levene's test, conducted to assess the homogeneity of variance for the dependent variables, confirmed that the variances of all components were homogeneous across the groups ($p>0.05$). The results of Box's M test, evaluating the equality of covariance matrices for dependent variables across the experimental and control groups, indicated that the covariance matrices were equal. Furthermore, Bartlett's test of sphericity, which examines the significance of relationships among variables, showed that these relationships were statistically significant ($\chi^2 = 30.9$, $p<0.01$). After confirming the assumptions for conducting MANCOVA, the results indicated statistically significant differences between the two groups in at least one of the variables. To further investigate which variables showed differences between the experimental and control groups, the findings are presented in Table 3.

Table 3. Results of Univariate ANCOVA for Examining the Difference between Experimental and Control Groups

Variable	Source	Sum of Squares	df	Mean Square	F	P Value	Effect Size	Test Power
Online Learning	Inter-group	258.26	1	258.26	79.65	0.001	0.53	0.97
Time Management	Inter-group	156.92	1	156.92	201.75	0.001	0.745	0.97
Technology Use	Inter-group	11.956	1	11.956	63.03	0.001	0.47	0.84
Behavioral Engagement	Inter-group	71.526	1	71.526	18.93	0.001	0.215	0.99
Motivational Engagement	Inter-group	53.56	1	53.56	13.017	0.001	0.159	0.945
Cognitive Engagement	Inter-group	0.345	1	0.345	0.101	0.751	0.01	0.061

The results indicate a statistically significant difference between the two groups in the online learning component ($F=12.35$, $p=0.001$). It can be concluded that the experimental group, trained by the flipped classroom method, achieved significantly higher scores compared to the control group. Similarly, a significant difference was observed in the time management component ($F=9.5$, $p=0.001$), indicating that the experimental group performed better than the control group. For the technology use component, there was also a significant difference ($F=10.3$, $p=0.001$), indicating that the experimental group demonstrated greater proficiency in this field compared to the control group. Regarding the components of academic engagement, the results showed statistically significant differences in behavioral and motivational engagement between the two groups. However, despite an increase in post-test scores in both the experimental and control groups, no significant difference was found between the two groups in cognitive engagement ($F=0.101$, $p=0.75$). In all components, the test power indicated sufficient power to identify existing differences.

Discussion and Conclusion

The present study aimed to evaluate the effectiveness of the flipped classroom on online learning self-efficacy and academic engagement among teacher trainees. The results of the ANCOVA indicated that the experimental group had a significantly better performance compared to the control group in all three components of online learning self-efficacy, namely online learning, time management, and technology use. Additionally, the experimental group demonstrated significantly higher levels of behavioral and motivational engagement compared to the control group. However, despite an increase in the post-test scores for both groups, the difference in

cognitive engagement between the two groups was not statistically significant. These findings support the positive impact of the flipped classroom method on improving online learning self-efficacy and academic engagement in teacher trainees.

The results of the first hypothesis are consistent with previous studies, including those by Bergmann & Sams (2012), Bishop & Verleger (2013), Tan et al. (2017), Cabi (2018), Bredow et al. (2021), and Dusengimana et al. (2023). This can be explained by noting that the flipped classroom approach allows learners to engage in foundational learning activities outside the classroom, thereby enabling more effective use of class time for analytical and practical tasks. This approach provides students with the opportunity to combine, analyze, apply, and evaluate knowledge within the classroom setting, leading to a deeper understanding of concepts and a more dynamic and interactive learning experience (Maxwell & Wright, 2016). In blended and flipped learning environments, the integration of face-to-face and online instruction enhances flexibility in learning time and location while facilitating diverse interactions and quick feedback (Cabi, 2018). These conditions enrich learners' experiences, increase responsibility, and boost self-efficacy, ultimately leading to greater success. The results can be further elucidated from the perspective of Bandura's self-efficacy theory. This theory emphasizes the interaction between individuals, their environment, and their behavior, highlighting the crucial role of learning experiences in shaping self-efficacy beliefs. By providing a flexible environment for self-paced study, the flipped classroom approach fosters students' confidence in their abilities, thereby enhancing online learning self-efficacy. Furthermore, rooted in the principles of social constructivism, this approach encourages collaborative learning, motivating students to actively engage in group discussions. The availability of diverse resources and the use of social networks further amplify students' learning motivation and their online self-efficacy. The flipped classroom approach also fosters self-regulatory behaviors, as students are required to pre-study course materials and prepare for in-class activities. This, in turn, strengthens their digital literacy and IT skills (Khodaei et al., 2022).

