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Effectiveness of flipped classroom in developing 11th graders' grammatical competences in Arabic

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ABSTRACT

Several studies reported the effectiveness of flipped classroom in facilitating learning and improving students' learning experiences, but few have focused on language learning (Arabic in particular). This research aimed to explore the effectiveness of the flipped classroom strategy in developing female 11th graders' Arabic grammatical competences in Arabic. A pre-test–post-test quasi-experimental design and a questionnaire were utilized to achieve such a purpose, using two equal groups ($N = 100$). The experimental group received the flipped classroom-based treatment, whereas the control group was taught with the usual method of teaching. Statistical methods (i.e. ANCOVA, *t*-test, and Pearson correlation coefficient) were used to analyze the data. The analysis revealed statistically significant differences between the mean scores of the post-test of the two groups in favor of the experimental group and a large effect size ($F = 0.35$). The study recommended using the flipped classroom strategy in developing the grammatical competence of native Arabic speakers, with all necessary technologies and infrastructure provided for schools.

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Flipped classroom; grammatical competence; course system; revised Bloom's taxonomy

1. Introduction

In the age of technology, the educational system seeks to equip students with essential twenty-first century skills through which students can become researchers. Students can then use technology effectively in learning outside schools to enhance critical thinking, self-learning, communication skills, and collaborative learning in a manner that ensures improvement of educational outputs (Al-Zahrani, 2015). Technology is an efficient tool in enriching learning environments and offering students with better learning opportunities (Chun & Plass, 2000; Jonassen & Reeves, 1996; Means, 1994). The integration of new technologies into teaching lessons creates unique opportunities for language teachers, motivates students, and engages them in the learning process (Girmen & Kaya, 2019). Innovative educators seek instructional methodologies that improve learning as well as motivate students to excel (Johnson et al., 2016).

Flipped classroom is one of the digital technologies proposed to improve students' learning and increase their motivation. Several studies reported the effectiveness of flipped classroom in improving students' performance and motivation in humanities, social science, and science (Davies et al., 2013; Girmen & Kaya, 2019; Han, 2015; Hsieh et al., 2016; Kevin, 2013; Moranski & Kim, 2016; Yang, 2017). Specifically, Cheng et al. (2018) found a statistically significant effect size ($g = 0.193$; $p < 0.001$; with a 95% confidence interval of 0.113–0.274) in favor of the flipped classroom instructional strategy in social science, science, mathematics, engineering, arts, and humanities. The novelty of the

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present study is that it examines the effectiveness of flipped classroom in developing students' grammatical competences in Arabic, which has not been considered according the best of the author's knowledge. Unlike previous studies on flipped classroom, it attempts to employ flipped classroom in facilitating students' challenges in achieving grammatical competence drawing on revised Bloom's taxonomy to attain accuracy in achieving the objective of the study. In Saudi Arabia, students encounter challenges in achieving grammatical competences in Arabic. As a teacher of Arabic, the author noticed a lack of interest and slow progress among students when teaching them grammatical competences, which might be attributed to traditional methods of teaching or complexity of Arabic grammar. In addition, several studies (i.e. Al-Harbi, 2015; AL-Zahrani, 2013) reported several shortcomings in students' acquisition of grammatical competences that manifest in the spread of grammatical errors among students in speaking, writing, parsing, and applying grammatical rules. These studies attributed such deficiencies to the traditional methods of teaching, which do not support students' practice of a language through activities. Drawing on the potential benefits of flipped classroom in the theoretical and empirical literature, the present study intends to explore the effectiveness of flipped classroom in aiding students to achieve grammatical competences.

1.1. Flipped classroom

Flipped classroom is one of the modern strategies in which interactions between a teacher and a learner occur, using technology to achieve educational objectives. It provides "a dynamic and interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (Flipped Learning Network, 2020, p. 1). The raised question is: How does traditional classroom differ from flipped classroom? Traditional classroom is teacher centered in which students are merely receivers of information and the class is the sole venue of learning. On the contrary, the idea of flipped classroom is summarized by Bergmann and Sams (2012) in few words, saying "which is traditionally done in class is now done at home, and that which is traditionally done as homework is now completed in class" (p. 13). In the present study, the author operationalized flipped classroom as a set of planned meaningful procedures that are based on flipped classroom instructional strategy through an electronic platform. The three steps of learning (presentation, training, and evaluation) are distributed between home (presentation and training) and school (evaluation).

Several studies emphasized the effectiveness of flipped classroom and its positive effects on teaching and learning processes either at a local level (Al-Abiri, 2015; Al-Jibrin, 2016; Al-Maqati, 2016; Al-Mu'adi, 2016; Al Zein, 2015; AL-Zahrani, 2013) and at an international level (Cheng et al., 2018; Girmen & Kaya, 2019; Han, 2015; Hsieh et al., 2016; Moranski & Kim, 2016; Yang, 2017).

As for its role in learning process, Al-Mu'adi (2016), Al Zein (2015), and Al-Abiri (2015) found that flipped classroom creates a positive environment along with the learner's sense of independence, self-esteem, and proficiency in learning, understanding, and application. Al-Maqati (2016), Al-Jibrin (2016), and AL-Zahrani (2013) found the positive effect of flipped classroom on students' achievement at higher cognitive levels (application, analysis, synthesis, and evaluation) and consideration of individual differences among learners.

As for the positive effect of flipped classroom on learning a foreign language, Girmen and Kaya (2019) studied the effect of the flipped classroom model on enriching the development of fourth graders' basic language skills with digital story activities and games. Girmen and Kaya found that the use of flipped classroom model developed the students' basic language skills along with their cognitive, emotional, social, and psychomotor skills. Similarly, Yang (2017) examined the use of a flipped classroom in the English language subject in secondary classrooms in Hong Kong. Upon conducting quantitative and quantitative data analyses, Yang found that students are positive about the flipped classroom on the one hand. On the other hand, although the teachers consider the flipped classroom pedagogy creative, they think it may only be useful for teaching English grammar. Hsieh et al. (2016) revealed the effectiveness of the theory-based flipped instruction in enhancing

participants' motivation, making them more active in using idioms in class and significantly improving their idiomatic knowledge. These works differ from the present study in considering the effect of flipped classroom on foreign language learners.

