



كلية التربية

كلية معتمدة من الهيئة القومية لضمان جودة التعليم

إدارة: البحوث والنشر العلمي ( المجلة العلمية )

=====

## **STUDENTS' PERCEPTION AND PERFORMANCE OF Flipped LEARNING IN HIGHER EDUCATION**

**By**

**Aman E.Nweiran**

**University of Jordan**

**Amman, Jordan**

**E-mail: a\_rahahleh@ju.edu.jo**

{ المجلد السابع والثلاثون - العدد الثامن - أغسطس ٢٠٢١ م }

[http://www.aun.edu.eg/faculty\\_education/arabic](http://www.aun.edu.eg/faculty_education/arabic)

**نبذة مختصرة**

كان الغرض من هذه الدراسة هو تحديد تصور وأداء طلاب اللغات الأجنبية في الجامعة الأردنية خلال دورة حول تكوين الكلمات والتجميع حيث تم تطبيق التعلم الصفي المعكوس. يتناقض التقليب في الفصل الدراسي مع الفصل التقليدي ، حيث يكون الطلاب مسؤولين عن قراءة القراءات المخصصة ومشاهدة مقاطع الفيديو المخصصة قبل الفصل ، ويتم استخدام وقت الفصل في المهام العملية والمناقشات المدروسة.

خلال هذه الدراسة ، تم جمع البيانات باستخدام الأساليب الكمية والنوعية. تم استخدام استبيان التغذية الراجعة وبيانات سجل الدورة التدريبية والمقابلة لدراسة تصور الطلاب والمعلم في الفصل المقلوب.

تم تقدير نتائج التحليل الذي تم إجراؤه على دورة تكوين الكلمات والتجميع ، ويتفاعل الطلاب بشكل إيجابي مع العناصر العامة للتعلم في الفصل المقلوب. في الختام ، يعتقد كل من المعلم والطلاب أن التعلم في الفصل المقلوب له تأثير إيجابي على فعالية التعلم. ومع ذلك ، فقد أعربوا عن أنهم يواجهون بعض التحديات خلال هذه الدورة.

**الكلمات المفتاحية:** الفصل المقلوب ، MOODLE ، التعلم النشط ، الفيديو ، التعليم العالي.

## Abstract

The purpose of this study was to determine the perception and performance of foreign language students at the University of Jordan during a course on word formation and collocation where flipped classroom learning was applied. Flipping classroom is in contrast to a traditional class, where the students are responsible for reading the assigned readings and watching the assigned videos before the class, and the class time is used for practical tasks and thoughtful discussions.

During this study, data were collected using quantitative and qualitative methods; a feedback questionnaire, course log data and an interview were used to study the perception of the students and teacher on flipped classroom.

The results of the analysis conducted on word formation and collocation course were appreciated, students react positively to general elements of flipped classroom learning. In conclusion, both teacher and students believe that flipped classroom learning has a positive effect on learning effectiveness. However, they expressed that they are facing a few challenges during this course.

**Keywords:** Flipped Classroom, MOODLE, Active Learning, Video, Higher Education.

## Introduction

Online learning has been on the rise in recent years, various models can be used to facilitate online teaching. Blended learning which combines face to face teaching and online learning is a new learning concept. Flipped classroom – also referred as inverted classroom – is a type of blended learning in this modern learning method the instructor share learning materials like videos or reading materials or slide presentations for students to refer outside the live classroom (Barua, Gubbiyappa, Baloch, & Das, 2014). and the class time is spent on active learning activities such as case studies, individual and small group exercises, role playing and discussions (Mikkelsen, 2015). This inverted approach involves students actively in course content during class time, where the students come to class having done the expected preparation (Raine & Gretton, 2017) and thus students are no longer inactive recipients as usually seen in traditional lectures.

