International Journal of Latest Engineering and Management Research (IJLEMR)
ISSN: 2455-4847
www.ijlemr.com || Volume 07 - Issue 05 || May 2022 || PP. 27-32

Assessing the Impact of the Flipped Classroom Model on Students' Academic Performance in Zambia during COVID – 19: Students' Perspective

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Abstract: With the advent of COVID-19, the objective of this study is twofold. First, it aims to investigate the impact of the Flipped Classroom (FC) Model on students' academic achievement from their perspectives. Second, it reveals the students' opinions about the model itself. A total of 52 respondents drawn from four carefully selected higher education institutions that offer blended mode of delivery that is both online as well as face to face. Qualitative data was collected using a five pointlikerty scale analysed using cross tabulation and content analysis. The students studying outside the classroom stated they experienced problems regarding the difficulty of the contents and insufficiency of the resources. Among the other problems were lack of time to study outside the class, difficulty in understanding the topics, and learning difficulty, poor internet connectivity. They also indicated that the cost of data and smart phones were also a deterrent in their smooth learning. Those studying using face to face point out that they would shun classes than attend classes to avoid contacting COVID-19

Keyword: flipped classroom, students' achievement, COVID-19, online learning, face to face

Introduction

One of the most important challenges facing the education system today is moving from traditional teaching, based on the direct transmission of knowledge from the lecturer to the student, to a teaching that fosters discussion spaces and activities focussed on the student, where multidirectional interaction between student and lecturer is prioritised and where cooperative learning is encouraged. This new educational environment proliferated by the advent of COVID-19 must also be able to increase student motivation to study and foster positive emotions and attitudes towards learning, since, as many authors have pointed out, the connection between the cognitive and affective dimensions in the teaching-learning process is increasingly evident. The inverted learning model or "flipped learning" is a clear example of this new learning environment, and today it is perhaps the active methodology, with greater projection within university.

What is Flipped Classroom and Who is Flipping?

Flipped classroom is a "pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (The Flipped Learning Network, 2014).

The FC model is a new pedagogical model where the lecturer shares predetermined digital resources with students through a platform outside the classroom, and related content is also taught through this outside platform asynchronously (Bergmann &Sams, 2012). Inside the classroom, active, collaborative, and interactive problem-solving activities and consolidation practices are carried out (Toto & Nguyen, 2009). Thus, learners are more active in the class, internalizing the contents through a wide range of classroom tasks (Crouch & Mazur, 2001). Bishop and Verleger (2013) contended that a flipped classroom is an educational technique which consists of two significant components: (1) the use of computer technologies such as video lectures and (2) the involvement of interactive learning activities.

Literature Review

In recent studies, the impacts of the FC model on student performance, engagement, learning outcomes, and motivation have been investigated. Studies have shown that the FC approach enhances student's learning performance (Baepler, Walker, & Driessen, 2014; Davies et al., 2013; Janotha, 2016; Sun & Wu, 2016; Talley & Scherer, 2013; Wiginton, 2013, produces enhanced learning outcomes (Chen Hsieh, Wu, & Marek, 2017; Gillispie, 2016; Kong, 2014; Smallhorn, 2017) and increases student motivation (Chyr, Shen, Chiang, Lin, & Tsai, 2017; Graziano, 2017; Smallhorn, 2017; Wiginton, 2013; Yılmaz, 2017).This instructional methodology seeks to overturn traditional teaching roles and spaces, so that the instructional content typically taught by the lecturer in the classroom is transmitted outside of class time, allowing the students access to such content at the

time that they want and as many times as they need during pre-classroom preparation (Gonzalez-Gomez et al., 2017). The use of the flipped classroom as an alternative to the traditional learning environments has been increasingly attracting the attention of researchers and educators. The advancement in technological tools such as interactive videos, interactive in-class activities, and video conference systems paves the way for the widespread use of flipped classrooms. It is even asserted that the flipped classroom, which is used to create effective teaching environments at colleges and universities, is the best model for using technology in education (Hamdan, McKnight, McKnight, &Arfstrom, 2013). Studies about the flipped classroom appear in different disciplines including information systems (Davies, Dean, & Ball, 2014), engineering, sociology, and humanities, mathematics education (Zengin, 2017), and English composition (Zhonggen, & Wang, 2016).

Although most of the research suggests that the FC model positively impacts students' learning, there are also studies which have not revealed anticipated positive effects. For example, Smallhorn (2017) did not find an observable increase in students' academic achievement. In another study conducted by Kim et al. (2014), they stated that there was no evidence that the FC Model contributed to increased student grades. Similarly, in a study by Sun and Wu (2016), the use of the FC Model did not impact teacher-students interaction and learning satisfaction.