Cheng et al. (2018) conducted a meta-analysis of the overall effect of flipped classroom on student learning outcomes in relation to a set of moderating variables, including student levels, publication types, study durations, and subject areas. They reviewed 55 publications published between 2000 and 2016 and found a statistically significant effect size of the flipped classroom ($g = 0.193$). Through a quasi-experimental study that used a block randomized design, Leo and Puzio (2016) examined the effectiveness of flipped instruction in a ninth-grade biology classroom. They found that flipped instruction exerts a positive effect on students' achievement, with effect sizes ranging from +0.16 to +0.44.

Using a pre-test–post-test experimental design, Olakanmy (2017) studied the effect of a flipped classroom model of instruction on academic performance and attitudes of 66 first-year secondary school students toward chemistry. They revealed that the flipped instruction model facilitates a shift in students' conceptual understanding of the rate of chemical reaction that is more significant than under the control condition. Moranski and Kim (2016) examined the impact of flipped classroom on 14 intact third-semester Spanish classes ($N = 213$). They found that the use of flipped classroom positively affects students' performance in the assignments with regard to perceived comfort, enjoyment, and subsequent confidence in the material.

Davies et al. (2013) studied the benefit of flipping the classroom in introductory-level college course on spreadsheets in terms of student achievement and satisfaction with the class, using a pre-test–post-test quasi-experimental mixed methods design. They found that flipped classroom is effective and scalable as it better facilitates learning than simulation-based training. Students also view this approach more motivating in that it allows for greater differentiation of instruction.

Reviewing the aforementioned studies reveals the positive effect of flipped classroom on students' academic achievement, self-study, and autonomy in several courses, such as mathematics, English language, chemistry, and Arabic. To the best of the researcher's knowledge, no single study has been devoted to the effectiveness of flipped classroom in developing students' grammatical competences in Arabic. Several studies reported deficiencies in grammatical competences, which are attributed to the methods that focus on memorization and rote learning that are devoid of practice and interaction. To bridge this gap, the author employed flipped classroom to study its effectiveness in developing students' grammatical competences in Arabic, assuming that its potential benefits can motivate students and provide them with more time to process grammatical rules effectively.

Educators in Saudi Arabia devote ample attention to Arabic language because it is a symbol of identity that preserves the Arabic culture and protect deviation from the Arabic language system (Khater et al., 1981). In Saudi Arabia, Arabic enjoys a high status as the language of instruction and a means of communication. Dhafer and Al-hammdi (1983) referred to this importance, saying that the plan of teaching Arabic in Saudi Arabia is the most comprehensive plan in the Arab world in which the focus on Arabic is manifested in the objectives of the high schools, as stated by the Ministry of Education. This importance is based on the assumption that excellence in the mother tongue leads to excellence in other subjects.

Given the importance of high schools in linking general and higher education, the Ministry of Education (2001) states that the syllabus of grammatical competences is the best solution for students' linguistic problems. In addition, the Ministry devotes ample attention to developing strategies of teaching Arabic to make it interesting for students and create positive attitudes toward the subject among the students. The principals in the Ministry of Education realize that grammatical competences are insufficient and that there should be new methods for teaching Arabic that pique students' interest in the learning process.

1.2. Grammatical competences

Grammar is a system that organizes people's use of a language and a means to acquire other skills of a language. Ibn Khaldun (1958) emphasized the importance of grammar, saying that it is one of the most important branches of a language and its ignorance results in misunderstanding. Al-Sulaiti (2002) emphasized the importance of grammar, saying that Arabs devote ample attention to grammar, and they are careful in its use because Arabic has rules and any deviation from these rules is considered an error in the structure and meaning. To enable learners to have a good command of language skills (reading, speaking, listening and writing), they should have grammatical competences because grammar is the backbone of a language. The Saudi Arabia Ministry of Education (2011, p. 8) defines grammatical competence as sound language performance that is based on knowledge, including reception and production skills. In generative grammar, grammatical competence is defined as:

> the implicit system of rules that constitutes a person's knowledge of a language. This includes a person's ability to create and understand sentences, including sentences they have never heard before, knowledge of what are and what are not sentences of a particular language, and the ability to recognize ambiguous and deviant sentences. (Richards et al., 1985, pp. 93–94)

Drawing on the previous definitions, the operationalized definition of grammatical competence in this study is students' proper grammatical performance resulting from knowledge to produce an infinite number of correct grammatical sentences, evaluate the correctness of grammatical structures, and connect between the produced sounds and pronounce them correctly in the required situations. Such a performance can be measured by students' scores in grammatical competence tests.

1.2.1. Grammatical competences and revised Bloom's taxonomy

The author draws on the revised Bloom's taxonomy of educational objectives to measure grammatical competences. The taxonomy provides a model that orders cognitive processes from simple remembering to higher critical and creative thinking. The model consists of the following levels: remember, understand, apply, analyze, evaluate, and create (Anderson & Krathwohl, 2001). Krathwohl (2002) stated that Bloom's taxonomy is more than a measurement tool. According to Krathwohl (2002, p. 212), Bloom believed the model could serve as:

- common language about learning goals to facilitate communication across persons, subject matters, and grade levels
- basis to determine for a course or a curriculum the specific meaning of broad educational goals, such as those found in the currently prevalent national state, and local standards
- means for defining the congruence of educational objectives, activities, and assessments in a unit, course, or curriculum
- panorama of the range of educational possibilities against which the limited breadth and depth of any particular educational course or curriculum can be considered.

Accordingly, these levels help teachers measure accurately students' competences in any subject. Table 1 provides additional details about the levels and sub-levels of the model.

The author classified the grammatical competences according to the revised Bloom's taxonomy for the following reasons:

(a) to operationalize the objectives of the teaching grammar accurately
(b) to choose the appropriate content to teach the grammar
(c) to design balanced and comprehensive activities that provide students with comprehensive grammatical knowledge and skills
(d) to choose appropriate teaching methods for teaching grammatical competences

Table 1. Classification of revised Bloom's taxonomy.

1. Remember: Refining relevant knowledge from long-term memory
1.1. Recognizing
1.2. Recalling
2. Understand: Determining the meaning of instructional messages, including oral and graphic communication
2.1. Interpreting
2.2. Exemplifying
2.3. Classifying
2.4. Summarizing
2.5. Inferring
2.6. Comparing
2.7. Explaining
3. Apply: Carrying out or using a procedure in a given situation
3.1. Executing
3.2. Implementing
4. Analyze: Breaking material into constituent parts and detecting how the parts relate to one another and to an overall purpose
4.1. Differentiating
4.2. Organizing
4.3. Attributing
5. Evaluate: Making judgment based on criteria and standards
5.1. Checking
5.2. Critiquing
6. Create: Putting elements together to form a novel, coherent content or make an original product
6.1. Generating, producing, planning

Adapted from Anderson and Krathwohl (2001).