In applying the flipped classroom approach, various technology tools can be used to interact virtually outside the class and used to work collaboratively to solve problems or exchange ideas. These tools let the users share text, pictures, and videos with other users during online learning (Zainuddin & Halili, 2016) MOODLE as one of the most popular learning management systems is characterized by a set of functionalities grouped in two different classes: resources and modules. Resources represent instructional materials that are usually created in digital format and then uploaded to the platform. PowerPoint, files, Web pages, word documents, video, flash animations, and audio files describe some examples of these resources. Modules are elements created via MOODLE to provide interaction among students and teachers towards manipulation and content transformation. In this context, MOODLE platform presents several modules that support a wide set of educational features, such as Assignments, Lessons, Workshops, Database, Choice, Chats, Forums, Wikis, News, Quiz, Glossary, Feedback, Survey, SCORM and External tools (Costa, Alvelos, & Teixeira, 2012).

Videos are one of the most important aspects of flipped learning where students are expected to watch before class, students can benefit from learning by watching a video where the content is accessible via all devices, at the time and place most convenient to the student. Also, video content can be viewed as many times as needed to reach a deeper understanding of the concepts (Post, Deal, & Hermanns, 2015). It is recommended that the educational videos should be from 5 to 30 minute to avoid losing students attention (Mikkelsen, 2015). and each video cover one topic (Smith & McDonald, 2013)

Researchers adopted a range of data collection methods to evaluate flipped learning. Quantitative methods involved comparison of exam scores, course evaluations, surveys, institutional data (eg, retention rates), and system log data (eg, time spent on certain activities on a course management system). Also qualitative data, such as interviews, classroom recordings, and observations (Karabulut-Ilgü, Cherrez, & Jähren, 2018).

The main objective of this research was to assess the suitability of using flipped classroom learning in foreign language faculty at university of Jordan in terms of students' perception and performance.

This paper is structured as follows. Section 2 reviews the literature of flipped learning. The method for the evaluation is detailed in Section 3 and section 4 discusses the results. Section 5 concludes the paper.

---

## Literature review

Many universities and colleges have used flipped learning as it presents possibilities for increased peer interaction and deeper engagement and understanding with the material (Karabulut-Ilgü, Cherrez, & Jahren, 2018).

The idea of flipped classroom was first in practice in 2007 by Bergmann and Sams, they began practicing flipped teaching at their secondary school students when, they recorded their lectures and posted them online in order to catch up students who missed their classes, they found it to be an effective way of teaching. flipped classrooms in higher education have had an interest in seeing this put into practice in university classrooms. Professors at the University of Graz conducted a research in which lectures were video recorded in a manner in which students could have access to them during the semester of a lecture-based course on educational psychology. The professors surveyed how the students used their educational tools: attending lectures and watching or rewatching videos. Students that watched the videos more than their peers performed better than those who chose otherwise (Basal, 2015).

In term of student Performance, the literature indicates that a flipped classroom is effective in term of increasing the academic achievements of students, (Davies, Dean, & Ball, 2013) conducted a study to investigate how the use of technology in the flipped classroom might be utilized to effectively promote students' achievement. The findings revealed that using technology was effective and scalable in a flipped classroom, and students' post-test scores in a flipped classroom increased compared to their pre-test scores. (Evseeva & Solozhenko, 2015) in their research they make an attempt to evaluate the effectiveness of the flipped classroom technology in the process of teaching and learning the English language, before face-to-

face classes, students viewed short video lectures regarding the topic of the lesson, studied additional on-line resources, posed questions for discussions in forums. Time in class was dedicated to explaining the grammatical and lexical phenomena that caused difficulties, making presentations and reports and discussing the most important points. After face-to face classes, students evaluated the work of their peers, checked their knowledge of the material studied by doing tests and shared their evaluations on the lesson. They use a survey to measure student satisfaction, the results of the survey showed that the improvement of students' academic performance is observed. (Yang, Yin, & Wang, 2018) reported that students who learned English as a foreign language through flipped classroom gained higher scores than their colleagues in traditional classrooms.

Students Responsibility toward study is an important aspect in the flipped learning, class time imply a lot of active learning activities. Students must come to class prepared; otherwise they cannot fully participate. Additionally, with assignments involving students become responsible for the learning process. (Enfield, 2013) found that flipped classroom was effective in helping students learn the content, and increased self efficiency in their ability to learn independently. (Mcgivney-Burelle & Xue, 2013) also noticed that students can work at their own pace in class. (Davies, Dean, & Ball, 2013) noticed that students were able to learn based on simulated learning and that they were motivated to learn at their own pace; they also noted that the students wished to recommend the flipped classroom to their other colleagues. (Avery, Huggan, & Preston, 2018) indicates in their research that many students explained that "the flipped classroom required that they assume more responsibility for their own learning, especially outside of the classroom".