Consistent with the results of research by Rashid et al. (2020), the findings suggest that flipped classrooms empower students to take responsibility for identifying their learning needs and employing strategies to meet their learning objectives. Therefore, the first step to understanding how to manage learning is to develop personal skills. In this study, one of the reasons for the effectiveness of flipped learning lies in adhering to the standards highlighted in the meta-analysis by Van Alten et al. (2019). They argue that successful implementation of flipped classrooms needs careful design, optimal use of in-class time, and proper evaluation of student learning. In this research, flipped learning is designed as a learner-based approach according to the principles of social constructivism because, in this model, students construct their knowledge due to access to educational resources and content outside the classroom while actively engagement in group discussions and activities in the classroom. Various studies have pointed out that flipped learning strengthens the principles of social constructivism by emphasizing social interactions, group discussions, and problem-solving in class. Flipped classrooms offer more opportunities for collaborative and group interactions, where students can share their ideas and benefit from peer feedback. This process enriches their knowledge and understanding. Bergmann & Sams (2012) hold that flipped learning creates more opportunities for social interaction and collaborative learning, which are core elements of social constructivism. Furthermore, in a review of flipped learning research, Bishop & Verleger (2013) emphasize that this approach strengthens significant interactions among learners and creates a suitable space for adhering to constructivist principles.

According to the results, the flipped classroom positively affected behavioral and motivational engagement among students, aligning with prior studies such as Davis et al. (2013), Murphy (2014), Estrada et al. (2019), and Hew et al. (2021). These studies demonstrate that innovative teaching methods, particularly flipped classrooms, can enhance students' academic engagement. Given that motivational responses are a source of self-efficacy, the flipped approach creates a

positive and relatively autonomous environment for group discussions, providing a pleasant classroom atmosphere. In this environment, students feel more prepared due to their positive perception of the classroom atmosphere and can demonstrate their abilities without fear of failure by gaining the teacher's attention and completing challenging tasks. Therefore, improvements in motivation and self-efficacy are a natural outcome. Pre-class learning enables students to exercise greater control over their learning, resulting in improved performance. This method provides an opportunity to experience different types of self-learning. Additionally, access to pre-class videos and resources increases students' self-confidence and competence, while interactions and feedback during class enhance their sense of mastery and self-approval, ultimately increasing engagement and self-efficacy (O'Flaherty & Phillips, 2015; Zainuddin, Chu & Perera, 2024). The flipped classroom model provides students with the opportunity to actively engage in online learning, promoting greater independence and boosting their self-efficacy (Hew et al., 2021). By encouraging effective time management and the use of technology, this approach motivates learners to plan and organize out-of-class activities more efficiently (Bredow et al., 2021). Additionally, instructors can enhance student interaction and communication through appropriate guidance and feedback, which ultimately leads to improved learning outcomes (Landin et al., 2018). Research by Tan et al. (2017) showed that students' self-directed learning skills improved significantly in flipped environments compared to traditional classrooms. In the flipped learning model, educational videos play a central role in shaping learners' academic understanding, motivation, and behaviors, offering the chance to revisit content (Sletten, 2017). These videos help students learn more effectively by engaging with video materials before class (Lo & Hew, 2017). For flipped classroom content, it is suggested to present learning materials in brief, focused segments (under 15 minutes). When instructional materials are designed according to multimedia principles, such as capturing attention and reducing unnecessary cognitive load, they can have a positive effect on working memory. Additionally, breaking down long-term assignments into smaller, manageable tasks is crucial (Kitsantas et al., 2013) as it enables students to better recall prior knowledge and manage cognitive load more effectively. In the present study, all these principles were taken into account while designing and producing the educational content. Therefore, the expected outcome was an improvement in the experimental group's performance in online learning, time management, and the use of technology. The flipped classroom's use of out-of-class assignments helps deepen students' understanding of concepts. As Blou and Shamir-Inbal (2017) suggest, students should regularly evaluate and adjust their learning strategies as they progress through the curriculum. By offering meaningful, challenging tasks, the flipped classroom fosters greater academic engagement. When assignments in this model are relevant and valuable to students, they draw more of their attention and energy, increasing their motivation to complete the tasks. This sense of commitment leads students to persist longer and dedicate more time to their work. As a result, attention and commitment—two key components of academic engagement—are effectively enhanced in the flipped classroom (Estrada et al., 2019). The findings of this study indicated that post-test results for both the experimental and control groups showed an increase in cognitive engagement, with no significant difference between the two groups. Given the rise in post-test scores for both groups, this outcome might be linked to the importance of media literacy in fostering cognitive engagement. Media literacy assists students in better understanding and critically analyzing concepts when processing media information. Activities such as "When I read a book, I ask myself questions to make sure I understand it" or "If I don't understand what I'm reading, I reread it" represent mental actions that occur while studying and processing media content. Since both groups engaged with media literacy material, this may have led them to equally analyze and process the information, resulting in increased post-test scores. Media literacy supports students in critically engaging with media content and actively participating in the learning process. Research has demonstrated that enhancing media literacy can increase participation in the learning process, which leads to greater cognitive