(e) to allow the teacher to choose the appropriate assessment tool according to the skills and educational objectives
(f) to improve students' receptive skills (reading and listening) and productive skills (speaking and writing).

Al-Harbi (2015), Al-Khamash (2008), and Brikit (2001) classified grammatical competences according to the educational objectives. Their classifications are similar to an extent, and the differences lie in the level of the grammatical competences (whether they are classified in the lower or higher levels of objectives). Unlike the aforementioned studies, the author based her classification of grammatical competences according to the revised Bloom's taxonomy. The author settled the differences between the previous classifications through referees' review. The author arrived at a classification of 24 competences distributed in the six educational objectives (remember, understand, apply, analyze, evaluate, and create). She applied the educational objectives on a unit of grammatical competences of female 11th graders, which includes the following topics: coordination, adjective, emphasis, apposition, vocative case, exceptive sentences, exclamation statement, and number. Based on the revised Bloom's taxonomy and drawing on the previous studies on the classification of grammatical competences, the author arrived at the following list of grammatical competences (Table 2).

2. Hypotheses and research questions

The main hypothesis that underlies this study is that flipped classroom is effective in developing 11th graders' grammatical competences. This hypothesis is based on the theoretical and empirical literature on the potential benefits of flipped classroom in learning. To be specific, this study hypothesizes statistically significant differences between the experimental and control groups in favor of the experimental group. Based on this hypothesis, the following research questions are raised:

(1) How effective is flipped classroom in developing 11th graders' grammatical competences?
(2) Are there any statistically significant differences between the experimental and control groups?
(3) What grammatical competences should 11th graders acquire in the course system?

Table 2. Grammatical competences classified according to Bloom's educational objectives.

1. Remember
1.1. Define a grammatical term
1.2. Recall a grammatical rule
1.3. Mention the function of a word in a syntactic structure
1.4. Mention the case marker in a syntactic structure
2. Understand
2.1. Conclude a grammatical rule in a syntactic structure
2.2. Differentiate between the different syntactic structures
2.3. Classify grammatical functions according to their types and cases
2.4. Give a case marker for a word in a syntactic structure
3. Apply
3.1 Parse a word or more than a word in a grammatical structure correctly
3.2. Use grammatical structures in writing
3.3. Make necessary changes when adding or deleting a grammatic agent
3.4. Transforming a grammatical structure into another grammatical structure
4. Analyze
4.1. Analyze a grammatical structure into its constituents
4.2. Determine the accurate differences between similar grammatical structures
4.3. Elicit a grammatical rule from given examples
4.4. Classify grammatical concepts according to their rules
5. Evaluate
5.1. Identify grammatical mistakes in grammatical structures
5.2. Correct grammatical mistakes in grammatical structures
5.3. Explain the cause of mistakes
5.4. Distinguish between correct and incorrect grammatical structures
6. Create
6.1. Design a conceptual model that illustrates grammatical rules
6.2. Write a correct paragraph that delivers a specific idea
6.3. Find solutions to a specific grammatical problem
6.4. Write a correct grammatical paragraph that includes certain conjunctions

3. Experiment

3.1. Methodology

This study followed a quasi-experimental design (Creswell, 2013) to examine the effectiveness of flipped instruction in developing the grammatical competences of female 11th graders whose ages range from 17 to 18. After the students' consent and the other required permissions were obtained, the study was conducted on female 11th graders who took a 16-session course in early 2017 in Buraydah, Saudi Arabia. Of note, the education system in Saudi Arabia is not co-education, which means that males and females are segregated. The ''course system'' is defined by the Ministry of Education (2011, p. 10) as a new secondary education structure that consists of a joint program. It is divided into two specialized tracks (i.e. humanities and science). Its plan is different from a semester system in terms of credit hours, grade point averages (GPA), semester grades. The course system also differs from the integrated curriculum system, which integrates courses and methods of teaching and assessment to enable students to acquire skills and prepare them for life and labor market.

3.2. Sample

The population of the study was female 11th graders in Buraydah in the academic year 1438/1439 (corresponding to 2017). The statistics of the students were taken from the website of the Ministry of Education in Qassim region. A total of 1200 female students were distributed in 15 high schools. Out of the 15 schools, one school was selected randomly. The number of the 11th graders in the selected school was 100. These students were then distributed equally in two groups (50 in the control group and 50 in the experimental group).

3.3. Variables

Variables are the different factors that play a role in a study. This study investigated the effectiveness of the independent variable (flipped classroom) in the dependent variable (grammatical competences), using two equal groups (control and experimental groups). The experimental group was taught using flipped classroom, whereas the control group was taught through traditional instruction.

3.4. Instruments and data collection

The data collection highly considered the research questions so that they could be best answered. The research used two methods (a test and a questionnaire), and the methods supplemented each other. The questionnaire included a list of grammatical competences refereed by experts of the Arabic language to determine the grammatical competences that are necessary for female 11th graders (see Appendix 1). To ensure its validity and reliability, the test aimed at measuring the students' performance in the grammatical competences was applied before and after the experiment on the experimental and control groups (see Appendix 2). The achievement test was used as a tool to measure the extent to which the female students acquire grammatical competences after applying the flipped classroom strategy.

The main aim of the questionnaire was to determine the grammatical competences that 11th graders need. With the theoretical and empirical literature on grammatical competences as basis, the list of grammatical competences was created. To validate this list, the author followed the set of procedures detailed below.

The design of the questionnaire requires determination of the appropriate grammatical competences for 11th graders. To achieve this objective, the researcher designed the grammatical competences according to the following steps:

(1) reviewing literature on grammatical competences
(2) subjecting the list of grammatical competences for review by experts in the Curriculum and Methods of Instruction of Arabic Language to determine the relevant grammatical competences that 11th graders need (see Appendix 1).

The first draft of grammatical competences was refereed by a panel of 32 experts to determine the validity of the instrument, clarity of wording, and appropriateness of the competences to achieve the objectives of the study. The panel included experts specializing in Curriculum and Methods of Instruction of Arabic and teachers of Arabic. The researcher modified the list of grammatical competences according to the suggestions of the panel, which included appropriateness of the competences for the level of female 11th graders and cognitive level of the competences. The referees were required to rate the competences on a scale from less than 60–100 to ensure objectivity of their rating.