With regard to flipped classroom perception, different studies agreed that both students and teacher have a positive perception toward flipped classroom learning, (ThiThanhQuyen, 2017) try to study non-majored English students' perceptions of this flipped teaching method using Face book as a platform to deliver learning material. The data are gathered through a mixed-method approach, using two main tools (questionnaires, and in-depth interviews). the results show that the students have positive attitudes towards the flipped model. (Al Yousef, Naanah, & Al Khazam, 2018) in their study aims to reveal the perceptions of King Abdullah II School for Excellence teachers about the importance of using flipped learning in developing the reflective thinking of their students in Jordan. a questionnaire used to evaluate 227 teachers of king Abdullah 11 school. The results showed that the teachers' perception of using flipped learning in developing their students' reflective thinking was high in different disciplines; and there were significant differences in their perceptions based on their gender and experience. (Bishop, & Verleger, 2013) Identified 11 previous studies that have explored student perception of flipped learning and concluded that generally students had positive perception of flipped classroom.

Students' interaction is one of the other positive impact in a flipped classroom environment either in the classroom or in distance learning, students' interaction refers to Collaboration with other students as well as with the teacher and active engagement in the classroom. (Roehl, Reddy, & Shannon, 2013) found that interaction between students and teachers actually improved in flipped classroom. ( Millard, 2017) has proposed that the flipped classroom can contribute to student engagement, personalized student guidance, team-based skills, classroom discussion, and creative freedom of faculty . Also, (Hung, 2015) stated that (64%) of students in flipped learning class improved their interactions with the instructor and classmates. (Love, Hodge, Grandgenett, & Swift, 2014) compared the effectiveness of two teaching methods (a traditional lecture and a flipped style) the results showed that the students had more opportunities to interact with one another and this helped them learn from other students.



## METHODOLOGY

Mainly, flipped classroom divides into two learning environments: inside and outside classroom, both environments must be implemented efficiently to insure the success of learning. Firstly, the teacher had to plan and determine what will conduct in each environment and had to insure the integration between inside and outside class materials and activities. A learning management system is an essential part of the flipped classroom because it joins the outside and inside class like a bridge (Basal, 2015). In flipped classroom the instructor must supply the students with all required materials before the class date, at university of Jordan MOODLE is used as an online learning management system, by using MOODLE the instructor upload files, videos, announcements, forum discussions, assignments, and exercises. It provides 24 hours a day, 7 days a week connection between teacher, students and materials.

This research was conducted to study perception of students and to evaluate their performance in a flipped classroom at university of Jordan, both quantitative and qualitative methods (questionnaire, teacher interview, system log analysis) were used to collect data for flipped classroom.

### 3.1 Participants

The course was word formation and collocation, a compulsory requirement to Bachelor's Degree in Linguistics for second-year level, the course had fourteen enrolled students, among which two males and thirty-eight females all students were from the faculty of foreign languages at the University of Jordan.

At the end, of course, students were asked to fill a questionnaire that asked about their views and feedback on the flipped classroom course. Out of the fourteen students, only twelve had previous experience of flipped classroom.

### 3.2 Course Plan

All the elements required for Word Formation and Collocation course were available at MOODLE, the teacher arrange the course into weeks format, there are 15 weeks and classes took place three times a week, in the introductory lecture the teacher gives an introduction to flipped classroom learning and upload a manual for using MOODLE in order to guide students on how to use the learning system, the course plan is uploaded at the beginning of the course, As shown in Figure 1, detailed information about topics to be covered and the tentative schedule where for each lecture the date, lecture topic, which pages in the textbook will be covered, also what are the videos and the assignments that must be achieve before the class.

