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The Effectiveness of the Just-in-Time Teaching Strategy on Female Students Achieving a Bachelor's Degree as Classroom Teachers, Their Motivation to Learn in the Grammar and Morphology Course, and Their Teaching Methods

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Abstract

The study aimed to determine the effectiveness of the just-in-time teaching (JITT) strategy in female students' achievement of a bachelor's degree as a classroom teacher, their motivation to learn in the grammar and morphology course, and their teaching methods. To achieve the objectives of the study, a quasi-experimental approach was adopted, and the study sample consisted of 60 female students with a bachelor's degree as classroom teachers who were studying the course of grammar and morphology and their teaching methods. They were distributed into two groups: the experimental group, which included 30 female students, and the control group, which included 30 female students. An achievement test was prepared and a questionnaire of motivation to learn was completed, and their validity and reliability were confirmed. The education program was prepared using the JITT strategy, and its validity was confirmed. The study results revealed that there were statistically significant differences between the average scores of the experimental group that studied by using the JITT strategy and the control group that studied by using the traditional method on the achievement test and the measure of motivation to learn in favor of the experimental group. The study recommended employing a timely teaching strategy in university teaching.

Keywords: *JITT Strategy, Motivation to Learn, Academic Achievement.*

INTRODUCTION

Recent years have witnessed great interest from higher education institutions in learner-centered education, and this interest has increased in conjunction with the Corona pandemic and the accompanying changes in the transition to distance learning. This interest also continued after the pandemic as higher education systems sought to introduce technology into education and shift to multiple forms of education. Face-to-face, synchronous, and distance learning. The focus in face-to-face education is on blended education, which combines regular education and e-learning.

One of the learner-centered active learning strategies that can be used in blended learning is the just-in-time teaching (JITT) strategy. It is an educational strategy that uses technology to build knowledge, skills, and attitudes, improve student learning (Smith, Rama, & Helms, 2018), make learners more effective, provide meaningful learning, increase learner activity, and allow more time for learning in the classroom. Students carry out a series of additional educational activities outside the classroom (Barikhlana, Sholikhan, Ayu, & Jufriadi, 2019). The JITT strategy was designed based on constructivist theory. This includes the fact that all learners have some previous knowledge that they use to generate new knowledge, and this strategy is based on the philosophy that students' basic knowledge is extremely important to enriching the educational material of the subject (Guertin, Zappe & Kim, 2007).

The developers of this strategy took into account that student learning is facilitated when there is active participation. They wanted students to be engaged, prepared for class discussions, and motivated during and outside lecture time. Likewise, the developers of this strategy used web-based technology to enhance communication between students and between students and teachers when they are not present at lecture time, and this type of communication can provide teachers with a piece of valuable information related to students (Vermaa, Santosh, 2021).

Vermaa & Santosh (2021) noted that the JITT strategy consists of two components: in-classroom activities that promote active learning and web-based out-of-classroom activities. It depends on enhancing classroom learning

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and is an appropriate strategy to improve students' performance in scientific and humanities subjects. Patterson (2004) added that this strategy involves students electronically responding to Web-based assignments, carefully prepared by the instructor and submitted shortly before the lecture, and the instructor correcting the students' solutions to these assignments "in a timely manner." Accordingly, the teacher identifies the students' areas of strength and weakness in order to adjust what is presented in the lecture to suit the students' needs, which helps the students come to the lecture prepared, committed, and enthusiastic.

The JITT strategy includes a set of steps (Kurt, 2019): The first is that students complete a focused set of activities (for example, reading from the textbook or using other learning resources) online (through the course website or the learning management system). Before coming to the lecture. Instructions are given to students before these activities. This stage is called the warm-up, and these activities often require open-ended answers. Secondly, the students send the activities assigned to them to the teacher hours before the start of the lecture, and the teacher collects the students' responses and identifies their areas of understanding and misunderstanding in order to adjust the teaching activities in a meaningful way. It is left to the teacher to focus the time in the classroom on collaborative problem-solving activities. This method allows the teacher to maximize the efficiency of lecture time to allow more focus and benefit from the material.