This procedure was followed to rate the list of grammatical competences according to their importance so that every competence was given a value. Specialists in Arabic language and Curriculum and Methods of Instruction of Arabic were consulted to rate these competences according to their importance (very important = 80–100, important = 60–79, not important = less than 60). See Appendix 1 for the details.

The objective of the test was to measure the effectiveness of flipped classroom in developing 11th graders' grammatical competences. The test aimed to show differences between the performance of the experimental and control groups before and after the treatment. The achievement test was confined to measure six levels (remember, understand, apply, analyze, evaluate, and create). The researcher applied the test after determining its objectives and the appropriate grammatical competences obtained from a list of refereed competences (validated questionnaire) that the study sought to develop.

On the basis of the list of the grammatical competences and the objectives of the test, the items of the test were designed. The items of the test took the form of clear and brief multiple-choice questions to ensure the clarity of students' answers. The questions of the test aimed to measure the students' achievement of the educational objectives in which the list of grammatical competences was based on. The test included 24 questions, and each question had four options (with only one correct answer), except questions in the level of create, which needs students' writing.

The first draft of the achievement test was refereed by the same expert panel to determine the validity of the instrument in measuring what it aimed to measure, clarity of the statements, and the appropriateness of the competences to achieve the objectives of the study. The comments of the referees included clarity and accuracy of the test items, which assisted the author in placing each item under its right educational objective.

The researcher measured the internal validity of the instrument using the Pearson correlation coefficient by calculating the correlation coefficients between the items of the test and the sum score test. Table 3 shows the correlation coefficient for all questions.

Table 3 shows a statistically significant correlation between the scores of the questions and the sum of the test scores, which ranged from 0.238 to 0.787. Accordingly, most questions achieved the objectives of measurement.

To measure the reliability of the test, the author measured the reliability of the instrument via Cronbach's alpha and split-half (see Tables 4 and 5, respectively).

Table 4 shows that the test of grammatical competences achieved high reliability in the pre-test (0.757) and post-test (0.899), indicating the author's adequate procedures in building the test.

Table 4 shows that the Pearson coefficient (0.803), Spearman–Brown coefficient (0.890), and Guttman coefficient (0.881) were statistically significant at 0.01. Such figures indicated that the test of grammatical competences yielded a high degree of reliability.

To verify the homogeneity of the sample, a *t*-test was conducted on the students' scores in the test of the grammatical competences in the pre-test (see Table 6).

Table 6 shows that the calculated *t*-value (1.935, $p = 0.056$) was greater than 0.05, thus indicating no statistically significant differences between the scores of the students in the pre-test. Accordingly, the results showed the homogeneity of the experimental and control groups in the test of grammatical competences.

3.5. Procedures

Many procedures were taken to ensure that the study was conducted correctly. The teacher presented the lessons via short video clips that she shared with students electronically through interactive Wizi Q, Edmodo, and YouTube channel. The students watched the content of these videos at home or elsewhere, using their own computer or smart devices before attending the lesson. The time of the class was dedicated to discussions, activities, exercises, and evaluation. The use of Wizi Q enables live and self-paced online lessons, which facilitate direct communication and online

Table 3. Validity of the test of grammatical competences.

Question	Correlation	Question	Correlation	Question	Correlation
1	0.238*	9	0.396**	17	0.368**
2	0.608**	10	0.515**	18	0.393**
3	0.641**	11	0.710**	19	0.515**
4	0.522**	12	0.427**	20	0.657**
5	0.493**	13	0.353**	21	0.712**
6	0.537**	14	0.393**	22	0.744**
7	0.635**	15	0.468**	23	0.787**
8	0.19	16	0.329**	24	0.637**

**$p < 0.01$.
*$p < 0.05$.

Table 4. Reliability of the test via Cronbach's alpha.

Test	No. of items	Cronbach's alpha coefficient
Pre-test	24	0.757
Post-test	24	0.899

contact between the teacher and students. Edmodo helps teachers share the content of the lessons, assignments, and tests with students, which enables students to watch the content of the lessons several times at their convenience.

The author carried out the following steps in conducting the study:

(1) obtained agreement for conducting the study from the Office of Education in Buraydah, which manages all the schools of Buraydah
(2) made a detailed plan for conducting the study and its stages, including time for conducting each stage (15-3-1439–16-4-1439 corresponding to 4-12-2017–5-1-2018)
(3) prepared a manual for teachers to teach via flipped classroom and produced video clips (see Appendix 3)
(4) trained students to use Edmodo and Wizi Q
(5) conducted the experiment wherein the experimental group was taught using flipped classroom; the control group, traditional method
(6) conducted post-test on the two groups after completing the experiment.

The researcher selected the content of the unit of the 11th graders' textbook in the light of the objectives of the study, situation, level of students, depth and relevance of the topics, and the time available to teach each unit. The topics of the grammatical competences include:

(1) Al-Tawabea (coordination, adjective, emphasis, and apposition)
(2) grammatical styles (vocative case, exceptive sentences, exclamation statement, and number).

These topics were taken from the first unit of the 11th graders' textbook 3, which was taught to 11th graders in Saudi Arabia in the first semester, which included eight lessons. The authors selected the first unit of the textbook because of its inclusion of the grammatical competences.

3.5.1. Design of the unit of grammatical competences using video

The researcher followed many procedures in designing the unit of grammatical competences using videos. The steps are as follows:

(a) defined the objectives of unit
(b) defined the grammatical terms, such as Al-Tawabea (coordination, adjective, emphasis, apposition and vocative case, exceptive sentences, exclamation statement, and number)
(c) gave correct examples for coordination, adjective, emphasis, apposition, vocative case, exceptive sentences, exclamation statement, and number
(d) used the right case marker for each word

Table 5. Reliability of the test via split-half.

Correlation	Coefficient	Sig.
Pearson	0.803**	0.00
Spearman	0.890**	0.00
Guttman split-half	0.881	0.00

**$p < 0.01$.
*$p < 0.05$.

Table 6. *T*-test for sample homogeneity.

