



---

# ASSESSMENT OF THE IMPACT OF FLIPPED CLASSROOMS ON ACADEMIC ACHIEVEMENT

Kamble Bhavana Narsing, Research Scholar, Dept. of Education, Himalayan University, Arunachal Pradesh  
Dr. Rajkumar Singh, Professor, Dept. of Education, Himalayan University, Arunachal Pradesh

## ABSTRACT

The purpose of this study was to determine the impact of a flipped classroom model on students' academic success, preparation for self-directed learning, and motivation. The participants in this study were 66 students who studied the course "Scientific Research Methods" and were enrolled in two distinct courses at Nagpur University's Faculty of Education during the autumn term of the 2014–2015 academic year. One class was marked as experimental, while the other was designated as control. The experimental group was taught using the flipped classroom paradigm, whereas the control group was taught using a traditional blended learning strategy. Data gathering instruments included an accomplishment test, a self-directed learning readiness measure, and a motivation scale. The t-test, MANOVA, and ANCOVA analyses were utilised to examine the obtained data in this study. The study's findings indicated that there was a substantial difference in academic success, motivation, and retention across groups. However, no significant difference in self-directed learning preparedness was detected between the experimental and control groups.

Keywords: Flipped Classroom, Academic Achievement, Motivation

## 1. INTRODUCTION

Changes in information and communication technology have also altered the credentials and talents that people in the information age are expected to possess. In the twenty-first century, dubbed the information age due to the developments in science and technology, individuals are expected to be active participants in the creation and interpretation of knowledge, rather than passive recipients of information supplied and requiring direction. It is critical for individuals to develop these qualities dubbed 21st century capabilities (Romiszowski, 1996). Now, educational institutions are attempting to teach students to think critically, to critique, to understand how to obtain information, and to possess these talents, and are developing curriculum to do this (Seferoglu & Akbiyik, 2006). Curricula have been revised to reflect this shift, as have teacher and student responsibilities to facilitate the acquisition of these 21st century abilities. Students actively participate in the process of information acquisition rather than simply listening passively; professors function as counsellors and guide students through this process. As a result of the shift in teacher



and student roles, the teacher-centered approach has given way to a student-centered approach that requires students to take ownership of their own learning, to actively participate in learning processes, to control their own learning processes, and to create an environment in which students play a central role. Among these qualities, collectively referred to as 21st century skills, are problem solving, critical thinking, communication, creativity, information and media literacy, collaboration, and self-direction. Self-directed learning is a critical ability for students who are expected to participate actively in the process of information creation and interpretation. Self-direction is critical because it enables students to take ownership of their own learning in a student-centered educational process. Knowles (1975) defined self-directed learning as a process in which students take the initiative to diagnose their own learning needs, formulate learning goals, identify human and material resources for learning, select and implement an appropriate learning strategy for the knowledge to be acquired, and evaluate learning outcomes. Individuals define their own learning objectives, make their own judgments about how to gain knowledge, actively employ information acquisition methods, and complete and assess learning on their own (Salas, 2010). While there are several definitions for self-directed learning, Caffarella (2000) noted that they all include the following characteristics: individuals accept responsibility for their own learning, prepare for the learning process, and complete and assess their learning. In today's information era, it is critical for educational processes to be effective for students to be able to select relevant information from an ever-growing knowledge stack, formulate suitable strategies, and control their own learning processes. As a result, having these abilities has become critical. Acquiring these critical educational abilities is achievable in the educational environment, particularly when instructors employ information and communication technologies to create student-centered learning settings. Due to the rapid advancement of technology and the fact that students utilise technology and the Internet extensively in their everyday lives, the employment of cutting-edge technologies in education has become a need. The distant learning method, which began with mail courses, has evolved to meet a variety of demands and constraints. The flipped classroom model has been a popular way of instruction in recent years, and it necessitates the use of technology. While the flipped classroom (FC) concept is not a new educational technique, it has gained popularity as a result of increased use of technology in education (Jensen, Kummer, & Godoy, 2015). The FC method enables students to acquire course ideas outside of the classroom setting through the use of online educational materials such as video, film, and audio, freeing up classroom time for active learning activities such as problem solving and practical applications (Bergmann & Sams, 2012). This approach, in which students complete the theoretical portion of the course prior to class, frees up classroom time for active learning methods such as question-answering, discussion, and problem solving. Students have responsibility for their