**Figure 1. Course plan for word formation and collocation – week 2**

Week	Day	Topic	Assignment
2	Sunday	- Intensifying adverbs (English collocations, Chpt.6, p.16-17)  - Everyday verbs 1 (English collocations, Chpt.7, p.18-19)	Watch the assigned video and do the assignment
	Tuesday	Everyday verbs 2 (English collocations, Chpt.8, p.20-21)	Watch the assigned video and do the assignment
	Thursday	Everyday verbs 3 (English collocations, Chpt.9, p.22-23)  Synonyms and Confusable words 1 (English collocations, Chpt.10, p.24-25)	Watch the assigned videos and get ready to answer the questions in class

### 3.2.1 Out-Of-Class Task (Pre-Class Preparation

The teacher assigns the required reading and one or more videos that the student must watch before the class date, after watching videos the students are responsible to achieve an assignment that asks about the video subjects, in order to measure knowledge retention from the watched video.

#### 3.1.1.1 Video Lectures

Because videos are the primary method for delivering pre-class content, 45 videos were used in the course for all lectures, where each lecture has one or more videos. All videos have chosen from YouTube carefully with duration from 1.55 – 10.19 minute. table1 shows the number and duration of videos.

**Table 1. Number and duration of the videos in the course**

Number of videos used in the course	Total video time (h)	Average video length (min)	Maximum video length (min)	Minimum video length (min)
45	3.27	6.57	10.19	1.55

#### 3.1.1.2 Required Readings

The teacher indicates which pages in the book chapters that cover the assigned topic. As in figure 1. Also, journal articles and useful websites are linked to support the content of the lecture videos.

### 3.1.1.3 Assignments

In word formation and collocation, after watching the learning videos, the students must achieve the assignments to assess if students have completed the assigned work and to gauge if they have understood the concepts in the video; this assessment ensures student focus on videos and pre-class material. Once the assessment is completed the instructor goes through students' responses before class to give them feedback on their understanding. In class the instructor can then reiterate the concepts where students had misunderstandings or confusion before starting the in-class activity.

### 3.2.2 In- Class Activity

At the beginning of each class session, the teacher begins with a short conversation on the basic material and some discussion of homework issues for revision. Exercises and links for journal articles related to the pre-class reading are practiced in a class by dividing students into groups or individually.

## 3.3 Data Gathering Procedure

In our research, we have used quantitative and qualitative methods in order to collect in-depth information about students and instructor views and feedback in flipped classroom learning.

### 3.3.1 Online Questionnaire

It is essential to get feedback from participants at the end of every flipped classroom for understanding its strengths and weaknesses which will help in developing strategies to enhance its quality (Barua, Gubbiyappa, Baloch, & Das, 2014). With this background, At the end, of course, an online questionnaire was adapted and modified from a validated questionnaire developed by pierce R et. All the 19 questions produced via goggle forms and uploaded into MOODLE course, with (Five multiple-choice questions, eleven Likert- scale questions with 4 possible responses: strongly disagree, disagree, agree, and strongly agree, additionally, the questionnaire had two Open-Ended Questions).

### **The questionnaire consisted of the following sections:**

- Section 1 (general information) containing five questions ask about gender, technical problems, student's familiarity with (MOODLE, flipped learning, technology tools).
- Section 2 (video scale) consisted of four items measuring students' satisfaction on videos.
- Section 3 (flipped classroom scale) consisted of 7 items measuring students' satisfaction of learning through flipped classroom.
- Section 4 (Open-ended) consisted of 2 questions that let students to write any comments they have about flipped classroom and to state any challenges they face at this course.

### **3.3.2 Instructor Interview**

Course instructor indicates that additional time and effort are required to rethink and prepare both pre-class and in-class activities, however the good thing that the course can be used without too much effort when you have to teach the course again.

Additionally, the teacher noticed that some of the students have a resistance to the new learning method, students confused when faced with a new learning strategy that required them to actively engage in the learning process. Generally, the course instructor finds that flipped classroom had improved the teaching process and was beneficial for students, where the role of the teacher shifts from being a source of information to a facilitator and so, the students become more active and engage in the learning process. Also, the teacher indicates that the percentage of absence was too low and drop-down rates equal to zero percent.

### 3.3.3 Log Data Analysis

Learning Management System(LMS)stores data about participants' actions in log files, which gives researches information about student behaviour.A log is a list of participants events in which each line contains a timestamp as well as one or more fields that hold information like each action completed (i.e., view, add, update, or delete), the activities performed in different modules(e.g.,resources, forum, assignment).This study analyses MOODLE log with the aim of tracking the number of views for videos, also submission of assignments and grades.