engagement (Cole, 2024).

In general, the results of this study indicate that the flipped classroom can improve teacher trainees' self-efficacy and academic engagement by optimizing content delivery and activity design. Considering the importance of interaction in the flipped classroom approach, future research should focus on how this model affects interactions in online classes and examine its influence on different variables. Moreover, using Web 2.0 tools can facilitate these interactions and enhance the learning process. According to Shyr & Chen (2018), further investigation is needed to identify which aspects of flipped learning environments most contribute to self-efficacy and academic self-regulation. The use of purposive sampling in this study may limit the ability to generalize the findings to other student populations. The study focused only on male teacher trainees, and the results might not apply to female teacher trainees. Additionally, relying solely on questionnaires as a data collection method may not provide a full understanding of students' attitudes and experiences with the flipped classroom, and responses could be influenced by personal or social biases. Finally, some external factors such as students' familiarity with educational technologies or online learning environments, which could affect self-efficacy, were not fully controlled in this study.

References

[1] Aftabsavar, Davoud, Mahmouei Momeni, Hossein. (2014). The effect of integrated curriculum approach on the achievement motivation, self-efficacy, and academic achievement in mathematics of fifth-grade primary students. First National Conference on Sustainable Development in Educational Sciences and Psychology, Social and Cultural Studies, Tehran. [In persian]

[2] Ahmadipour, H. (2022). Online learning self-efficacy: A necessity for virtual education. *Journal of Education and Health Promotion*, *11*(1), 113. https://doi.org/10.4103/jehp.jehp_848_21.

[3] Albelbisi, N., & Yusop, F. (2019). Factors influencing learners' self –regulated learning skills in a massive open online course (MOOC) environment. *Turkish Online Journal of Distance Education*, *20*, 1–16. doi: 10.17718/tojde.598191.

[4] Alivernini, F., & Lucidi, F. (2011). Relationship between social context, self-efficacy, motivation, academic achievement, and intention to drop out of high school: A longitudinal study. The Journal of Educational Research, 104(4), 241-252. https://doi.org/10.1080/00220671003728062

[5] Altaii, K., Reagle, C. J., & Handley, M. K. (2017). Flipping an engineering thermodynamics course to improve student self-efficacy. In Paper presented at 2017 ASEE Annual Conference & Exposition, Columbus, Ohio. https://peer.asee.org/28368

[6] Bandura, A. (2012). "Social cognitive theory," in Handbook of Theories of Social Psychology, Vol. 1, eds P. M. Van Lange, A. W. Kruglanski, and E. Higgins (Thousand Oaks, CA: Sage Publications Ltd), 349–373.