own learning and proceed at their own pace under the FC model (Davies, Dean, & Ball, 2013). Students engage in self-directed and active learning by gaining access to learning environments made available over the Internet whenever and whenever they like (Baker, 2000). The assessment of this model using Bloom's taxonomy stages revealed that students satisfy their knowledge and comprehension requirements by watching videos before to class and satisfy their application, analysis, synthesis, and evaluation requirements by engaging in classroom activities (Rutkowski & Moscinska, 2013). With the characteristics of the flipped classroom model, in which learning environments provide a personalised learning experience (Hamdan, McKnight, McKnight, & Arfstrom, 2013), teachers take on the role of counsellors and students take on the role of active participants (Halili & Zainuddin, 2015; King, 1993), students assume responsibility for their own learning and progress at their own pace (Davies et al., 2013). Self-direction abilities are critical for online learning environments, because students have a greater degree of autonomy, freedom, and responsibility for their own learning processes than they do in face-to-face learning environments (Kocdar, 2015). Self-direction is affected by online learning (Song & Hill, 2007); research has shown a link between self-directed learning and accomplishment. Students who excel at self-directed learning also excel at knowledge acquisition and management (Merriam & Caffarella, 1991). Salas (2010) similarly stated that online courses in higher education and distant learning programmes are viewed as critical steps toward self-learning. By offering students with independence and flexibility, flipped learning, which encourages students to take greater control over their learning and has an Internet component (Gunawardena & McIssac, 2003), can guarantee that students engage in self-directed learning more successfully (Sahin, 2010). On the other hand, the flipped classroom approach demands students to manage and sustain motivation for both self-directed learning and the ability to regulate their own learning processes. Motivation is a necessary condition for students to manage their learning processes (Boevé et al., 2016). Song and Hill (2007) identified motivation as one of the three primary characteristics of self-directed pupils. Motivation is what motivates people to exert effort (Kurt, 2005), and self-directed students should exert effort in their learning process. As a result, motivation is a necessary condition for self-directed learning. Students that are more motivated also have a greater capacity for self-directed learning (Candy, 1991). Thus, motivation is a factor to consider while designing a learning environment (Dede & Argun, 2004). Learning settings that propel students forward, provide them with necessary capacities, allow them to show their own ideals, and allow them to experience both success and failure, can have an effect on motivation (Unsal, 2012). In recent years, it has been noted that student motivation is a critical component in enhancing success in diverse educational settings created by technology advancements (Deveci-Topal, 2013). According to studies, web-based learning, online learning, and blended learning settings, all of which



have become integrated into the educational process alongside technology, have an effect on student motivation.

## 2. RESEARCH QUESTIONS

1. Is there a significant difference between the experimental and control groups in terms of academic achievement scores?
2. Is there a significant difference between the experimental and control groups in terms of self-directed learning readiness levels?
3. Is there a significant difference between the experimental and control groups in terms of motivation levels?
4. Is there a significant difference between the experimental and control groups in terms of retention scores?

## 3. METHODS

This was a quasi-experimental pre–post-test–post-test research with a control group. This design allocates groups not to be modified as an experimental and a control group in an unbiased manner. Pre-testing was used to assess groups prior to the study, and post-testing was used to assess groups twice following the study.

The sample for this study consisted of 66 students, divided into two branches with 32 and 34 students in each class, who took the "Scientific Research Methods" course at Ahi Evran University's Department of Psychological Counseling and Guidance during the spring term of the 2014 – 2015 academic year. Existing groups were randomly assigned to the experimental and control groups. Scales of motivation and learning techniques, a self-directed learning readiness measure, and an academic achievement exam were utilised to collect data for this study.

**Experimental Procedure:** This study used a flipped classroom style in one group and a traditional blended learning strategy in the other during the application process. Students in both groups utilised the researcher's designed learning environment as a system. Both groups are taught by the same teacher. The online material was accessible only to registered users. Students in the experimental group completed the theoretical portion of the course prior to class by watching content-focused videos and then completing weekly quizzes at the

conclusion of the videos, as part of the flipped classroom paradigm. Thus, during class time spent in the classroom, they engaged in active learning activities such as question-and-answer sessions and group discussions. Additionally, these students engaged in higher-order learning tasks devised by the researcher in the classroom setting. However, using the traditional blended learning technique, students in the control group learnt the theoretical portion of the course in the classroom and then reacted to the identical questions as the other group at the conclusion of the films in the online classroom setting. They completed higher-order learning assignments as homework and reported them electronically. The experimental group studied at home and completed assignments at school, whereas the control group did the exact reverse. Outside of classroom hours, students in both groups might use the forum to communicate with the course instructor and other students.