On the other hand, motivation is a major variable in the psychology literature in general and educational psychology in particular. This is because arousing motivation is a prerequisite for learning to occur (Filgona, 2021). Motivation is defined as an internal physical or psychological state that drives an individual towards behavior in certain circumstances, and directs him towards satisfying a specific need or goal. That is, it is a driving force that activates and directs at the same time (Balzotti & Roberts, 2014).

The study by Yilmaz et al. (2017) indicated that the variables that most influence motivation to learn are teachers' skills and educational strategies. There are five main components of the factors affecting students' motivation to learn: the student, the teacher, the content, the method or process, and the environment. Method or process refers to the way content is presented, i.e., the approach used in education (Williams & Williams, 2011).

A group of previous studies dealt with the JITT strategy and its effect on achievement, and others dealt with the effect of teaching strategies on motivation. The study (Vermaa, Santosh, 2021) indicated that the JITT method improves students' performance, participation, and achievement regardless of the subject or place, so it has become necessary to introduce timely teaching into the curricula of teacher training institutes. The results of the study (Barikhlana, Sholikhan, Ayu, & Jufriadi, 2019) showed that there are differences in achievement between students who learn using the JITT strategy and students who learn in the usual way. It was also concluded that the achievement of students who have high motivation is greater than that of those who have low motivation.

The results of the study by Al-Sawalha, Al-Hamran, and Eyadat (2020) showed that there is an effect of the flipped learning strategy on motivation. Hammad et al.'s (2023) study indicated the impact of teaching using e-learning applications on developing learning motivation among female university students. The results of Al-Hamran's (2019) study showed the effectiveness of the active learning strategy in developing motivation for learning and academic achievement among university students.

The Study Problem

Through her work as a university teacher of grammar and morphology and the methods of teaching them to female students in the Bachelor's degree program as a classroom teacher, the researcher noticed the lack of time available to teach the prescribed content of the subject. She feels that this puts pressure on the students and limits their motivation towards studying the subject. It had a negative impact on their academic achievement, which created a feeling in her of the necessity of searching for a teaching strategy that would allow for more effective use of lecture time. It increases the students' motivation and improves their level of achievement. This feeling was reinforced by the fact that a group of previous studies indicated the effectiveness of the active learning strategy in increasing students' achievement. (Al-Hamran, 2019; Vermaa, Santosh, 2021) and raising the level of motivation (Al-Sawalha, Al-Hamran, and Eyadat, 2020; Barikhlana, Sholikhan, Ayu, &

Jufriadi, 2019). The researcher chose the JITT strategy to study its impact on female students' achievement and motivation because it allows more time for learning in the classroom through the student implementing a series of additional educational activities outside the classroom (Barikhlana, Sholikhan, Ayu, & Jufriadi, 2019). The problem of the study was to determine the effectiveness of the just-in-time teaching strategy (JITT) on female students' achievement, their motivation to learn in the grammar and morphology course, and their teaching methods.

The Two Study Hypotheses

The study seeks to verify the validity of the following two hypotheses:

There are no statistically significant differences at the significance level (0.05) between the average achievement scores of the female students of the experimental group who studied grammar and morphology and the methods of teaching them using the JITT strategy and the average achievement scores of the female students of the control group who studied the same subject in the usual way.

There are no statistically significant differences at the significance level (0.05) between the average scores of female students' motivation to learn among the female students of the experimental group who studied according to the JITT strategy, and the average scores of motivation to learn among the female students of the control group who studied in the usual way.

The Importance of Study

Due to the lack of Arab research and studies that have addressed the effectiveness of using the JITT strategy in improving achievement and motivation among university students, the current study is considered at the theoretical level to complement the theoretical foundations related to active teaching strategies and their impact on students' achievement and motivation towards education.

It is also expected that the results of the current study will contribute to improving educational practices and increasing the competencies of university teachers in using learner-centered educational strategies in a way that enables them to help students overcome problems of achievement and motivation toward learning.

The Limits of the Study

The study sample was limited to female students in the course of grammar and morphology and their teaching methods in the specialty of classroom teacher at the Faculty of Educational Sciences at Jerash University in Jordan, in the first semester of the academic year 2023-2024. The study is limited to the program based on the JITT strategy, the achievement test for grammar and morphology and their teaching methods, and the learning motivation tool.