## DISCUSSION OF RESULTS – FINDINGS

The collected data were classified and analyzed by using statistical package of social science (SPSS); a descriptive analysis was performed in order to characterize the behaviour of each variable measured. This questionnaire consisted of items based on a 4–point Likert scale going from “strongly disagree” (1) to “strongly agree” (4). We sum strongly agree and agree to indicate the agree percent and strongly disagree and disagree to indicate disagree percent

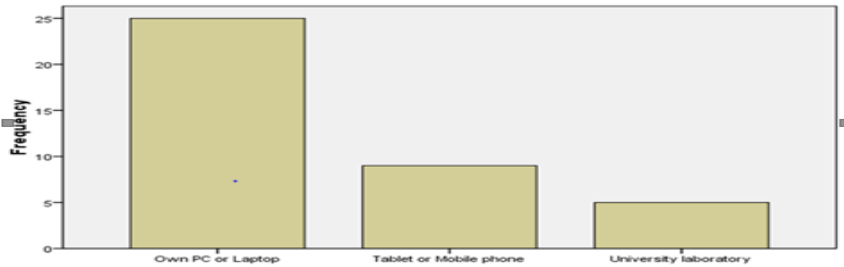
Thirty–nine of the enrolled students in the class have participated in answering the questionnaire, the analysis of the results is divided into several sections related to the research questions proposed, to assess to what extent students react positively to general elements of the flipped classroom, by the following a focus on some of the students' responses is presented.

### 4.1 Access To Technology And Flexibility

The success of flipped classroom relies on student equitable access to course material, the majority of students 92.3% indicate that they don't or rarely have technical problems to access course material, 53.8% of students indicate that they have used elearning platform MOODLE previously. The survey showed that all participants were familiar with diverse technology tools, which would be used by students to access video lectures and assignments outside class. Figure2 shows

that 64.1% of students used their own pc or laptops, and 23.1% used mobile phones or tablets and 12.8% used university laboratory, zero percent for those don't have access.

. *Figure 2: Technology tools used*



## 4.2 Student Perception Of Video Usage And Pre Reading Materials

Pre-class preparation is considered as one of the most important aspects in flipped classroom learning, where students take the responsibility to learn in their own and to be more actively engage than being a passive recipient of lecture contents.

Because videos are the primary method of choice for delivering pre-class content to students, a deeply analysis for videos usage and assignments submission is conducted, depending on students' responses on questionnaire and on course log data.

### 4.2.1 Questionnaire Analysis

Most students had positive perceptions about flipped video, results showed that 89.7% agreed that Watching the assigned videos before class provided good preparation for the class activities ( $M=3.31$ ,  $SD=0.86$ ). Also, students were asked if they have adequate time to spend on the pre-reading material (videos, other reading), the responses to this question was that most of students 79.5% was agreed and satisfied. A minority 20.% disagree with this question. 82.1% of students agreed that pre-reading materials are available on MOODLE before class date.

**Table 2. Students' experiences of using video for learning.**

Questions	Frequency	Percent	Mean	Standard Deviation
1- Pre-reading materials (videos, assigned readings) were available on ELearning portal (MOODLE) before the Flipped Classroom activity.	Strongly disagree	3	7.7	3.26 0.94
	Disagree	4	10.3	
	Agree	12	30.8	
	Strongly agree	20	51.3	
2- Watching the assigned videos before class provided good preparation for the class activities	Strongly disagree	3	7.7	3.31 0.86
	Disagree	1	2.6	
	Agree	16	41.0	
	Strongly agree	19	48.7	
3- Adequate time was provided to spend on the pre-reading materials (videos, others) before the Flipped Classroom activity.	Strongly disagree	4	10.3	2.92 0.87
	Disagree	4	10.3	
	Agree	22	56.4	
	Strongly agree	9	23.1	

In this unit, the student's least satisfied with the time they have to spend on pre-reading material (Videos) before flipped class date. Overall students indicate that they are satisfied in watching videos.