#### 4. RESULTS AND DISCUSSIONS

##### IMPACT OF IMPLEMENTED EDUCATIONAL METHOD ON GENERAL ACADEMIC ACHIEVEMENT

In this study, an independent sample t-test was used to determine whether there was a difference between general academic achievement scores calculated using weekly quiz scores, higher-order learning activities scores, and achievement test scores of students in both the experimental and control groups, as compared to the students in the experimental group.

**Table 1 Independent Sample t-test results**

Groups		N	$\bar{x}$	S	SD	T	<i>p</i>	$\eta^2$
General Academic Achievement	Experimental Group	32	79.41	7.35	64	3.47	0.00	0.159
	Control Group	34	72.04	9.63				

Experimental Group: The group that experienced the flipped classroom model.

Control Group: The group that underwent the classical blended learning method.

Table 1 showed that there was a significant difference between post-test mean scores of the experimental and control groups on general academic achievement [ $t_{(64)} = 3.47, p < 0.05$ ]. This finding indicated that the flipped classroom model has the effect of increasing students' achievement. As a result of the analysis, this study found the effect size to be  $\eta^2 = 0.159$ . This value indicated a high-level of effect power.

The academic accomplishment of students who utilised the flipped classroom approach was higher than the academic achievement of students who used a traditional blended learning strategy. This finding

demonstrated that pupils who followed the FC model had more success. This may be due to the fact that, under the FC model, students study the theoretical portion of the course before class, allowing them to ask questions in the classroom, receive instant feedback, and engage with the course instructor during the session. Students might arrive to class prepared because of the flipped classroom model's qualities, such as having completed assignments in advance.

### THE EFFECT OF IMPLEMENTED EDUCATIONAL METHOD ON SELF-DIRECTED LEARNING READINESS

An independent sample t-test was used in this study to determine if there was a statistically significant difference between the self-directed learning readiness sub-factors and overall scores of students in the FC group and students in the conventional blended learning group. Table 2 presents the results of the self-directed learning scores obtained by the participants in each group.

Table 2 Independent Sample t-test results

Groups		N	$\bar{x}$	S	SD	T	<i>p</i>
Self Direction	Experimental Group	32	4.21	0.32	64	1.55	0.13
	Control Group	34	4	0.73			
Willingness to learn	Experimental Group	32	4.10	0.37	64	.75	.46
	Control Group	34	4	.70			
Self-control abilities	Experimental Group	32	3.93	0.46	64	0.36	0.72
	Control Group	34	3.88	0.63			
Self-directed Learning Readiness	Experimental Group	32	4.05	0.30	64	0.64	0.52
	Control Group	34	3.97	0.63			

Experimental Group: The Group of Flipped Classroom

Control Group: The Classical blended learning method group.

Table 2 shows that there is no significant difference exist among both self-direction [ $t_{(64)}= 1.55, p > 0.05$ ], willingness to learn [ $t_{(64)}= 0.75, p > 0.05$ ] and self-control abilities [ $t_{(64)}= 0.36, p > 0.05$ ] subdimensions of self-directed learning readiness total scores [ $t_{(64)}= 0.64, p > 0.05$ ] according to the study environment of students. In other words, students' scores on self-directed learning readiness and sub-factor scores did not change according to the learning environment.

There is no difference in self-directed learning preparation levels between students who are taught in a flipped classroom model and those who are taught in a classing blended learning style, according to the study. Despite the fact that it has been claimed in the research that the FC learning environment can have a favourable influence on self-directed learning, this is not the case in practise.

The only tools employed in this study were feedback and discussion boards for both groups. This can be explained by the fact that there was no significant difference between the groups when it came to self-directed learning ability. It is possible that other outcomes might have been attained by combining different tactics.

### THE EFFECT OF IMPLEMENTED EDUCATIONAL METHOD ON RETENTION

The one-way analysis of covariance was used to compare the change in post- and pre-test scores between students in the experimental FC group and students in the control group who were exposed to the conventional blended learning technique (ANCOVA).

According on the academic success post-test scores of students in both the experimental and control groups, retention means were modified after the experimental operation was finished. These retention means are shown in Table 3 for both experimental and control groups.

**Table 3 Descriptive Statistics of Retention Scores by Groups**

GROUPS	N	MEAN	ADJUSTED MEAN
EXPERIMENTAL GROUP	32	81.88	80.94
CONTROL GROUP	34	72.21	73.09

Experimental Group: The Group of Flipped Classroom

Control Group: The Classical blended learning method group.

According to table no. 3, the mean of the retention test which was administered 5 weeks after the application was 81.88 for students in the experimental group and 72.21 for the control group. This study found that the experimental group students' retention mean score adjusted according to post-test was 80.94, and the control group students' retention mean score adjusted according to post-test was 73.09.