PROCEDURAL DEFINITIONS

The study included the following procedural definitions:

Just-in-Time Teaching (JITT) Strategy

It is a strategy based on which students are expected to complete an activity sent by the school before the lecture via the web and send responses to this activity to the school. The school then uses these responses to customize the lecture to the students' specific needs.

Female Students' Achievement

The number of special outcomes achieved in the study units (nominal sentences, verbal sentences, and objects) from the grammar and morphology course and their teaching methods scheduled in the bachelor's program for classroom teachers at the University of Jerash. It was measured by the marks obtained by female students in the achievement test prepared in this study.

Motivation to Learn

An internal or external condition that stimulates the learner's needs for learning is defined procedurally by the total score that female students obtain on each area of the motivation to learn scale, which includes six areas: internal goal orientation, external goal orientation, self-efficacy, task value, social connectedness, and teacher support.

Grammar and Morphology Course and Methods of Teaching Them

A compulsory course is suggested in the plan of the Bachelor of Classroom Teacher program at the College of Educational Sciences. It includes the concept of linguistic style, linguistic structures, methods of developing them, and the basics of Arabic grammar, such as the nominal sentence, the verbal sentence, and common methods in daily use. Students distinguish the meanings of masculine and feminine, dual and plural, nouns, adverbs, objects, prepositions, and adverbs, and clarify the procedural steps for teaching linguistic structures.

STUDY METHODOLOGY AND PROCEDURES

Study Approach

The study used the quasi-experimental method. To investigate the effectiveness of the JITT strategy in enhancing achievement and learning motivation among a sample of female students with a bachelor's degree as classroom teachers in the Faculty of Educational Sciences at Jerash University.

Study Population

The study population consisted of 60 female students from the Bachelor's degree in classroom teachers in the College of Educational Sciences, distributed equally among 30 female students for the experimental group and 30 female students for the control group. The two study groups of female students were chosen intentionally from the female students studied by the researcher.

Study Tools

The current study included three tools: a measure of motivation to learn, an achievement test, and a learning program based on the JITT strategy.

The First: A Scale of Motivation to Learn

The motivation-to-learn scale prepared by Fowler (2018) was used. The scale consists of 38 items, distributed into six areas: The internal orientation to achieve goals includes (4) items; the external orientation to achieve goals includes (8) items; self-efficacy includes (8) items; the value of the task includes (6) items; social connection includes (5) items; and teacher support includes (7) items.

Validity of Motivation-To-Learn Tool

To verify the validity of the content of the Motivation to Learn scale, it was presented to a group of professors specializing in curricula, measurement, and evaluation in Jordanian universities to determine the validity of the items for each field and the extent to which each item represents the field to which it belongs. The item was accepted, on which eight arbitrators unanimously agreed. At least on its relevance to the field, with an agreement rate of 80%. In light of the opinions of the arbitrators, the wording of some items was modified, and the scale maintained the number of its items, amounting to 38 items distributed over its five dimensions. The questionnaire items were designed according to a five-point Likert scale, and their items were given the following weights: (1) strongly disagree, (2) disagree, (3) neither disagree nor agree, (4) agree, and (5) strongly agree.

Reliability of The Motivation to Learn Tool

The reliability of the motivation to learn scale was confirmed using the Cronbach Alpha method to determine the internal consistency of the items on a sample of 20 female students at the Faculty of Educational Sciences at the University of Jerash, where information was obtained about the female students' ratings on the motivation scale using the Cronbach Alpha method. The reliability coefficients for the scale's domains ranged

between (0.83-0.88), and the value of the reliability coefficient for the overall scale was (0.92), which are acceptable values for the purposes of scientific research.

The Second Tool: Achievement Test

To achieve the objectives of the study, the researcher analyzed the content of the units (nominal sentences, verbal sentences, and objects) of grammar and morphology and the methods of teaching them, then determined the educational outcomes to be achieved, then developed questions that fit the content and outcomes, after which the test was prepared, which consisted of a set of questions that measured students' achievement in the units that were chosen. The final test consists of 30 multiple-choice items.