Flipped Classroom and Students' Academic Achievement

In recent years, several research studies have focused on the impacts of FC learning environments on students' academic achievements, one of which was conducted by Zengin (2017). In this study, the learning environment was designed using the FC Model alongside Khan Academy and free open source software (Zengin, 2017). The aim of this research was to investigate the impact of the FC Model on students' academic achievement and reveal their opinions about this model. The participants of the study included 28 students in the Mathematics Teaching Program at a state university in Turkey, and the results of the study revealed that the FC learning environment, designed using both Khan Academy and mathematics software, doubled the students' academic success (Zengin, 2017). Moreover, it was found out that this learning approach facilitated student learning, enabled visualization in mathematics teaching, and contributed to permanent learning (Zengin, 2017).

In their mixed methods research, Zhonggen and Wang (2016) investigated the effectiveness of the FC Model on English writing courses. The data of the study were collected through a scale of satisfaction, a Business English writing test, and a structured interview (Zhonggen& Wang 2016). As pre- and post-tests, they administered the scale of satisfaction and a Business English writing test (Zhonggen& Wang 2016). The findings showed that members of the experimental group, who were taught using the FC Model, scored higher on the aforementioned scales than the control group members, who were taught in a traditional learning environment (Zhonggen& Wang 2016).

To illustrate the effectiveness of the FC Model, Janotha (2016) examined to what extent FC teaching affected the academic achievement of nursing students. The participants in the experimental taught trough FC Model and control groups taught through traditional pedagogy were administered a national standardized test and Council of Health Education System tests (Janotha, 2016). The test scores of the experimental group gained from the national standardized test were compared to those of the control group, and it was seen that the students in the experimental group achieved higher academic performance than the students in the control group (Janotha, 2016).

FC learning environments can also contribute to teachers' pre-service learning, skills, and affective development, specifically by creating a meaningful and authentic context for learning. Graziano (2017), for instance, conducted a study to uncover the benefits of the FC Model for pre-service teachers, its impacts on students' success, and the difficulties of the model. It was observed that learners were more productive and enthusiastic to participate in flipped lessons (Ray and Powell, 2014).Firstly, this study is significant as relevant literature reveals that although there is an increase in studies related to the FC model throughout the world, there are a limited number of studies done in Turkey. Secondly, this study is significant because to the best of the researcher's knowledge, it is the first experimental study about the impact of FC Model on students' academic performance in Zambia. Therefore, it is believed that it will contribute to a better understanding of the model and its effects on teaching and learning. Moreover, the findings of this particular study can contribute to develop FC Model-oriented courses in educational settings.

Methodology

Due to the nature of the data collected, the researcher used the mixed method of research. The participants in the study consisted of 60 students studying on different academic programmes in the 2020-2021Academic year. The sample of 60 was arrived at using the saturation principle which states that in a qualitative research a sample of 60 is adequate to yield result (Guest, Brunce and Johnson 2006).At the beginning of the research, there were 60 students; however, eight participants were excluded from the study

group at the end of the research because they either did not carry out the out-of-class activities, or they did not participate in the classroom practices for one or two weeks.

Table 1: Participants according to University

SN	University	Females	Males	Total
1	ZCAS University	5	5	10
2	University of Lusaka	5	5	10
3	Copperbelt University	5	5	10
4	Rusangu University	5	5	10
5	Mulungushi University	5	5	10
6	Nkrumah University	5	5	10
	Totals	**30**	**30**	**60**

This meant that the respondents were reduced to 52. The participants were arranged according to the nature and mode of studywhether they fell under flipped learning ortraditional that they were engaged in during the period under study and whether they were undertaking professional or academic programmes

Table 2: Information About the Participants of the Study

	Academic programmes		Professional programmes		Total	
	f	%	*f*	%	*f*	%
Flipped learning	26	72	9	56	35	67
Traditional Learning	10	28	7	44	17	33
Total	36	100	16	100	52	100

According to Johnson and Onwuegbuzie (2004), by not being limited to a single method of research, the researcher can answer their research questions comprehensively and thoroughly. Since quantitative data draw the overall picture of a problem, qualitative data is essential to reveal explanatory details. Therefore, this study was designed using a mixed-methods approach. The independent variables of the research are flipped classroom and traditional teaching approaches while the dependent variable is students' academic achievements. Questions were posed to students on whether they preferred FC or traditional learning methods and what challenges they faced if any. The responses are indicated in table 3 below:

Table 3: Issues influencing mode of study

	Internet Connectivity	Time	Learning Difficult	Difficulty in the Content	Insufficiency of Resources	Total
Flipped Learning	15	1	12	1	6	35
Traditional Learning	1	10	1	4	1	17
Total	**16**	**11**	**13**	**5**	**7**	**52**

Content and Procedure

Learners were placed in two groups and necessary learning environments were designed for both groups to carry out the studies. The general features of these learning environments are shown in Figure 1 below:

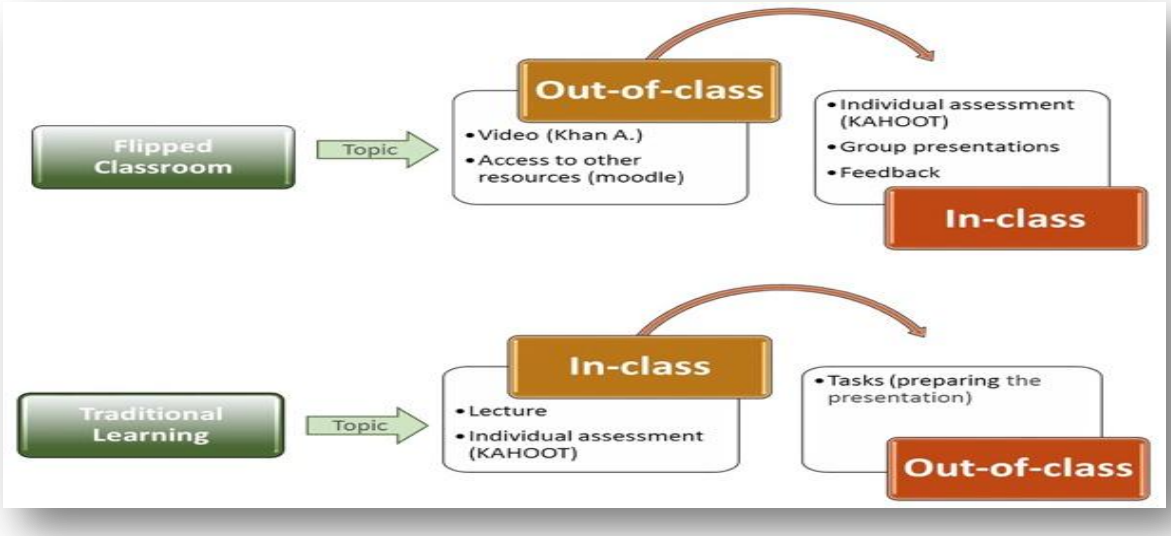

Figure 1: Features of learning environments for experimental group (flipped classroom) and control group (traditional learning) model

Experimental Group

Studies conducted on the FC model (Chen Hsieh et al., 2017; Herreid &Schiller, 2013; Lage et al., 2000; Song &Kapur, 2017) have led to the development of an appropriacy form for the flipped learning environment. This form includes in-class activities which focus on not only sub-skills such as remembering, understanding and applying, but also higher order thinking skills such as analyzing, evaluating, and creating as defined by Anderson (2005). To increase the validity of the form, five field experts were consulted for their opinions and suggestions about the form content, appropriacy, and comprehensibility. Based on their suggestions, necessary corrections and alternations were done.

Out of Class Activities

In accordance with the weekly topics, URL addresses of the videos with the learning contents were sent to the students. The students were expected to come to the classroom prepared and having watched the assigned videos.

In Class Activities

In-class activities included individual assessments and group presentations. The students logged in to the Moodle platform with their login credentials, using their smart phones to reach the interface and see the assignments and test uploaded into the system by the lecturer.

Discussion of Results

This study was an investigation into the effectiveness and suitability of the flipped classroom model in from the students' perspective. Overall, students in the flipped classroom group felt more motivated for learning when compared to those in the traditional lecture-based classroom group. Additionally, students considered the flipped classroom teaching approach to be more helpful for learning the course material and for exam preparation. Moreover, students in the flipped classroom group felt better improvement in their communication and critical thinking skills. Multiple factors may contribute to the effectiveness of the flipped classroom method for use with pedagogy. First, the flipped classroom approach offers personalized study. Students in the flipped classroom group have more freedom and flexibility of self-paced learning, giving students an opportunity to use their time more efficiently. Second, the flipped classroom approach offers group study. Compared to the traditional lecture-based classroom in which there is only teacher-student interaction, the flipped classroom encourages not only teacher-student interaction but also student-student interaction. Studying as a group may contribute to improving individual student's mastery of medical knowledge.

The flipped classroom approach emphasizes the output of knowledge from students. The traditional lecture-based classroom focuses on how much knowledge can be absorbed in class by the students through reading and listening (input); however, in the flipped classroom, students are encouraged to verbalize what they

learn and to exchange ideas through discussion or debate. The burden and pressure may compromise the satisfaction that students felt as our questionnaire showed no difference in the satisfaction with the course or the teaching approach between the two groups.

Conclusion

Findings reveal that in general, students resist learning the topics on their own outside the classroom in the FC Model. Instead they prefer learning the topics from the instructor inside the class. The problems encountered in this model can be categorized under three main titles: Motivation, Content, and Learning.

As reported by our participants, in a new learning environment, students who are typically willing to put effort into learning tend to have difficulty getting motivated. The students studying outside the classroom stated they experienced problems regarding the difficulty of the contents and insufficiency of the resources. Among the other problems were lack of time to study outside the class, difficulty in understanding the topics, and learning difficulty, poor internet connectivity. Most of the students stated that the under the FC model, courses included heavily-loaded requirements, and they did not have time to watch the videos outside the class. Besides, it was stated that they watched the videos assigned and suggested in order to learn the topics outside the classroom. While studying, they used learning strategies such as revising and summarizing the contents.

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