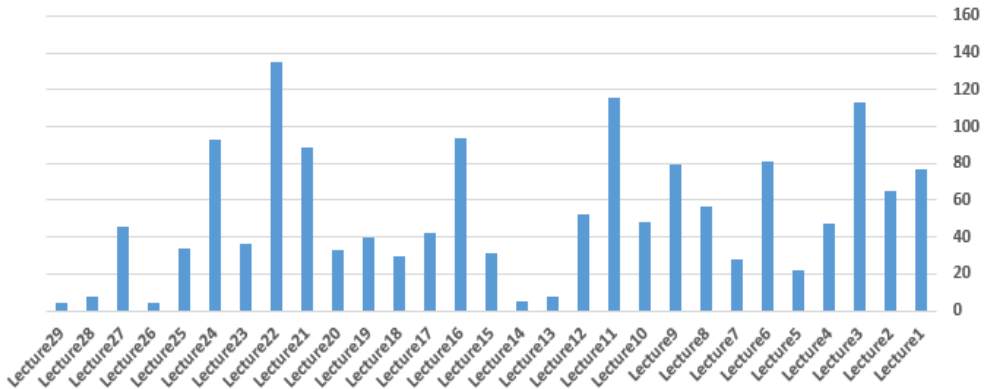
## 4.2.2 Log Data Analysis

### 4.2.2.1 Videos Views Analysis

For each lecture, a tracking for number of views for the assigned videos before class date is calculated; with the intention to measure students' responsibility in watching video. Figure 3 shows the number of views for videos before the assigned lecture date. For example, the video for lecture 8, was played fifty-seven times before class date, which mean that the video has played more than one time by some of students. The total average for videos views is 53.



Figure 3 Distribution of videos log before flipped class date



#### 4.2.2.2 Assignments Submission Analysis

Figure 4 shows the average of students' grades in course assignments, the overall average equal 4.24 this good average score means that the students benefit from self learning of the pre class material.

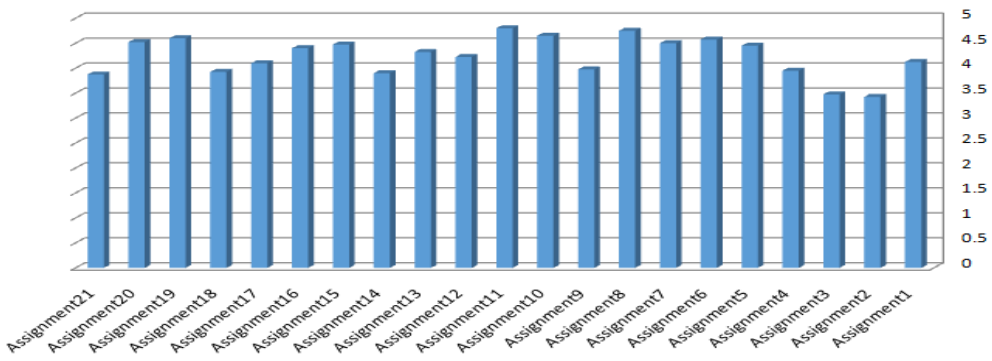


Figure 4 The average of students' grades in course assignments

### 4.3 Student Perception Of In Class Activities

Regarding the activities that were provided in-class time, it could be seen from Table 3. about 90% from students declare agreement and strongly agreement with the statement "The activities during Flipped Classroom session improved my understanding of the topic".

Pre-class video alongside other elements should be combined with in-class activity. Otherwise, class time may prove ineffective and time consuming. 92.3% (M=3.38, SD=0.71). See that there was a good connection between the content in the assigned videos and the in-class activities.

**Table 3. Students' general perceptions of in class activity.**

Questions	Frequency	Percent	Mean	Standard Deviation
1- The activities during Flipped Classroom session improved my understanding of the topic.	Strongly disagree	1	2.6	3.23 0.71
	Disagree	3	7.7	
	Agree	21	53.8	
	Strongly agree	14	35.9	
2-There was a good connection between the content in the assigned videos and the class activities	Strongly disagree	1	2.6	3.38 0.71
	Disagree	2	5.1	
	Agree	17	43.6	
	Strongly agree	19	48.7	

The Descriptive Statistics Table 3 indicates that the students most appreciated that there was a good connection between the content of the videos (pre- reading) and the activities in the class (M=3.38, SD=0.87).