[7] Barani, H., Mohammadi Soleimani, M. R., Amirfakhraei, A., & Wahab Samavi, S. A. (2024). Transcultural Adaptation and Psychometric Evaluation of the Online Learning Self-Efficacy Scale among High School Seniors in Bandar Abbas City. *Interdisciplinary Journal of Virtual Learning in Medical Sciences*, *15*(1), 62-75. https://doi.org/10.30476/ijvlms.2023.100230.1258.

[8] Barrot, J. S., Llenares, I. I., & Del Rosario, L. S. (2021). Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines. *Education and information technologies*, *26*(6), 7321-7338. doi: 10.1007/s10639-021-10589-x.

[9] Battalio, J. (2007). Interaction Online: A Reevaluation. *Quarterly Review of Distance Education*, *8*(4), 339-352. Retrieved November 2, 2024 from https://www.learntechlib.org/p/106666/.

[10] Bawa, P. (2016). Retention in online courses: Exploring issues and solutions—A literature review. *Sage Open*, *6*(1), https://doi.org/10.1177/2158244015621777
[11] Bergmann, J., & Sams, A. (2012). Before you flip, consider this. *Phi Delta Kappan*, *94*(2), 25-25. https://doi.org/10.1177/003172171209400206.
[12] Bishop, J., & Verleger, M. A. (2013). The flipped classroom: A survey of the research. In *2013 ASEE annual conference & exposition* (pp. 23-1200).
[13] Blau, I., & Shamir-Inbal, T. (2017). Re-designed flipped learning model in an academic course: The role of co-creation and co-regulation. Computers & Education, 115, 69–81. https:// doi. org/ 10. 1016/j. compe du. 2017. 07. 014
[14] Bredow, C. A., Roehling, P. V., Knorp, A. J., & Sweet, A. M. (2021). To flip or not to flip? A meta-analysis of the efficacy of flipped learning in higher education. *Review of educational research*, *91*(6), 878-918. https://doi.org/10.3102/0034654321101912
[15] Bristol, T. (2014). Flipping the Classroom. Teaching and Learning in Nursing, 9, 43-46. https://doi.org/10.1016/j.teln.2013.11.002
[16] Cabı, E. (2018). The Impact of the Flipped Classroom Model on Students' Academic Achievement. *The International Review of Research in Open and Distributed Learning*, *19*(3). https://doi.org/10.19173/irrodl.v19i3.3482
[17] Chiu, T. K. F. (2022). Applying the self-determination theory (SDT) to explain student engagement in online learning during the COVID-19 pandemic. Journal of Research on Technology in Education, 54(sup1), S14– S30. https://doi.org/10.1080/15391523.2021.1891998
[18] Chuang, H., Weng, C., & Chen, C. (2018). Which students benefit most from a flipped classroom approach to language learning? *British Journal of Educational Technology*, *49*, 56–68. https://doi.org/10.1111/bjet.12530
[19] Cole E (2024) Media Literacy:Empowering Critical Engagement in the Digital Age. *Global Media Journal*, 22:70
[20] Cussó-Calabuig, R., Farran, X. C., and Bosch-Capblanch, X. (2018). Effects of intensive use of computers in secondary school on gender differences in attitudes towards ICT: a systematic review. Educ. Inf. Technol. 23, 2111–2139. doi: 10.1007/s10639-018-9706-6
[21] Davies, R. S., Dean, D. L., & Ball, N. (2013). Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. *Educational Technology Research and Development*, 61(4), 563-580. https://doi.org/10.1007/s11423-013-9305-6
[22] Dogan, U. (2015). Student engagement, academic self-efficacy, and academic motivation as predictors of academic performance. The Anthropologist, 20(3), 553–561. https://doi.org/10.1080/09720073.2015. 11891759
[23] Dusengimana, C., Munyemana, J. J., & Mugabe, G. (2023). Trends in the use of Flipped Classroom Model and its Effectiveness in Higher Learning Education: A Systematic Review. *African Educational Research Journal*, *11*(4), 616-633. DOI**:** https://doi.org/10.30918/AERJ.114.23.096.
[24] El Miedany Y. (2019) Flipped Learning. In: Rheumatology Teaching. Springer, Cham. https:// doi. org/ 10. 1007/ 978-3- 319- 98213-7_ 15
[25] Enfield, J. (2013). Looking at the impact of the flipped classroom model of instruction on undergraduate multimedia students at CSUN. *TechTrends*, *57*(6), 14-27.
[26] Eslami, M., Dortaj, F., Sadipour, E., & Delavar, A. (2016). The causal modeling of academic engagement based on personal and social resources among undergraduate students at Amir Kabir University in Tehran. *Counseling Culture and Psychotherapy*, 7 (28), 133-161. doi: 10.22054/qccpc.2017.7096 [In Persian].
[27] Estrada, Á. C. M., Vera, J. G., Ruiz, G. R., & Arrebola, I. A. (2019). Flipped classroom to improve university student centered learning and academic performance. *Soc. Sci*., 8 (11),