Validity of the Test

The content validity of the test was verified by presenting it to a group of professors specializing in curricula, measurement, and evaluation in Jordanian universities, with the aim of reviewing its paragraphs and expressing their opinions about the linguistic formulation and questions. The extent to which it represents the content, the outcomes to be measured, and the appropriateness of the alternatives in answering those questions. And add, delete, or modify what they see fit, or make any other suggestions. Based on the opinions of the arbitrators, some of the linguistic wording in the questions was modified. Thus, the test in its final form consists of 30 items that measure students' achievement in the specified units.

Test Reliability

To verify the test's reliability, the researcher applied it to 20 female students from the study population and outside her sample twice, with a time interval of two weeks under the same conditions. The Pearson correlation coefficient was calculated between the two application times. The reliability coefficient value was 0.86. The researcher also verified the reliability of the scale by using Cronbach's alpha to measure the reliability of the measurement tool. The alpha value was (0.78) for all test items, and these coefficients are considered acceptable for the purposes of this study.

The Third Tool: Education Program using the JITT Strategy

An educational program based on the JITT strategy was prepared according to the following procedures:

The first stage: surveying the theoretical frameworks that were concerned with the JITT strategy, such as the study by Kurt (2019) and the study (Vermaa, Santosh, 2021).

The second stage is developing an educational program based on timely teaching, consisting of the following steps:

The first step is preparation, where the researcher sets goals related to the subject that will be taught according to this strategy.

The second step is to formulate the questions (assignments) in a way that allows more information about the students to be known, such as how they think, how they process information, and what previous knowledge they possess. Before attending the lecture, activities and assignments are sent to the students via the web.

Female students complete a set of activities and assignments specified by the faculty member, which were sent to them via distance learning means and are called warm-up or puzzle exercises.

Evaluating responses: The school corrects the students' responses well before the lecture, identifies their areas of understanding and misunderstanding, and adjusts the teaching activities in the lecture in a purposeful manner. This allows the teacher to focus lecture time on activities related to their misunderstandings.

Validate the Education Program Using Just-in-Time Teaching

The validity of the program was verified by the honesty of the judges. It was presented to five arbitrators with expertise in curricula and teaching. In light of the judges' comments, the content of the components of the teaching-based learning program was modified in a timely manner.

Procedures

This study was conducted according to the following procedures:

1. Develop study tools. It is a measure of learning motivation, achievement test, and education program using the JITT strategy, and its validity and reliability have been verified.

2. Purposely selecting the Faculty of Educational Sciences at Jerash University as a sample for the study. Because the researcher works in it, the experimental and control study groups were determined from female students in the Bachelor's degree program as classroom teachers.

3. Applying the pre-measurement of the two study tools to the experimental and control groups.

4. Applying the timely teaching program to the experimental group, which included 10 lectures on grammar and morphology and their teaching methods and units (nominal sentence, verbal sentence, and objects) during the first semester of the academic year 2023/2024.

5. Applying the post-measurement of the two study tools to the experimental and control groups.

6. Dumping the data into the computer memory to be processed statistically according to SPSS to analyze it according to the study hypotheses.

STUDY VARIABLES

First, the Independent Variables

It has two levels: a learning program based on timely teaching for members of the experimental group and the usual method for members of the control group.

Second: Dependent Variables

Motivation to learn has six domains: the domain of internal orientation to achieve goals, the domain of external orientation to achieve goals, the domain of self-efficacy, the domain of task value, the domain of social connection, and the domain of teacher support.

Achievement Test

Equivalence of the study groups on the scale of motivation to learn.

After selecting the sample and distributing it into two groups: experimental and control, the motivation to learn scale was applied to the two groups: control and experimental. To ensure the equality of the study sample and its suitability to conduct the study. Arithmetic means and standard deviations were calculated for their responses to the motivation to learn scale, and Table No. 1 shows this.

Table 1. Arithmetic means and standard deviations of the study individuals' responses on the motivation to learn scale.

The domain	The control group		The experimental group	
	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation
Internal orientation to achieve goals	2.74	0.68	2.72	0.64
External orientation to achieve goals	2.64	0.67	2.64	0.70
Self-efficacy	2.83	0.71	2.84	0.69
Task value	2.70	0.58	2.69	0.58
Social connection	2.69	0.62	2.68	0.62
Teacher support	2.73	0.57	2.72	0.54
Total	2.71	0.61	2.69	0.61

*Average out of (5).