#### 4.4 Students General Perception Of Flipped Classroom

General student perceptions of flipped learning were positive. The mean and standard deviation of questions asked about general student perception are shown in Table 4.

**Table 4. Students' general perceptions of flipped classroom**

Questions	Frequency	Percent	Mean	Standard Deviation	
1- Do you believe the way class time was used in flipped learning was more beneficial to your learning than traditional lecture format	Strongly disagree	2	5.1	3.03	0.81
	Disagree	6	15.4		
	Agree	20	51.3		
	Strongly agree	11	28.2		
2- Flipped classroom gave me greater opportunities to communicate and interact with other students and teacher.	Strongly disagree	4	10.3	2.92	0.88
	Disagree	7	17.9		
	Agree	18	46.2		
	Strongly agree	10	25.6		
3- Flipped learning helped me to become active and independent learner (learn by myself)	Strongly disagree	2	5.1	3.15	0.71
	Disagree	1	2.6		
	Agree	25	64.1		
	Strongly agree	11	28.2		
4-I was interested in the course and I have enjoyed learning	Strongly disagree	2	5.1	3.38	0.81
	Disagree	2	5.1		
	Agree	14	35.9		
	Strongly agree	21	53.8		
5-Learning by flipped classroom has improved my outcomes in word formation and morphology.	Strongly disagree	2	5.1	3.15	0.78
	Disagree	3	7.7		
	Agree	21	53.8		
	Strongly agree	13	33.3		
6-Overall, I find the course is organized in flexible manner and I am satisfied with this flip learning course.	Strongly disagree	2	5.1	3.38	0.88
	Disagree	4	10.3		
	Agree	10	25.6		
	Strongly agree	23	59.0		

As shown from table 4 most students (79.5%) are satisfied with the way class time was used and it's more beneficial for their learning than a traditional lecture format with ( $M= 3.03$ ,  $SD =0.81$ ).

It's important to also observe, that more than 71% of students ( $M= 2.92$ ,  $SD =0.88$ ), believe that the flipped classroom gives them greater opportunities to communicate with other students.

In term of students' motivation toward self learning, 92.3% ( $M= 3.15$ ,  $SD =0.71$ ) of students indicate that they become more active and independent learner.

The students most appreciated that they were interested in the course and enjoyed this way of learning ( $M= 3.38$ ,  $SD =0.81$ ), in addition to flexibility, organization and satisfaction by the flipped course ( $M= 3.38$ ,  $SD =0.88$ ). As shown most students (84.6%) agree that they are satisfied with flip classroom and that the course is organized in flexible manner. Only (15.4%) of them disagree with the suggestion.

#### 4.5 Students Open Questions Answers – Discussion

Students were given the opportunity to answer two open-ended questions in order to indicate if they have any comments or challenges they face in flipped classroom learning many students said that they benefited from learning by watching videos, some students say that it was amazing technique for learning, some students say that they like the new way of teaching and that they feel they more active, one student say that "it highly enrich my vocabulary with right pronunciation for each word and let me know some information by myself", with regard to students challenges in flipped classroom learning, some students say that they are too many assignments, others indicates that they don't have enough time to solve assignments before class date, one of the students said" even if I have an exam I have to watch a videos and solve an assignment" ,one of the students suggests that the class will be more interesting if there was a technological equipment in the classroom.

## Conclusion

The important finding of this study is that flipped classroom proved to be appreciated by students at foreign language faculty. the results showed that students react positively to questionnaire elements, they expressed that they enjoyed becoming independent and more active in learning process, also they indicate that they find this way in learning more beneficial than traditional lecture format. With respect to course log data analysis, the results showed that students have good responsibility toward video watching, and the assignment average grade was relatively good. All in all, both teacher and students indicate high satisfaction with the flipped classroom approach.