315. https://doi.org/10.3390/socsci8110315.
[28] Fredericks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. Review of Educational Research, 74, 59 – 109.
[29] Goke, R., Berndt, M., & Rocker, K. (2021). Classroom culture when students are reluctant to learn online: Student dissent behaviors explained by their self-efficacy, control of learning, and intrinsic motivation. *Frontiers in Communication*, 6, 641956. https://doi.org/10.3389/fcomm.2021.641956
[30] Herrington, J., Oliver, R., & Reeves, T. C. (2003). Patterns of engagement in authentic online learning environments. Australian Journal of Educational Technology, 19(1), 59-71. https://doi.org/10.14742/ajet.1701
[31] Hew, K. F., Bai, S., Dawson, P., & Lo, C. K. (2021). Meta-analyses of flipped classroom studies: A review of methodology. Educational Research Review, 33, 100393. https://doi.org/10.1016/j.edurev.2021.100393
[32] Holmes, J., & Benders, D. S. (2012). Comparison between Distance Methods Versus Traditional Classroom in Teaching Intelligence Analysis. Available at SSRN 2090375
[33] Honicke, T., and Broadbent, J. (2016). The influence of academic self-efficacy on academic performance: a systematic review. Educ. Res. Rev. 17, 63–84. doi: 10.1016/j.edurev.2015.11.002
[34] Hsieh, J. S. C., Wu, W. C.,V., & Marek, M. W. (2017). Using the flipped classroom to enhance EFL learning. Computer Assisted Language Learning, 30(1–2), 1–21. https://doi.org/10.1080/09588221.2015.1111910
[35] Huang, L., & Wang, D. (2023). Teacher support, academic self-efficacy, student engagement, and academic achievement in emergency online learning. Behavioral Sciences, 13(9), 704. https://doi.org/10.3390/bs13090704
[36] Khodaei, S., Hasanvand, S., Gholami, M., Mokhayeri, Y., & Amini, M. (2022). The effect of the online flipped classroom on self-directed learning readiness and metacognitive awareness in nursing students during the COVID-19 pandemic. *BMC nursing*, *21*(1), 22. https://doi.org/10.1186/s12912-022-00804-6
[37] Kitsantas, A., Dabbagh, N., Huie, F. C., & Dass, S. (2013). Learning technologies and self-regulated learning: Implications for practice. In H. Bembenutty, T. J. Cleary, & A. Kitsantas (Eds.), Application of Self-Regulated Learning Across Diverse Disciplines: A Tribute to Barry J. Zimmerman (pp. 325–354). Information Age Publishing.
[38] Koreneva, I., Myroshnychenko, N., Mykhailenko, L., Matiash, O., & Kuzmenko, H. (2023). The Use of Innovative Technologies in Education:: analysis of effectiveness and implementation at different levels of education. *Cadernos de Educação Tecnologia e Sociedade*, *16*(3), 625-638. DOI:10.14571/brajets.v16.n3.625-638.
[39] Lee, J. W. & Mendlinger, S. (2011). Perceived self-efficacy and its effect on online learning acceptance and student satisfaction. Journal of Service Science and Management, 4(3), 243-252. doi: 10.4236/jssm.2011.43029.
[40] Lee, Y., & Martin, K. I. (2019). The flipped classroom in ESL teacher education: An example from CALL. Education and Information Technologies, 25, 2605–2633. https:// doi. org/ 10. 1007/s10639- 019- 10082-6
[41] Lo, C. K., & Hew, K. F. (2017). Using first principles of instruction to design secondary school mathematics flipped classroom: The findings of two exploratory studies. Educational Technology & Society, 20, 222–236. doi: 10.18178/ijlt.3.2.82-89
[42] Lundin, M., Rensfeldt, A. B., Hillman, T., Lantz-Andersson, A., & Peterson, L. (2018). Higher education dominance and siloed knowledge: a systematic review of flipped classroom research. *International Journal of Educational Technology in Higher Education*, *15*(1), 1-30. https://doi.org/10.1186/s41239-018-0101-6
[43] Maraghi M, Mortazavi-Tabatabaei S A, Ahmady S, Hosseini M. (2018). The relation of