Table 1 shows that there are apparent differences in the arithmetic means and standard deviations in each area of the tool according to the variables of the study. To reveal the significance of these differences, the results of the two-way MANOVA were extracted for the main impact of these variables on the degree of motivation to learn, and Table 2 shows these results.

Table 2. Results of the second analysis of variance (two-way MANOVA) of the differences between the averages of the study individuals' responses on the motivation to learn scale according to the group variable.

Source	Variables	Sum of squares	Degrees of freedom	Mean squares	F value	sig
The group: Hotelling value=0.155 h=0	Internal orientation to achieve goals	0.294	1	0.236	0.684	0.624
	External orientation to achieve goals	0.174	1	0.175	0.524	0.686
	Self-efficacy	0.173	1	0.173	0.456	0.720
	Task value	0.210	1	0.172	0.621	0.677
	Social connection	0.214	1	0.203	0.642	0.662
	Teacher support	0.178	1	0.184	0.78	0.668
The error	Internal orientation to achieve goals	20.185	59	0.356		
	External orientation to achieve goals	19.562	59	0.345		
	Self-efficacy	22.850	59	0.335		
	Task value	19.523	59	0.345		
	Social connection	20.256	59	0.335		
	Teacher support	19.457	59	0.354		

Table 2 shows that there are no statistically significant differences between the averages of the responses of the study individuals in the pre-measurement on the dimensions of the motivation to learn scale according to the group variable. This means that the two study groups were equal before implementing the study procedures.

Equivalence of the Study Sample for the Achievement Test

After selecting the sample and distributing it into two groups: experimental and control, the pre-test was applied to the two groups: control and experimental. To ensure the equality of the study sample and its suitability to conduct the study, the arithmetic means and standard deviations were found for the experimental and control groups for the pre-test, as shown in Table 3.

Table 3. Testing the differences between the average performance of students in the control and experimental groups in the pre-test.

The group	The number	Arithmetic mean	Standard deviation
Control	30	1.43	0.64
Experimental	30	1.42	0.71

Table 3 shows that the arithmetic mean of the control group in the pre-test was 1.43 and its standard deviation was 0.64, while the arithmetic mean of the experimental group in the pre-test was 1.42 and its standard deviation was 0.71. It is noted that the arithmetic averages of the performance of the students in the control group and the experimental group in the pre-test were close, and therefore the two groups are equivalent to conduct the study.

Statistical Processing

To test the study hypotheses, arithmetic means and standard deviations were extracted, a two-way MANOVA was performed, and a t-test was analyzed.

STUDY RESULTS AND DISCUSSION

Results Related to the First Null Hypothesis and Their Discussion

There are no statistically significant differences at the significance level of 0.05 between the average achievement scores of the female students in the experimental group who studied grammar and morphology and the

methods of teaching them using the timely teaching strategy. The average achievement scores of the control group students who studied the same subject in the usual way.

To verify the validity of the first null hypothesis, the scores of the female students in the two research groups (experimental and control) on the achievement test were calculated. The results showed that the average score of the experimental group was (22,854), with a variance of (3,744). As for the control group, its average score was (17,973), and the variance was (4,936). To determine the significance of the differences, a t-test was used for two independent samples of equal numbers. Table 4 shows that the differences are statistically significant at the significance level (0.05) and with a degree of freedom (58). The calculated T value (19.1) was greater than the tabulated value of (2), as shown in Table 4.

Table 4. The arithmetic mean, standard deviation, and calculated and tabulated T-value for the female students of the two research groups in the post-test.

Group	Number	Arithmetic mean	Standard deviation	Degrees of freedom	T-value		Significance level
					Calculated	Tabulated	
Experimental	30	22.854	3.774	58	19.1	2	Statistically significant
Control	30	17.973	4.936				

Table 4 shows that the null hypothesis was rejected and the alternative hypothesis was accepted, which states that there are statistically significant differences at the significance level (0.05) in favor of the experimental group. This indicates the superiority of the experimental group over the control group in achievement, and it becomes clear that the timely teaching strategy was effective in raising the level of female students' achievement in grammar and morphology and their teaching methods.