Group	No.	Mean	SD	DF	*T*	Sig.
Control	50	8.02	3.26	98	−1.935	0.056
Experimental	50	9.24	3.04			

(e) checked any error in the use of grammatical topics covered by the study
(f) wrote and read sentences and paragraphs on the topics of grammatical competences correctly
(g) distinguished between grammatical styles: vocative case, exceptive sentences, exclamation statement, and number
(h) distinguished between each type of the grammatical style, parsing it, and using the right case for each a word in addition to determining their particles
(i) read the texts loudly in which the grammatical structures were included correctly (see Appendix 3).

3.5.2. Methods of assessment of the unit of grammatical competences

The author followed practical methods for assessing 11th graders' performance in the unit of grammatical competences. These methods are listed below.

(a) Tests: the textbook's tests and teachers' tests
(b) Classroom activity: individual and group activities, oral and written activities, and worksheets
(c) Non-class performance on the synchronized Wizi Q platform: simultaneous learning and implementation of activities, written and verbal
(d) Presentations and projects of the unit through the asymmetric platform Edmodo
(e) Research and self-study: the activities that are carried out by the students assigned by the teacher or suggested by the textbook that are done outside the class (inside or outside the school).

3.5.3. Design of the instructional videos

The author followed many procedures to produce the instructional videos. The steps are as follows:

(a) determined the objectives of the video
(b) selected appropriate content
(c) selected educational activities
(d) wrote texts of the lessons
(e) recorded explanations of the lessons
(f) designed illustrations
(g) edited videos
(h) had 21 referees specializing in video montage review the videos
(i) had the previously mentioned expert panel review the videos
(j) modified the content of lessons and montage according to the comments of the expert panel
(k) created a channel on YouTube (https://t.co/A6QgwG8lWR) and uploaded video lessons on this channel(see Appendix 3)
(l) presented the videos via flipped classroom strategy and shared the link of the videos with the students (see Appendix 3)

(m) produced eight videos whose average length was roughly eight minutes, and each video has a topic of grammatical competence (see Appendix 3).

The students viewed the videos in the evening and discussed the competences included in the videos in class the next day. The videos included transcripts so that students can read the transcripts and listen to the videos at the same time to facilitate comprehension.

4. Results and discussion

This study primarily aimed to measure the effectiveness of flipped classroom in developing the grammatical competences of female 11th graders in the general education course system. In this section, the data retrieved by the test of grammatical competences and questionnaire were structured according to the research questions.

4.1. Grammatical competences

The question "What grammatical competences should 11th graders acquire in the course system?" was answered through the questionnaire of the list of the grammatical competences. Table 7 shows the referees' rating of the grammatical competences.

The list consists of 24 competences whose relative importance ranges between 88% and 100%.

4.2. Effectiveness of flipped classroom in developing grammatical competences

The question "How effective is the flipped classroom in developing female 11th graders' grammatical competences?" was answered via students' answers to the achievement test. To address this research question, the students' pre-test and post-test scores for overall students' competences were compared. To compare the pre-test and post-test scores, descriptive statistics, eta squared, *t*-test, and ANCOVA were utilized to analyze the data.

T-test was employed to test the differences between the mean scores of the post-test of the experimental and control groups. The results of the *t*-test revealed significant differences between the mean scores of the experimental and control groups in the post-test.

Table 7. Referees' rating of grammatical competences.

1. Remember	
1.1. Define a grammatical term	90%
1.2. Recall a grammatical rule	100%
1.3. Mention the function of the word in a syntactic structure	88%
1.4. Mention the case marker in a syntactic structure	96%
2. Understand	
2.1. Conclude a grammatical rule in a syntactic structure	100%
2.1. Differentiate between different syntactic structures	98%
2.2. Classify a grammatical function according to their types and cases	96%
2.3. Give a case marker for the word in a syntactic structure	99%
3. Apply	
3.1. Parse a word or more than one word in a grammatical structure correctly	97%
3.2. Use grammatical structures in writing	100%
3.3. Make necessary changes when adding or deleting a grammatic agent	95%
3.4. Transform a grammatical structure into another grammatical structure	89%
4. Analyze	
4.1. Analyze a grammatical structure into its constituents	98%
4.2. Determine the accurate differences between similar grammatical structures	96%
4.3. Elicit a grammatical rule from given examples	100%
4.4. Classify grammatical concepts according to their rules	100%
5. Evaluate	
5.1. Identify grammatical mistakes in grammatical structures	94%
5.2. Correct a grammatical mistake in grammatical structures	100%
5.3. Explain the cause of mistakes	88%
5.4. Distinguish between correct and incorrect grammatical structures	96%
6. Create	
6.1. Design a conceptual model that illustrates a grammatical rule	100%
6.2. Write a correct paragraph that shows a specific meaning	98%
6.3. Find solutions to a specific grammatical problem	95%
6.3. Write a correct grammatical paragraph that includes specific conjunctions	100%

Table 8 shows that (t (98) = 6.976, p = 0.01), which revealed significant differences in favor of the experimental group. Specifically, the table shows statistically significant differences in favor of the experimental group (M = 21.64, SD = 6.10, p = 0.01) over the control group (M = 14.54, SD = 3.82, p = 0.01) in the post-test of grammatical competences. Comparing the mean scores of the post-test in the control and experimental groups revealed an increase in the scores of the experimental group.

Comparing the results of the pre-test (M = 9.24, SD = 3.04) and post-test (M = 21.64, SD, 6.10), (t (98) = −12,863, p = 0.01) indicated statistically significant differences in favor of the post-test (Table 9).

To determine the degree of development in students' grammatical competences among those in the experimental group, the following equation was used:

$$\frac{M2 - M1}{M1} \times 100 = \frac{21.64 - 9.24}{9.24} \times 100 = \frac{12.40}{9.24} = 134.0\%.$$

The result of the equation showed the degree of development in students' grammatical competences. The score in the post test of the experimental group was 134.0%, which revealed the degree of effectiveness of the flipped classroom strategy in the development of the students' grammatical competences.

4.2.1. T-test for grammatical competences

The researcher also tested the existence of statistically significant differences between the mean scores of the experimental group in the 24 grammatical competences at the six levels (remember, understand, apply, analyze, evaluate, and create). The researcher then calculated the degree of improvement in these levels.

