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Artículos científicos

Implementación de aula invertida: desempeño académico de estudiantes universitarios en un curso de lectura de textos en inglés

Implementing flipped classroom: first year college students' academic performance in a EFL reading comprehension course

Implementação da sala de aula invertida: desempenho acadêmico de universitários em um curso de leitura de textos em inglês

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Resumen

Actualmente, el modelo de aula invertida ha adquirido un inusitado auge, en gran medida debido a la situación generada por el virus SARS-CoV-2 que todavía afecta al mundo entero. El interés en esta metodología se debe a la combinación de otros constructos importantes en educación, como el aprendizaje autodirigido, centrado en el alumno, desempeño escolar, entre otros, así como las tecnologías de la información y la comunicación (TIC) en el aula. Aunque existen muchas investigaciones sobre el uso del modelo de aula invertida y la comprensión de lectura en inglés, estas se centran principalmente en cursos generales de inglés y no abordan la instrucción exclusiva de comprensión lectora de textos en inglés, lo que representa una problemática muy particular en el aprendizaje de lenguas extranjeras.

Este trabajo de investigación abordó la intervención con el modelo de aula invertida para un curso de comprensión lectora en inglés dirigido a estudiantes de primer ingreso en una universidad situada al norte de la Ciudad de México. El estudio fue de corte cuantitativo con diseño cuasi-experimental con pre y pospruebas para comprobar si la mencionada intervención mejoraba el desempeño de los estudiantes. La muestra no aleatoria estuvo conformada por 63 estudiantes de

ambos sexos. A partir del análisis estadístico con la prueba U de Mann-Whitney, se encontró que la diferencia en el desempeño académico con el modelo de aula invertida y la enseñanza tradicional no es estadísticamente significativa (U = 454, p = .938, r = 0.01).

Palabras clave: clase invertida, comprensión de lectura, rendimiento académico, aprendizaje de idiomas, enseñanza superior, inglés.

Abstract

Nowadays the flipped classroom approach has acquired a great interest, largely due to the situation caused by the Sars – Co V - 2 virus which afflicts us worldwide. The interest in this methodology derives from the combination of other important constructs in education such as: self-directed learning, student - centered learning, academic performance, as well as Ict (information and communication technologies) in the classroom. Although there is an infinity of research on flipped classroom and reading comprehension in English, a few of them study reading comprehension as a sole skill. Reading comprehension instruction represents several challenges and a special teaching method when taught as foreign language (Efl).

This study aimed to prove whether the implementation of a Efl reading comprehension course for first - year undergraduate students at a public university in northern Mexico City improves academic performance on that subject. The study design was quasi - experimental with a non-random sample of 63 students both female and male. Pre- and post - tests were given to assess academic performance. From the Mann – Whitney U test analysis, it was found that the difference between flipped classroom - traditional instruction, is not statistically significant (U = 454, p = .938, r = 0.01).

Keywords: flipped classroom, reading comprehension, academic performance, Efl, higher education, English language.

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Resumo

Atualmente, o modelo de sala de aula invertida adquiriu um boom incomum, em grande parte devido à situação gerada pelo vírus SARS-CoV-2 que ainda afeta o mundo inteiro. O interesse por essa metodologia se deve à combinação de outros construtos importantes na educação, como aprendizagem autodirigida, centrada no aluno, desempenho escolar, entre outros, além das tecnologias de informação e comunicação (TIC) na sala de aula. Embora existam muitas investigações sobre o uso do modelo de sala de aula invertida e compreensão de leitura em inglês, estas são focadas principalmente em cursos de inglês geral e não abordam o ensino exclusivo de compreensão de leitura de textos em inglês, o que representa um problema muito particular. aprendendo idiomas extrangeiros.

Este trabalho de pesquisa abordou a intervenção com o modelo de sala de aula invertida para um curso de compreensão de leitura em inglês destinado a alunos do primeiro ano de uma universidade localizada ao norte da Cidade do México. O estudo foi de natureza quantitativa com desenho quase-experimental com pré e pós-testes para verificar se a referida intervenção melhorou o desempenho dos alunos. A amostra não aleatória foi composta por 63 alunos de ambos os sexos. A partir da análise estatística com o teste Mann-Whitney U, verificou-se que a diferença no desempenho acadêmico com o modelo de sala de aula invertida e ensino tradicional não é estatisticamente significativa (U = 454, p = 0,938, r = 0,01).

Palavras-chave: sala de aula invertida, compreensão de leitura, desempenho acadêmico, aprendizagem de línguas, ensino superior, inglês.