---

## References

1. Al Yousef, M. B., Naanah, I. A., & Al Khazam, A. M. (2018). The Perceptions of King Abdullah II School for Excellence Teachers about the Importance of Using Flipped Learning for the Development of Students' Reflective Thinking in Jordan. *Educational Research and Reviews*, 13(11), 406–416.
2. Avery, K., Huggan, C., & Preston, J. P. (2018). The flipped classroom: High school student engagement through 21st century learning. *in education*, 24(1), 4–21.
3. Barua, A., Gubbiyappa, K. S., Baloch, H. Z., & Das, B. (2014). Validation of feedback questionnaire on Flipped Classroom (FC) activity. *Journal of Advanced Pharmacy Education & Research*, 4(3), 339–349.
4. Basal, A. (2015). The implementation of a flipped classroom in foreign language teaching. *Turkish Online Journal of Distance Education*, 16(4), 28–37.
5. Bishop, J. L., & Verleger, M. A. (2013, June). The flipped classroom: A survey of the research. In *ASEE national conference proceedings*, Atlanta, GA (Vol. 30, No. 9, pp. 1–18).
6. Costa, C., Alvelos, H., & Teixeira, L. (2012). The use of MOODLE e-learning platform: a study in a Portuguese University. *Procedia Technology*, 5, 334–343.
7. 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.

8. 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.
9. Evseeva, A., & Solozhenko, A. (2015). Use of flipped classroom technology in language learning. *Procedia–Social and Behavioral Sciences*, 206, 205–209.
10. Flipped classroom. (2020, August 30). Retrieved September 30, 2020, from [https://en.wikipedia.org/wiki/Flipped\\_classroom](https://en.wikipedia.org/wiki/Flipped_classroom)
11. Hung, H. T. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, 28(1), 81–96.
12. Kadoić, N., & Oreški, D. (2018, May). Analysis of student behavior and success based on logs in MOODLE. In 2018 41st International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO) (pp. 0654–0659). IEEE.
13. Karabulut-Ilgu, A., Jaramillo Cherez, N., & Jahren, C. T. (2018). A systematic review of research on the flipped learning method in engineering education. *British Journal of Educational Technology*, 49(3), 398–411.
14. Kim, J. E., Park, H., Jang, M., & Nam, H. (2017). Exploring flipped classroom effects on second language learners' cognitive processing. *Foreign Language Annals*, 50(2), 260–284.
15. McGivney–Burrelle, J., & Xue, F. (2013). Flipping calculus. *Primus*, 23(5), 477–486.

16. Mikkelsen, T. R. (2015). Nursing students' experiences, perceptions and behavior in a flipped-classroom anatomy and physiology course. *Journal of Nursing Education and Practice*, 5(10), 28-35.
17. Millard, E. (2017). 5 Reasons Flipped Classrooms Work: Turning lectures into homework to boost student engagement and increase technology fueled creativity. University Business. com.
18. Pierce, R., & Fox, J. (2012). Vodcasts and active-learning exercises in a "flipped classroom" model of a renal pharmacotherapy module. *American journal of pharmaceutical education*, 76(10).
19. Post, J. L., Deal, B., & Hermanns, M. (2015). Implementation of a flipped classroom: nursing students' perspectives. *Journal of Nursing Education and Practice*, 5(6), 25.
20. Raine, D., & Gretton, S. (2017). The flipped classroom, a teaching enhancement fund report. Centre for Interdisciplinary Science University of Leicester.
21. Roehl, A., Reddy, S. L., & Shannon, G. J. (2013). The flipped classroom: An opportunity to engage millennial students through active learning strategies. *Journal of Family & Consumer Sciences*, 105(2), 44-49.
22. Smith, C. M., & McDonald, K. (2013). The flipped classroom for professional development: Part II. Making podcasts and videos. *The Journal of Continuing Education in Nursing*, 44(11), 486-487.



23. Love, B., Hodge, A., Grandgenett, N., & Swift, A. W. (2014). Student learning and perceptions in a flipped linear algebra course. *International Journal of Mathematical Education in Science and Technology*, 45(3), 317-324.
24. ThiThanhQuyen, T. (2017). Students' perceptions of flipped model on Facebook for educational purposes. *IOSR Journal of Research & Method in Education (IOSR-JRME)*, 7(3), 7-14.
25. Yang, J., Yin, C., & Wang, W. (2018). Flipping the classroom in teaching Chinese as a foreign language. *Language Learning & Technology*, 22(1), 16-26.
26. Zainuddin, Z., & Halili, S. H. (2016). Flipped classroom research and trends from different fields of study. *International review of research in open and distributed learning*, 17(3), 313-340.