Table 10 shows statistically significant differences at 0.01 between the scores of the experimental group in the pre-test and post-test on the level of the educational objectives. These figures show the improvement of the female students' grammatical competences in the experimental group. To determine the percentage of development in each objective, the development was calculated with the following equation:

$$\frac{M2 - M1}{M1} \times 100.$$

Table 11 shows the development in students' grammatical competences (reflected in high percentages) after the application of the flipped classroom strategy. The development in create was the first (275.0%), followed by remember (152.0%), understand (120.0%), evaluate (89.6%), analyze (87.4%), and apply (81.0%).

4.2.2. Effect size of using flipped classroom

ANCOVA was used to measure the effect size of using flipped classroom in developing the students' grammatical competences (in the course system). The effect of pre-test (on the dependent variable) was removed following Mellinger and Hanson (2017) . ANCOVA is used in experimental studies when researchers want to remove the effects of an antecedent variable (e.g. pre-test scores are used as covariates in pre-test–post-test experimental designs).

Table 8. *T*-test for post-test of experimental and control groups.

		Post-test				
Group	No.	*M*	SD	*T*	Df	Sig
Control	50	14.54	3.82	−6.976**	98	0.00
Experimental	50	21.64	6.10			

**$p < 0.01$.
*$p < 0.05$.

Table 9. *T*-test for the pre-test and post-test.

		Post-test				
Test	No.	*M*	SD	*T*	Df	Sig
Pre-test	50	9.24	3.04	−12.863**	98	0.00
Post-test	50	21.64	6.10			

In Table 12, the calculated F (52,607, $p = 0.1$) revealed statistically significant difference between the mean scores of the post test of the control and experimental groups after controlling the effect size of the pre-test. In addition, the value of the eta-squared coefficient η^2 was 0.35, indicating that approximately 35.0% of the variance in the development of grammatical competences in the post-test was attributed to the effect of the independent variable.

4.3. Discussion of findings

The empirical data revealed the most important grammatical competences required by 11th graders in the textbook of Arabic and significant differences between the performance of the experimental and control groups. In addition, the high performance of students who received the treatment had a large effect size. These findings are further discussed in the following parts.

4.3.1. Grammatical competences

The study identified (24) grammatical competences that 11th graders require in the Arabic course. Identification of the most important grammatical competences that students need simplify educators' tasks in achieving the objectives accurately. Students should also know these competences so that they can work to achieve them and feel a sense of responsibility for their learning. Like Al-Harbi (2015), Al-Khamash (2008), and Brikit (2001), this study classified the grammatical competences according to the educational objectives. Unlike the former studies that applied the educational objectives to the evaluation of grammatical activities, grammatical questions, and grammatical skills, this study applied the educational objectives to the grammatical competences of 11th graders. The empirical classification of the grammatical competences based on their importance should be considered in writing the textbooks and designing the syllabus of the 11th graders' Arabic course and give every competence due attention.

4.3.2. Effect of the flipped classroom on grammatical competences

The data obtained by the translation test revealed significant differences between the experimental and control groups. Such a finding provides concrete evidence for the significant role of flipped classroom in developing students' grammatical competences, which may be attributed to the potential benefits of flipped classroom that do not exist in traditional teaching methods. Flipped classroom makes students feel responsible for their learning and consider their individual differences, ultimately creating a flexible environment that permit students to interact and reflect on their learning.

Table 10. *T*-test for educational objectives of grammatical competences.

	Pre-test		Post-test				
Grammatical competences	*M*	SD	*M*	SD	*T*-value	Df	Sig.
Remember	1.38	0.90	3.48	0.89	−11.75**	98	0.00
Understand	1.40	0.95	3.08	1.10	−8.17**		0.00
Apply	1.56	0.95	2.82	1.29	−5.56**		0.00
Analyze	1.74	1.16	3.26	0.99	−7.07**		0.00
Evaluate	1.54	1.18	2.92	1.12	−5.99**		0.00
Create	1.62	1.16	6.08	1.98	−13.76**		0.00

Table 11. Percentage of development in each level of educational objectives.

Cognitive objectives	Pre-test *M*	Post-test *M*	Percentage of development
Remember	1.38	3.48	152.0%
Understand	1.40	3.08	120.0%
Apply	1.56	2.82	81.0%
Analyze	1.74	3.26	87.4%
Evaluate	1.54	2.92	89.6%
Create	1.62	6.08	275.0%

Furthermore, this strategy gives students opportunities to engage in meaningful activities without the teacher being the center.

These findings agreed with those of previous studies at the local level (Al-Abiri, 2015; Al-Jibrin, 2016; Al-Maqati, 2016; Al-Mu'adi, 2016; Al Zein, 2015; AL-Zahrani, 2013) and the international level (Davies et al., 2013; Girmen & Kaya, 2019; Han, 2015; Hsieh et al., 2016; Kevin, 2013; Moranski & Kim, 2016; Yang, 2017). To be specific, Girmen and Kaya (2019), Cheng et al. (2018), Moranski and Kim (2016), Hsieh et al. (2016), Leo and Puzio (2016), Yang (2017), and Kevin (2013) found the effectiveness of the flipped classroom strategy in improving students' performance and attitude toward the teaching courses. The present study applied flipped classroom on grammatical competences in Arabic. The former studies were devoted to English as a foreign language, language skills, chemistry, and computer applications, among others, with different degrees of effectiveness. Unlike the previous studies, the author used a direct synchronized platform for the interaction and participation of female students and designed video lessons according to the objectives of the unit to develop the grammatical competences, which helped students acquire the grammatical competences with a high degree.

Like Al-Zahrani (2015) and Al-Qahtani (2016), the present study found increased percentages of students' achievement in the high cognitive objectives. This study differed from the aforementioned studies in the degree of improvement in the three cognitive levels, namely, create, remember, and understand. The application of the flipped classroom strategy improved the students' achievement in the high cognitive objectives of grammatical competences, with create (275.0%) having the highest percentage of development, followed by remember (152.0%), understand (102.0%), evaluate (89.6%), analyze (87.4%), and apply (81.0%). This finding indicated the significant role of flipped classroom in developing students' achievement in cognitive objectives. Educators should draw on the strategy of flipped classroom to aid students in achieving cognitive objectives. The interesting finding here was the effect of flipped classroom on create, which is one of the difficulties that students face in the composition of sentences. In so doing, flipped classroom can tackle students' obstacles in achieving cognitive objectives.

Like Yang (2017), the present study found the effectiveness of flipped classroom in teaching grammar. Similar to Hsieh et al. (2016), this study found that flipped learning is successful in achieving the instructional goals of the class. However, these studies differed from the present study in accounting for foreign language learners. The present study concerned native Arabic speakers. Leo and Puzio

Table 12. Results of ANCOVA for post-test.