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Introduction

Flipped classroom currently attracts the interest of researchers and education specialists as a new way of organizing the educational process, integrating ICT. Learning has changed from the place and time to acquire knowledge to the place and time to apply the knowledge acquired (Evseeva & Solozhenko, 2015).

Flipped classroom transforms the teaching-learning process, where knowledge, theory, new content and the exercises necessary to acquire such knowledge are within the students' grasp at the time and space that they deem best; while in the classroom, the activities focus on completing more advanced tasks and discussing complex issues together with the teacher. At the same time, this techno-pedagogical approach also fosters students' self-direction (Zainuddin & Corinne, 2018),

self-regulation (Liu, Sands-Meyer & Audran, 2019) or autonomy (Lakarnchua, Balme & Mathews, 2020).

However, despite the undisguised zeal to incorporate state-of-the-art technology in the classroom, in real contexts this incursion must be accompanied by a long process of reflection, design, implementation, evaluation and adjustments to cope with new demanding practice issues, which includes new roles, scenarios and different communication styles framed in a range of spaces and times that represent a great challenge for all the actors of this new educational process.

On the other hand, English language is currently *lingua franca* used in an infinite number of fields, including the academy, science, culture, politics, economy, commerce, etc. It is undeniable that having a good linguistic competence in English is not only desirable, but also necessary to undergo such areas.

Therefore, we can assert that in Mexico, the teaching of English as a foreign language acquires a disturbing relevance, if we consider the little English language proficiency of the population, and that of students in particular, as shown by the results in international certification tests and publications of both public and private organizations.

Some examples of the above are: the Program for International Student Assessment [PISA] (2018); the Organization for Economic Co-operation and Development [OECD] (2012); the Ministry of Public Education [SEP] (2017); and the British Council [CB] (2020), which point to Mexican students with lower than average scores in reading, mathematics and science, or lacking elementary skills to perform successfully in the academy, being reading comprehension and English proficiency the most evident lacks.

It is necessary to innovate in the teaching method and the use of ICT could contribute to the learning and development of linguistic skills in that language. For this reason, the present study aimed to compare the academic performance of first-year college students taking the subject "Reading Comprehension of Texts in English I" at a public university in northern Mexico City.

The research question that guided to this study: “Is the academic performance different from students who attend a flipped classroom reading comprehension course to those who attend a traditional reading comprehension course?”.

Aim of the study

The aim of this study is to compare the academic performance of first-year college students who attend the subject "Reading Comprehension of Texts in English I" in a flipped classroom course to those who attend a traditional course.

Hypothesis

Students who take the course in a flipped classroom have a different academic performance than students who take a traditional classroom course.

Methodology

This was a quasi-experimental study with a pretest and a post-test. Two previously formed intact groups (Cohen, Manion, & Morrison, 2018) were analyzed during a 17-week-long semester. The pre-test was applied through Google Forms in both groups during the first week of the semester, while the post-test, in its printed version, was administered at the end of the semester, during the certification period scheduled by the university.

Population and sample

The students who enrolled in the subject "Reading Comprehension of Texts in English I" are in their first year of college. There are 20 majors offered by the university. Out of the 63 students participating in the study, 68% were women and 32% men; they are currently enrolled students aged 18 to 64 years. Although it is not part of the study, an interesting fact is that two thirds (63%) of the participants belong to social sciences and humanities majors (Table 1).

Table 1. Population majors

Major	Frequency	Percentage
Art and Cultural Heritage	5	8
Political Science and Urban Administration	9	14
Social Sciences	2	3
Culture and Communication	11	17
Literary Creation	5	8
Law	3	5
Philosophy and History	3	5
History and Contemporary Society	2	3
Engineering in Industrial Electronic Systems	1	2
Engineering in Electronic Systems and Telecommunications	1	2
Software Engineering	3	5
Nutrition and Health	10	16
Health Promotion	3	5
Civil Protection and Risk Management	5	8
N	63	100

Own work.

Instrument

The same test was used in both the pre-test and the post-test, with a 16-week difference in application. The instrument consists of a 604-word text written in standard English on a rare but non-controversial topic to assume lack of attention towards recycling. There were 15 multiple choice questions (a, b and c), each with a value of one point. The instrument evaluates skimming, scanning, search reading as well as understanding noun phrases and affixes, guessing word meaning and using the bilingual dictionary.