This may be due to the timely teaching strategy, which allows the school to utilize the time available in the lecture to delve into the students' weak points and work to address them. It provides the opportunity to take into account individual differences among students through activities and assignments prepared by the teacher that are sent to students via the web, and students' responses are received. This allows the teacher to identify what is proficient and what is not proficient and divide the students into proficient and non-proficient students. Thus, providing enrichment activities for proficient students and remedial activities for non-proficient students, in addition to giving sufficient opportunity for students to solve the activities by referring to multiple sources, is considered a type of self-learning.

These results agreed with the results of the study (Vermaa, Santosh, 2021) in that the JITT strategy works to improve students' performance, participation, and achievement regardless of the subject or place. The results of the study (Barikhlana, Sholikhan, Ayu, & Jufriadi, 2019) showed that there are differences in achievement between students who learn using the JITT strategy and students who learn in the usual way. The results of Al-Hamran's study (2019) showed the effectiveness of the active learning strategy in increasing the academic achievement of university students.

Results Related to the Second Null Hypothesis and Their Discussion

There are no statistically significant differences at the significance level (0.05) between the average scores of students' motivation to learn among the female students of the experimental group who studied according to the timely teaching strategy and the average scores of students' motivation to learn among the female students of the control group who studied in the usual way.

To verify the validity of the second null hypothesis, the female students' scores were calculated on the scale of students' motivation to learn for the experimental and control groups. The results were processed statistically for two interconnected samples of equal size after conducting the post-test for the scale of students' motivation toward learning. After the scale was answered, the results were transcribed and processed statistically. Table (5) shows the results.

Table 5. Equivalence of the two post-research groups in measuring students' motivation to learn.

Skill	Group	Sample size	Arithmetic mean	Standard deviation	T-Value		Degree of freedom	Significance level
					Calculated	Tabulated		

Internal orientation to achieve goals	Experimental	30	32.16	5.77	9.04	2	58	Statically significant
	Control	30	21.49	3.72				
External orientation to achieve goals	Experimental	30	37.56	5.88	6.46	2	58	
	Control	30	29.54	4.24				
Self-efficacy	Experimental	30	35.50	5.46	12.63	2	58	
	Control	30	21.30	3.92				
Task value	Experimental	30	42.85	6.77	9.05	2	58	
	Control	30	30.54	4.08				
Social connection	Experimental	30	33.24	5.44	12.44	2	58	
	Control	30	20.22	4.22				
Teacher support	Experimental	30	40.77	6.32	9.24	2	58	Statically significant
	Control	30	29.33	4.12				

Table 5 shows that the null hypothesis was rejected and the alternative hypothesis was accepted, which states that there are statistically significant differences at the significance level (0.05) in favor of the experimental group. This indicates the superiority of the experimental group over the control group in the level of students' motivation to learn, which indicates that the timely teaching strategy was effective in increasing the level of female students' motivation to learn in all areas: internal orientation to achieve goals, external orientation to achieve goals, self-efficacy, task value, social connection, and teacher support.

The impact of the timely teaching strategy in increasing the level of female students' motivation to learn may be attributed to the nature of the timely teaching strategy, which depends on the assignments and activities sent to the students via the web, which the students deal with at the appropriate time for them. In addition, they take enough time to deal with the activities and duties assigned to them. This strategy also makes the school focus on the students' weak points and focus the teaching in the lecture on their weak points, so they feel that learning is meaningful to them, and thus their motivation towards receiving this learning increases because it satisfies their cognitive needs.

The results of this study are consistent with the results of the study of Al-Sawalha, Al-Hamran, and Eyadat (2020), which showed that there is an effect of the flipped learning strategy on motivation, and the study of Hammad et al. (2023), which showed that there is an impact of teaching using e-learning applications on developing learning motivation among female university students. The results of Al-Hamran's (2019) study showed the effectiveness of the active learning strategy in developing motivation to learn among university students.

RECOMMENDATIONS

In light of the results, the researcher recommends the following:

Employing the Just-in-Time Teaching strategy in university teaching due to its effectiveness in increasing students' achievement and motivation to learn.

Holding training workshops for faculty members at universities on active learning strategies in general and the Just-in-Time Teaching strategy in particular.

Building remedial and enrichment activities that enhance just-in-time teaching (JITT).

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