Source	Sum of squares	Df	Mean of squares	*F*	Sig.	Eta squared
Interpreted variance	1338. 168	2	669.084	26.38**	0.00	0.352
Intervention	4900.904	1	4900.904	193.245	0.00	0.666
Covariance	77.918	1	77.918	3.072	0.083	0.031
Experimental effect	1334.178	1	1334.178	52.607**	0.00	0.352
Residuals	2460.022	97	25.361			
Variance sum	36,523.000	100				
Interpreted sum	3798.190	99				

(2016) found that the effect size of flipped classroom ranges from +0.16 to +0.44. The effect size of flipped classroom in this study though was 0.35, which was within the range of Leo and Puzio. Teachers of Arabic grammar should consider these findings when teaching. They encounter difficulties in teaching Arabic grammar, which manifest in students' slow progress, boredom, and low performance. Applying flipped classroom is expected to have positive effect on students' motivation, interest, and performance.

Scrutinizing the discussion above revealed how this study differed from the studies on the effectiveness of flipped learning in education. The present study analyzed the effectiveness of flipped classroom in developing 11th graders' grammatical competences in Arabic using various methods (i.e. video lectures in Edmodo, Wizi Q, and YouTube) that have the potential to enhance students' motivation and involvement in the learning process. To the best of the authors' knowledge, there are sparse studies on the effect of the flipped classroom on developing students' grammatical competences either at a local level or an international level.

The study also provided an empirical list of the grammatical competences organized according to their importance. The author classified the grammatical competences according to the revised Bloom's taxonomy. Using revised Bloom's taxonomy operationalized the objectives of the teaching grammar accurately and assisted the author to design balanced and comprehensive activities, choose appropriate teaching methods for teaching grammatical competences, and improve students' receptive skills (reading and listening) and productive skills (speaking and writing).

5. Conclusion

The main objective of the study is to examine the effectiveness of flipped classroom in developing 11th graders' grammatical competences in Arabic. The findings revealed the effectiveness of flipped classroom as manifested in the statistically significant differences between the experimental and control groups and effect size ($F = 0.35$). The study also demonstrated empirically the grammatical competences that 11th graders require. Owing to the potential features of flipped classroom that make effective link between students' work at home and school, the students' performance in the grammatical competences was improved. The flipped instruction changed students' home into an effective environment for learning. The modern methods, namely, video lectures in Edmodo, Wizi Q, and YouTube, assisted in students' leaning. These methods showed potentials in attracting students' attention. The students' free use of these methods at any time catered to their individual differences as well. The empirical rating of the grammatical competences that the study reached was effective in systematizing instruction of grammar and adhering to the students' needs. Textbooks of linguistic competences should follow accurate competences that systematize instruction and assessment of grammar, which should be based on empirical evidence. This study recommended that textbooks of 11th graders should reflect the empirical rating of the grammatical competences required by such students.

One of the limitations of the study is that it does not cater' for students' and teachers' perspectives on the flipped classroom. Future studies should integrate teachers' and students' perspectives for a rigorous investigation of the topic. Taking into consideration students' attitudes when choosing a teaching strategy is crucial for educators. Given the positive effect of flipped classroom on teaching grammatical competences, the author recommends further studies on the effect on such a strategy on teaching different topics of Arabic grammar to see how it can aid native Arabic speakers in learning Arabic grammar.

Drawing on the findings of the study, the author recommends the following:

(a) Training teachers in specialized programs to use modern technology in the methods of teaching
(b) Providing all the necessary technologies and infrastructure that are needed for the application of flipped classroom

(c) Using different and various teaching methods and strategies that are based on the integration of technology in education, contribute to the interaction of students, and involve them in the learning process
(d) Diversifying the methods of evaluation of grammatical competences and methods of measuring learning outcomes and using objective tools to measure grammatical competences
(e) Considering balance between the inclusion of the grammatical competences in the textbooks of Arabic in high schools (course system) and other levels of education.

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References

AL-Abiri, A. (2015). *Faailiat istikhdam altadris almaqlub ala tahsil tullab athalith almutawasit fi muqarar alfiqh wa etijahahum nahw almuqarar* [Effectiveness of using flipped classroom in third intermediate students' achievement in AL-Fiqh course and their attitude towards the course] [Unpublished master thesis]. Imam Muhammad bin Saud Islamic University.

Al-Harbi, A. (2015). *Taqwim alanshetah alsafiah fi muqararat alkfaiat anahwaih fi almrahlah althanawiah* [Evaluation of activities included in the textbooks of grammatical competences in high school] [Unpublished master thesis]. Umm Al Qura University.

Al-Jibrin, F. (2016). *Faeiliat istikhdam altadris almaqlub fi tahseel altulab fi muqarar altafsir* [The Effectiveness of using the flipped learning in students' achievement in in the course of Tafsir] [Unpublished master thesis]. Imam Muhammad bin Saud Islamic University.

Al-Khamash, F. (2008). *Taqweem Asalah alnahwiah litulab alsaf althani athanawi fi dhawa almaharat alnahwiah almatalubah* [Evaluation of grammatical questions of the second-high school students in light of the required grammatical skills] [Unpublished master thesis]. Umm Al-Qura University.

Al-Maqati, S. (2016). The impact and effectiveness of the flipped learning strategy in the academic achievement of students at the fourth-grade in (introduction to teaching) course in the faculty of education at the University of Shaqra (semi-experimental study). *International Interdisciplinary Journal of Education*, *5*(8), 135–158. http://iijoe.org/v5/IIJOE_A_06_08_05_2016.pdf

Al-Mu'adi, A. (2016). *Faeiliat istikhdam altaalum almudamij fi alfusul almaqlubat fi tanmiat maharat altafkir arriadhi litulab alsaf alkhamis alibtidai* [Effectiveness of using integrated learning in flipped classroom in developing mathematical thinking skills of grade 5 students] [Unpublished master thesis]. Imam Muhammad bin Saud Islamic University.

Al-Qahtani, H. (2016). *Faeiliat aistikhdam alsaf almaqlub fi tanmayat altahseel aldrasi fi alkemia* [Effectiveness of the flipped classroom in improving the students' academic performance in Chemistry [Unpublished master thesis]. Imam Muhammad bin Saud Islamic University.