Before the application of the instrument and to determine its validity and reliability, the Kuder-Richardson test formula 20 (Richardson and Kuder, 1939) was used, calculated with Microsoft Excel for Mac version 16.61.1 (2022). The value found was 0.7138, which indicates that the instrument is reasonably reliable. The other statistical calculations were made with Data tab (2022).

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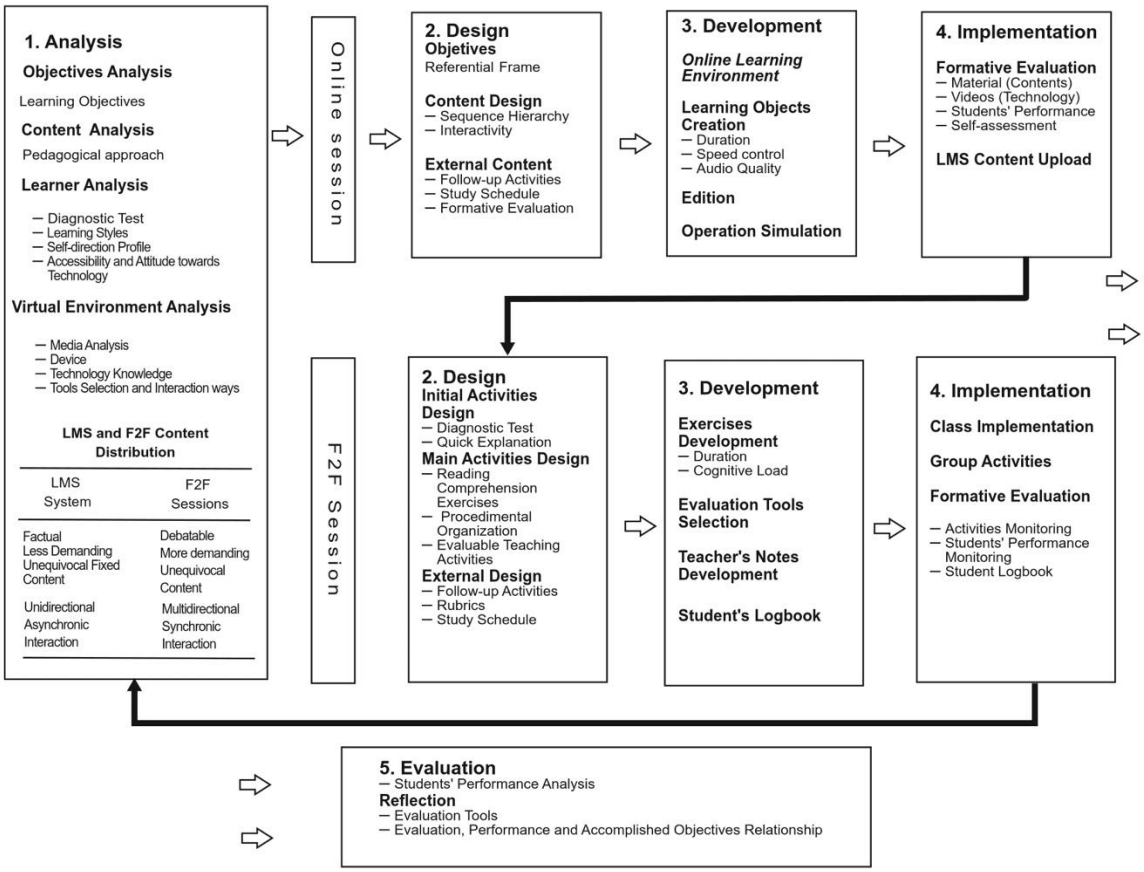
Procedure

The instructional design was carried out following the program of the subject "Reading Comprehension of Texts in English I" and the ADDIE (Analysis, Design, Development, Implementation and Evaluation) process as explained by Dafonte- Gomez, Garcia-Crespo and Ramahí-Garcia (2018). The ADDIE model for the flipped classroom reading course is shown in Figure 1.

Figure 1. ADDIE for a flipped reading comprehension course



Own work.

The intervention was carried out during 17 weeks corresponding to a normal university term (2 weekly sessions, 32 in total). During the first week, the diagnostic test (pre-test), the self-direction profile (Aceves, 2008) and the learning styles questionnaires (Alonso, Gallego and Honey, 1994) were applied via Google forms. In the same week, the objectives, content and methodology of the course were explained to the students.

The following explains both the experimental and control groups work throughout the implementation semester.