The results of an ANCOVA test, which was used to examine whether or not the difference between the adjusted retention mean scores of the two groups was statistically significant, are provided in the table below.

**Table 4 shows the results of the ANCOVA test on retention scores that were modified according to the post-test results per group**

Resources of	Sum of	SD	Mean Squares	F	<i>p</i>	$\eta^2$
--------------	--------	----	--------------	---	----------	----------

Variance	Squares					
Pre-Test (Reg.)	1194.55	1	1194.55	6.46	0.01	0.11
Group	972.49	1	972.49	5.26	0.03	
Error	11652.50	63	184.96			
Total	14388	65				

Table 4 showed that between the groups to which different educational methods were applied, there was a significant difference in terms of retention scores adjusted according to post-test scores [ $F_{(1-63)}=5.26, p<.05$ ]. In other words, students' retention scores adjusted according to post-test scores changed with the applied educational method. The retention levels of students in the FC group were higher than those in the classical blended learning group. As a result of the analysis, this study found the effect size to be  $\eta^2 = 0.11$ , indicating a high effect size.

Students who used the flipped classroom approach retained more information than those who used the traditional blended learning model. Using a variety of various sensory organs in learning materials can help students in the flipped classroom model retain more information longer after they have completed their course work. For example, videos, which allow students to both listen and see while appealing to distinct sensory organs, may help students retain more information longer after they have completed the course. The greater the number of sensory organs that are stimulated by the learning environment, the more lasting the learning.

## 5. CONCLUSION AND SUGGESTION

First and foremost, educators who wish to use the flipped classroom approach must possess the requisite abilities. This is critical for assuring the efficiency of the process. As a result, educationalists can benefit from training programmes designed to help them get the knowledge and abilities necessary to implement this paradigm. It is critical to guarantee that students see the videos prior to going to class while using the flipped learning method. Furthermore, students can be encouraged to view the films before class by employing strategies such as answering questions, summarising the movie, and debating open-ended questions about the videos on discussion forums, which can be found on the internet. Students were given the opportunity to ask their queries in the forums during this research. Further research may allow students to discuss their questions with the entire class and the course instructor in virtual sessions that are planned at a specific time in order to develop synchronous communication. The flipped classroom approach may be structured in a variety of ways by educators. The materials utilised, the components of the online learning



environment, and the activities conducted in the classroom may all be customised. Additional research can be conducted to determine the impact of various materials, habitats, and activities on the process.

## REFERENCES

- Abeyssekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research. *Higher Education Research & Development*, 34(1), 1-14.
- Acar, S. (2009). *The effects of ARCS motivation strategies on learners academic successes, permanances of learning, motivations and attitudes in web supported performance based learning*. (Unpublished doctoral thesis, Gazi University, Ankara).
- Arshad, K., & Imran, M. A. (2013). Increasing the interaction time in a lecture by integrating flipped classroom and just-in-time teaching concepts. *Compass: Journal of Learning and Teaching*, 4(7).
- Ayan, D. (2010). *Promoting EFL pre-service teacher's self-directed learning through electronic portfolios: A case study*. (Yüksek Lisans Tezi, Middle East Technical University, Ankara).
- Baepler, P., Walker, J. D., & Driessen, M. (2014). It's not about seat time: Blending, flipping, and efficiency in active learning classrooms. *Computers & Education*, 78, 227-236.
- Baker, J. (2000). *The "classroom flip": Using web course management tools to become the guide by the side*. Paper presented at the 11th International Conference on College Teaching and Learning, Jacksonville, FL.
- Bergmann, J., Overmyer, J., & Wilie, B. (2012). The flipped class: Myths versus reality. *The Daily Riff*. Retrieved from <http://www.thedailyriff.com/articles/the-flipped-class-conversation-689.php> sayfasından erişilmiştir.
- Bergmann, J., & Sams, A. (2012), *Flip your classroom: Reach every student in every class every day*. Washington, DC: International Society for Technology in Education.
- Boevé, A. J., Meijer, R. R., Bosker, R. J., Vugteveen, J., Hoekstra, R., & Albers, C. J. (2016). Implementing the flipped classroom: An exploration of study behaviour and student performance. *Higher Education*. doi: 10.1007/s10734-016-0104-y
- Boyras, S. (2014). *Evaluating flipped classroom/education method in English teaching*. (Unpublished Master thesis, Afyon Kocatepe University, Afyon).
- Büyüköztürk, Ş., Akgün, Ö. E., Özkahveci, Ö., & Demirel, F. (2004). The validity and reliability study of the Turkish version of the Motivated Strategies for Learning Questionnaire. *Educational Sciences: Theory & Practice*, 4(2), 208-239.