Al-Sulaiti, Z. (2002). *Tadrees alnahw Alarabi fi dhawa alitijahat alarabiyah alhadeethah* [Teaching Arabic grammar in the light of modern trends]. Aldaar Almisriatu Allubnanitu.

AL-Zahrani, S. (2013). *Athar istakhdam alikhtbertat alektroniah ala tatweer almaharat alanawiah ltiulab alsaf althani althanawi* [Effect of using electronic tests on the development of some grammatical skills of the 11th graders] [Unpublished master thesis] Al-Baha University.

Al-Zahran, A. (2015). Faailiat istikhdam altadris almaqlub fi tatweer atahseel almarfi fi muqarar ataleem alelektroni litulab kulliat altarbiyah fi jameat amalek Abdulaziz [Effectiveness of flipped classroom in developing the academic achievement of the students of the College of Education at King Abdulaziz University]. *Journal of the Faculty of Education at Al-Azhar University*, *34*(2), 473–501. https://jsrep.journals.ekb.eg/article_33032_0fee09feb3e357781981324f6077ed0b.pdf

Al Zein, H. (2015). The effect of using flipped learning strategy on the academic achievement of the students in the education department in Princess at Nourah Bint Abdulrahman University. *International Interdisciplinary Journal of Education*, *4*(1), 171–186. http://iijoe.org/v4/IIJOE_10_01_04_2015.pdf

Anderson, L., & Krathwohl, D. (2001). *A taxonomy for learning, teaching, and assessing: A revision for Bloom's taxonomy*. Longman.

Bergmann, J., & Sams, A. (2012). *Flip your classroom*. International Society for Technology in Education.

Brikit, A. (2001). *F'aliat wahdat talimiah qaimah ala nomdhag atalum albinai fi tanmiat maharat alnahw litulab alsaf alawal althanwi wa atijahatahim nahwaha* [Effectiveness of learning units based on constructive learning method in developing grammatical skills of 10th graders and their attitude toward them] [Unpublished doctorate thesis]. Umm Al Qura University.

Cheng, L., Ritzhaupt, A., & Antonenko, P. (2018). Effects of the flipped classroom instructional strategy on students' learning outcomes: A meta-analysis. *Educational Technology Research and Development*, *67*(4), 793–824. https://doi.org/10.1007/s11423-018-9633-7

Chun, D. M., & Plass, J. L. (2000). Networked multimedia environments for second language acquisition. In M. Warshauer & R. Kern (Eds.), *Network-based language teaching: Concepts and practice* (pp. 151–170). Cambridge University Press.

Creswell, J. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.

Davies, R. S., Dean, D. L., & Ball, N. (2013). Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. *Education Technology Research and Development*, *61*, 563. https://doi.org/10.1007/s11423-013-9305-6

Dhafer, M., & Al-Hammadi, Y. (1983). *Altadrees fi allughati alarabyati* [Instruction in Arabic language]. Dar Al-Mareekh.

Flipped Learning Network Hub. (2020). Definition of flipped learning. Retrieved May 14, 2020, from https://flippedlearning.org/definition-of-flipped-learning/

Girmen, P., & Kaya, M. F. (2019). Using the flipped classroom model in the development of basic language skills and enriching activities: Digital stories and games. *International Journal of Instruction*, *12*(1), 555–572.

Han, Y. (2015). Successfully flipping the ESL classroom for learner autonomy. *NYS TESOL Journal*, *2*(98), 98–109.

Hsieh, J., Wu, W., & Marek, M. (2016). Using the flipped classroom to enhance EFL learning. *Computer Assisted Language Learning*, *30*(1–2), 1–21.

Jonassen, D., & Reeves, T. (1996). Learning with technology: Using computers as cognitive tools. In D. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp. 693–719). Macmillan.

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., & Hall, C. (2019). *NMC horizon report: 2016 higher education edition*. The New Media Consortium. https://sconul.ac.uk/sites/default/files/documents/2016-nmc-horizon-report-he-EN-1.pdf

Kevin, R. (2013). *Examining the effects of the flipped model of instruction on student engagement and performance in the mathematics classroom: An action research study* [Unpublished doctoral dissertation]. Capella University.

Khaldun, I. (1958). *The Muqaddimah* [An introduction to history]. Princeton.

Khater, M., Al-Hammadi, Y., Abdulmaougoud, M., Tuaimah, R., & Shehatah, H. (1981). *Turuq Tadrees Alarabiah wa altaleem aldini fi dhawa alitijahat altarbawiah alhadeethah* [Methods of instruction of Arabic and religious education in the light of modern educational trends]. Dar AL-Maarefah.

Krathwohl, D. (2002). A revision of Bloom's taxonomy: An overview. *Theory into Practice*, *41*(4), 212–218.

Leo, J., & Puzio, K. (2016). Flipped instruction in a high school science classroom. *Journal of Science Education and Technology*, *25*(5), 775–781. https://doi.org/10.1007/s10956-016-9634-4

Means, B. (1994). Using technology to advance educational goals. In B. Means (Ed.), *Technology and education reform: The reality behind the promise* (pp. 1–22). Jossey-Bass Publishers.

Mellinger, C., & Hanson, T. (2017). *Quantitative research methods in translation and interpreting studies*. Routledge.

Ministry of Education Saudi Arabia. (2001). *Watheqat Manahj almarhlah althanawiah* [Curriculum of high school]. Centre of Educational Development.

Ministry of Education Saudi Arabia. (2011). *Daleel altaleem althanawi "nidham almuqararat"* [Guide to secondary education course system]. Ministry of Education.

Moranski, K., & Kim, F. (2016). Flipping lessons in a multi-section Spanish course: Implications for assigning explicit grammar instruction outside of the classroom. *The Modern Language Journal*, *100*(4), 830–852. https://doi.org/10.1111/modl.12366

Olakanmy, E. (2017). The effects of a flipped classroom model of instruction on students' performance and attitudes towards chemistry. *Journal of Science Education and Technology*, *26*(1), 127–137. https://doi.org/10.1007/s10956-016-9657-x

Richards, J., Platt, J., & Platt, H. (1985). *Dictionary of language teaching and applied linguistics*. Longman.

Yang, C. (2017). An investigation of the use of the "flipped classroom" pedagogy in secondary English language classrooms. *Journal of Information Technology Education: Innovations in Practice*, *16*(1), 1–20.