Experimental group (Ge)

In this group, the classic flipped classroom model was implemented, that is to say, a theoretical class on video on the Moodle LMS platform and two F2F sessions of an hour and a half at a classroom to give feedback, solve tasks, study vocabulary, do complementary exercises, etc.

At the same time, tasks were assigned to the students on the Moodle LMS platform, being the first tasks rather simple in order to familiarize the students with the learning environment. The development of metacognitive strategies was also favored with a self-assessment section included in some of the mentioned activities.

As the semester progressed, the theoretical topics were presented on the platform (theoretical class) and the class time (F2F) was used to carry out exercises, provide feedback, study vocabulary and/or make presentations or group discussions.

The entire course was found on the Moodle LMS platform, the downloadable textbook in PDF format and its video lessons which lasted about half an hour; students' video presentations of grammar topics (5 minutes length); and an alternative explanation with examples and links to complementary activities.

Control group (Gc)

The control group received the traditional teaching method, whose dynamics were very similar in each class. That is, the professor presented a grammatical topic and/or a sample text (an easy written text in English with a general interest topic). Then he continued with the activation of previous knowledge, the explanation of reading styles and guided practice through several exercises. Feedback was provided and as a follow-up, vocabulary and/or grammar explanation, group discussion, etc. At the end of the class, extra materials were provided as homework.

In both experimental group and control group, all the explanations, questions, and answers were given completely in Spanish. As it is a reading comprehension course, the only contact students have with the target language are texts written in English.

As previously mentioned, the sample consisted of 63 both female and male students. Its modest size was due to student dropout; that is, original online enrolled students found it unviable to attend classes at northern Mexico City university campus after the beginning of "the new normal."

All students from other campuses of the university who had enrolled in the experimental group were invited to continue with the course, since the theoretical class (full course) was on the Moodle LMS platform. However, a few students completed the semester online.

Results

Table 2 shows the descriptive results of the tests before and after the intervention, both for the control group (Gc) and for the experimental group (Ge). The arithmetic mean of the pre-test results in both groups is the same (4.56), but after the intervention a small increase is observed in the post-test (6.33 and 6.35).

Table 2. Pre- and Post-test Academic Performance

Group	Pre Gc	Pre Ge	Post Gc	Post Ge
Median	4.56	4.56	6.33	6.35
Std. Deviation	1.53	1.28	1.39	1.43
Variance	2.33	1.65	1.92	2.05
Range	6	5	4	4

Own work

Note that the standard error is lower in the control group after the intervention, which suggests that the group that took the traditional classroom course increased their average more uniformly.

Descriptive statistics after the intervention

The descriptive results of the experimental and control groups are shown in Table 3. All the tests were scored on a scale from 0 to 10. It is interesting to note that in both groups the minimum score was five points; that is, seven to eight correct answers out of fifteen of the post test.

Tabla 3. Post-test Student Academic Performance

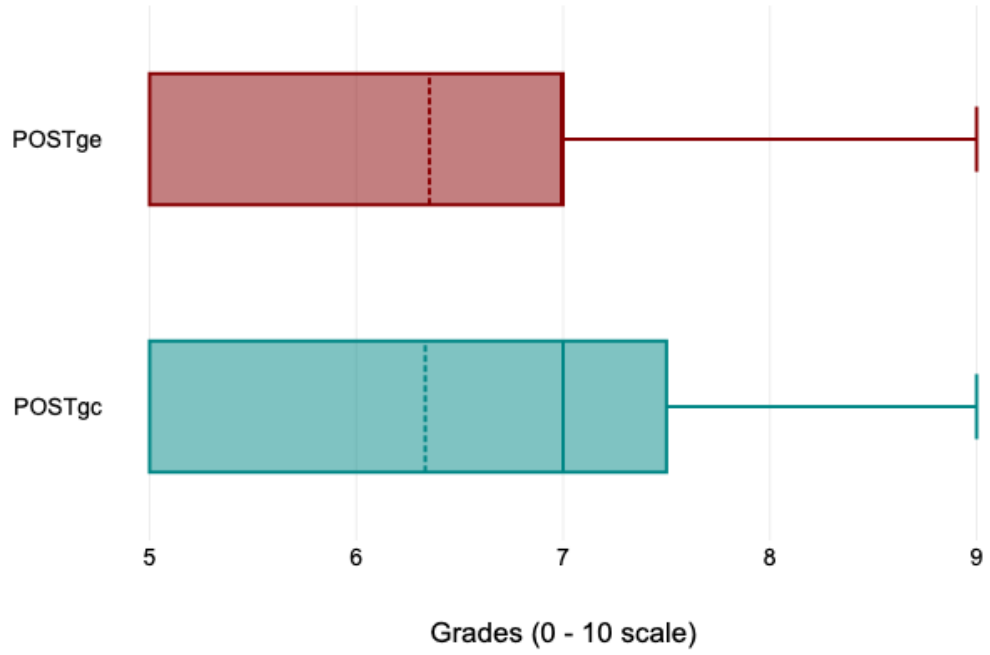
	Post Gc	Post Ge
Mean	6.33	6.35
Median	7	7
Modal	5	5
Std. Deviation	1.39	1.43
Quartile 1	5	5
Quartile 2	7	7
Quartile 3	7.5	7