educational self-efficacy and motivation among Medical Education students. 1 (2) :1-5. URL: http://jamed.ir/article-1-31-en.html

Moafian, Fatemeh, et al. (2014). The effect of blended e-learning on learning and self-efficacy of nursing students in the cardiovascular care course. Journal of Nursing Education, 3(3), 42-49. http://jne.ir/article-1-361-en.html&sw=Effect+of+Blended+Electronic+Ed. [In persian]

[45] Maxwell, K. L., & Wright, V. H. (2016). Evaluating the effectiveness of two teaching strategies to improve nursing students' knowledge, skills, and attitudes about quality improvement and patient safety. Nursing Education Perspectives, 37(5), 291-292 https:/doi.org/10.1097/01.NEP.0000000000000004

[46] McLaughlin, J. E., Roth, M. T., Glatt, D. M., Gharkholonarehe, N., Davidson, C. A., Griffin, L. M., ... & Mumper, R. J. (2014). The flipped classroom: a course redesign to foster learning and engagement in a health professions school. *Academic medicine*, *89*(2), 236-243. DOI: 10.1097/ACM.0000000000000086

[47] Mukul, E., & Büyüközkan, G. (2023). Digital transformation in education: A systematic review of education 4.0. *Technological forecasting and social change*, *194*, 122664. https://doi.org/10.1016/j.techfore.2023.122664

[48] Murphree, D. S. (2014). "Writing wasn't really stressed, accurate historical analysis was stressed": Student Perceptions of In-Class Writing in the Inverted, General Education, University History Survey Course. *History Teacher*, 47(2), 209-219. http://www.jstor.org/stable/43264223

[49] Nikitova, I., Kutova, S., Shvets, T., Pasichnyk, O., & Matsko, V. (2020). "Flipped learning" methodology in professional training of future language teachers. European Journal of Educational Research, 9(1), 19–31. https:// doi. org/ 10. 12973/ eu- jer.9. 1. 19

[50] O'Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *The internet and higher education*, *25*, 85-95. https://doi.org/10.1016/j.iheduc.2015.02.002.

[51] Paciello, M., Ghezzi, V., Tramontano, C., Barbaranelli, C., & Fida, R. (2016). Self-efficacy configurations and wellbeing in the academic context: A person-centred approach. Personality and Individual Differences, 99, 16–21. https://doi.org/ 10.1016/j.paid.2016.04.083,

[52] Panergayo, A. A. E., & Mansujeto, K. A. (2022). Assessment of self-efficacy in an online learning of teacher education students in one state university in the Philippines. *International Journal of Computing Sciences Research*, *6*, 680-693. doi: 10.25147/ijcsr.2017.001.1.65

[53] Rasheed, R. A., Kamsin, A., & Abdu, A. N. (2020). Challenges in the online component of blended learning: A systematic review. Computers & Education, 144, 103701. https://doi.org/10.1016/j.compedu.2019.103701

[54] Schunk, D. H., & Pajares, F. (2010). Self-Efficacy Beliefs. International Encyclopedia of Education, 18(3), 668–672.