Own work

The descriptive statistical operations of the post-test show that the control group and the experimental group have equal values for the dependent variable (Mdn = 7).

These data are graphically represented in a boxplot (Fig. 2), where five statistics are presented: the minimum, maximum, median, and first and third quartile values.

Figura 2. Post-test Boxplots (Gc & Ge)



Own work

The graphic above suggests that some students learn better in the traditional way, since, as Öztürk and Çakıroğlu (2021) point out, "In flipped EFL classroom, it is difficult for students to manage how and when they should study or how to evaluate their learning in in-class and out-of-class activities" (p. 5).

Normality test

With the data obtained after the intervention, the Shapiro-Wilk test was performed to determine if the dependent variable (academic performance) in the sample has a normal distribution and, thus, decide the type of statistical analysis to follow: parametric or non-parametric. The Shapiro-Wilk test is known to give better results when the sample number is less than 35 compared to other normality tests, such as Ryan-Joiner, Anderson-Darling, or Kolmogorov-Smirnov.

All four tests calculate the p-value of significance; if it is less than 0.05, it suggests non-normality, that is, the distributions are statistically and significantly different from a normal distribution (Cohen, Manion and Morrison, 2018). Since the number of participants in both the control group and the experimental group is much less than 35, the Shapiro-Wilk test was applied, the results of which are shown in Table 4.

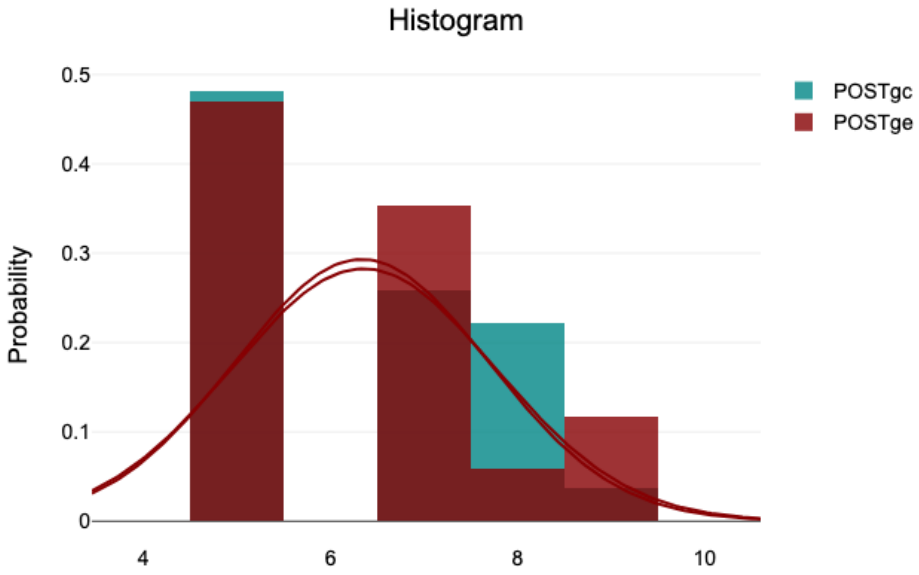
Table 4. Shapiro-Wilk Test for normal distribution

Shapiro – Wilk test	Statistics	p
Gc pretest	0.79	<. 001
Ge pretest	0.79	< .001

Own work

As described above, a non-parametric test was applied in this study because the sample is modest and does not follow a normal distribution (Rong-Chi, Liang-Yi, & Yong-Ming, 2016). This can also be seen in Figure 3.

Figure 3. Experimental and Control Groups Post-test Histogram



Own work

Thus, the Mann-Whitney U test was selected to compare the post-test medians in the control and experimental groups. Unlike parametric statistical tests, such as the Student's t-test, the Mann-Whitney U test does not require large samples nor a normal distribution. The result of the statistical analysis is shown in Table 5.

Table 5. Statistics for Mann–Whitney U-Test

Mann – Whitney	Values
U	454
Z	-0.08
Asymptotic Significance (2-tailed)	0.938
Exact Significance (2-tailed)	0.948

Own work

The Mann-Whitney U-test indicates that the difference in academic performance between the control group and the experimental group is not statistically significant.

Discussion

The result contained in Table 5 disagrees with what is generally found in the literature, where "around four out of five" (Rodríguez-Jiménez, Pérez-Ochoa and Ulloa-Guerra, 2021, p. 17) interventions resulted in gain or positive effect in the academic performance of the experimental group. In the same way and regarding reading comprehension instruction, Prado-Yépez et al. (2021) found that the flipped classroom has a significant impact on improving reading comprehension in English compared to traditional teaching.

Unfortunately, most of the published studies do not explain in detail how the learner manages to study, when and how he does it, or how the student evaluates her learning in each activity inside and outside the classroom, etc. Furthermore, Martinez et al. (2019) question whether "the flipped classroom has a high success rate in increasing student academic performance or there is a scarcity of publications that prove the contrary" (p. 33).

Instead, this study agrees with what was found by Al-Harbi and Alshumaimeri (2016), Mohammaddokht and Fathi (2022) and Öztürk and Çakıroğlu (2021), who point out that there is no significant or statistical difference that the flipped classroom positively affects EFL students academic performance.

In this respect, Hung (2017, cited by Amiryousefi, 2019) argues that the complex nature of the flipped classroom is due to the infinity of variables that permeate the final result (the environment in the classroom, the teacher's ability, the nature of materials and activities, etc.), thus suggesting that foreign language acquisition activities be flexible enough to meet all students' learning needs. He also acknowledges that it is "difficult to persuade students to work for themselves, as well as to accept the required academic load and time commitment" (p. 157).

Consequently, it is necessary to systematize and structure the flipped classroom more so that both students and teachers have not only technology, but also full accessibility to the LMS platform and its contents, without assuming that they already have technical support or essential computer skills.

It is also pertinent to explain the benefits and limitations of this methodology and familiarize students in the various ways in which flipped classroom can be implemented; as Mohammaddokht and Fathi (2022) suggest, "foreign language teachers should be instructed on how to use the flipped classroom to teach reading skills" (p. 7).

The present study had limitations. The first, the transition to the "new normal"; that is, the semester of intervention began online to continue in campus the following month, which resulted in a large dropout of students.

The second limitation, totally related to the previous one, was the very modest size of the sample. These limitations had an impact on the result obtained, which must be taken with caution since it is possible that it cannot be transferred to other populations.

However, it is interesting to have verified that students who did not belong to the campus were able to finish the semester via Moodle LMS platform; indeed, the encouraging finding is that the flipped classroom empowers access to knowledge.

Conclusions

This work focused on comparing the academic performance of students who take the subject "Reading Comprehension of Texts in English I" with the flipped classroom model and with the traditional teaching model. The subject is included in the first year of instruction in a public university at northern Mexico City.

The Mann-Whitney U-test demonstrated that the difference between the control group and experimental group post-test with respect to the dependent variable is statistically non-significant ($U = 454$, $p = .938$, $r = 0.01$); therefore, the proposed hypothesis is not supported:

“Students who take the course with the flipped classroom implementation have a different academic performance than students who take it with traditional teaching model.”

Finally, despite the limitations of this study and the result obtained, theoretically the flipped classroom techno-pedagogical approach allows students to achieve results in their learning due to the personalized pace of consulting online videos.

This flexibility that the learners have to organize their study and decide how, when and where to access the platform not only encourages self-direction but also, it is an inclusion methodology for students with reduced mobility or whose time is compromised for work or family reasons, can obtain academic achievements. The conditions for achieving such goals are well worth further investigation.

Future lines of research

This study exclusively covered the effect of the flipped classroom on the academic performance of an EFL reading comprehension course. A future study could also evaluate the effects of the flipped classroom on the student's self-direction, self-regulation, autonomy and/or motivation, or whether the flipped classroom reduces anxiety in the study of a foreign language.

Due to the quantitative nature of this research, there is a need to find out how the student feels about this techno-pedagogical approach. A future mixed-design study, made up of a much larger sample, could include interviews with students, analysis of their participation in the platform's forums, and observations during F2F sessions. All of the above would make it possible to make more precise findings and verify whether a flipped classroom course is a feasible high-achievement methodology for teaching EFL reading comprehension.

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