[55] Shao, Y., & Kang, S. (2022). The association between peer relationship and learning engagement among adolescents: The chain mediating roles of self-efficacy and academic resilience. Frontiers in Psychology, 13, 938756. https://doi.org/10.3389/fpsyg.2022.938756

[56] Shyr, W. J., & Chen, C. H. (2018). Designing a technology-enhanced flipped learning system to facilitate students' self-regulation and performance. *Journal of Computer Assisted Learning*, *34*(1), 53–62. https:// doi. org/ 10. 1111/ jcal. 12213

[57] Sit, J., Chung, W., Chow, M., Wong, T. (2005). Experiences of online learning: Students' perspective. *Nurse Education Today*, *25*(2), 140-147. doi: 10.1016/j.nedt.2004.11.004

[58] Sletten, S. R. (2017). Investigating flipped learning: Student self-regulated learning, perceptions, and achievement in an introductory biology course. *Journal of Science Education and Technology*, *26*, 347-358. https:// doi. org/ 10. 1007/ s10956- 016- 9683-8

[59] So, H. J., Choi, H., Lim, W. Y., and Xiong, Y. (2012). Little experience with ICT: are

they really the net generation student-teachers? Comput. Educ. 59, 1234–1245. doi: 10.1016/j.compedu.2012.05.008.

[60] Talebi, S., Zare, H., Rastegar, A., & Hosein Poor, A. (2014). The Factor Structure of the Fredericks Academic Engagement Scale (Cognitive, Behavioral, and Motivational). *Journal of Research in Educational Systems*, *8*(24), 1-16. 20.1001.1.23831324.1393.8.24.1.8 [in persian].

[61] Tan, C. X., Ang, R. P., Klassen, R. M., Yeo, L. S., Wong, I. Y. F., Huan, V. S., & Chong, W. F. (2008). Correlates of academic procrastination and students' grade goals. Current Psychology, 27(2), 1046–1310. https:// doi. org/ 10. 1007/ s12144- 008- 9028-8

[62] Tran, V. D. (2022). Perceived satisfaction and effectiveness of online education during the COVID-19 pandemic: the moderating effect of academic self-efficacy. *Higher Education Pedagogies*, *7*(1), 107-129. https://doi.org/10.1080/23752696.2022.2113112.

[63] Van Alten, D. C. D., Phielix, C., Janssen, J., & Kester, L. (2019). Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. Educational Research Review, 28, 100281. https:// doi. org/ 10. 1016/j. edurev. 2019. 05. 003

[64] Xu, D., & Jaggars, S. S. (2013). The impact of online learning on students' course outcomes: Evidence from a large community and technical college system. *Economics of Education Review*, *37*, 46-57. https://doi.org/10.1016/j.econedurev.2013.08.001

[65] Yavuzalp, N., & Bahcivan, E. (2020). The online learning self-efficacy scale: Its adaptation into Turkish and interpretation according to various variables. *Turkish Online Journal of Distance Education*, *21*(1), 31-44. https://doi.org/10.17718/tojde.674388

[66] Zainuddin, Z., Chu, S. K. W., & Perera, C. J. (2024). Flipped Classroom. In *Gamification in A Flipped Classroom: Pedagogical Methods and Best Practices* (pp. 11-65). Singapore: Springer Nature Singapore.

[67] Zimmerman, W. A., & Kulikowich, J. M. (2016). Online learning self-efficacy in students with and without online learning experience. American Journal of Distance Education, 30(3), 180-191. doi: 10.1080/08923647.2016.1193801