The Impact of the Use of Flipped Classrooms and E-Learning Strategies on Academic Achievement and Student Satisfaction

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ABSTRACT

The purpose of this study was to identify the impact of the use of flipped classrooms and e-learning strategies in teaching the scientific research unit on the development of achievement and student satisfaction. The researchers used the semi-experimental curriculum to identify the impact of E-learning and flipped classroom strategies in teaching first-year university students.

The study sample consisted of 106 students divided into two groups, the first being made up of 59 students taught using e-learning and the second being made up of "47" students studying using flipped classrooms. The researchers prepared the content of the scientific research unit to fit the e-learning and flipped classroom strategies. The researchers also prepared a test on the scientific research unit as well as a measure of satisfaction with the use of e-learning and flipped classroom strategies in teaching.

The results of the study show that the level of student satisfaction who used the e-learning strategy was acceptable on average (1.85) and the level of student satisfaction who used flipped classroom strategy was also acceptable on average (1.81). Besides, the results indicate no statistically significant differences between students' levels of satisfaction that used e-learning and flipped classrooms. The results also show a statistical difference in students' achievement levels in favor of the post-test for students who used the e-learning strategy and students who used the flipped classroom. There were also no statistically significant differences in the level of the post-achievement test due to the different learning strategies used. The study concludes with providing some recommendations and suggestions.

Keywords: Flipped Classroom, E-learning Strategy, Student Satisfaction, Scientific Research

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1. Introduction:

This era has witnessed a tremendous development of communications and information tools. and a rapid spread among societies, reflecting our lives in all affairs. Education is one aspect of technology and has influenced it in the areas of planning, implementation and evaluation. Educators and decision-makers are required to take the necessary steps to develop the educational process in the aforementioned areas. And indeed, learning methods evolved, so it moved from traditional learning to e-learning, many institutions and organizations dealing with e-learning and distance learning are changing the role of the teacher from source of information to a trainer, guide, and mentor, and the main role in learning was based on the learner.

It is the best kind of education that makes the educational process more enjoyable and vibrant with many projects and readings in student-centered rather than teacher-centered learning, and as the use of modern technology in the educational process increases the number of teachers who want to teach their students in creative ways (Strayer, 2007).

There are many modern strategies that rely on the use of modern technologies to activate digital learning, such as the e-learning strategy, the integrated learning strategy, and the reverse learning strategy.

Flipped Learning is one of the types of integrated learning that uses technology to convey lectures outside the classroom, and the reverse learning strategy is a popular idea these days, advocated by many interested in the field.

Flipped learning is one of the modern technical solutions to address the weakness of traditional education and the development of students' thinking skills, reflective learning is a strategy that includes the use of technology to benefit from learning in the educational process, so that the teacher can spend more time interacting, word repeated and discussing with students in the classroom, instead of giving lectures, where students watch short video performances of lectures at home. More time remains to discuss content in the classroom under the supervision of the teacher in accordance with the bloom rate, students are achieving the lower level of cognitive learning. (Acquisition and assimilation of knowledge) at home, focusing on the higher level of the field of knowledge (Application, analysis, composition, assessment) within the chapter (Brame, 2013).

The application of reversed learning dates to 1998 when Johnson and Walvoord, in their book "Effective Graduation", encouraged the use of reversed learning strategy by giving students the opportunity to access the content at home, thereby using class time to focus on analysis and problem-solving processes (Johnson, 1998).

Several previous studies have shown the importance of e-learning and reversed learning in the educational process, its impact and satisfaction with its application at different educational stages, including Zayn (2015), Johnson Renner, (2012), and Strayer, (2007).

1.1 Statement of the problem:

It had been the observation of the researchers that students faced some difficulties when studying the unit of scientific research and acquiring its concepts. This encouraged researchers to conduct the current study in order to seek modern strategies that could better contribute to the students' acquisition of scientific research skills such as the e-learning strategy and the reverse learning strategy by activating the role of the student to improve his learning from a simple understanding of concepts and ideas to and make learning more fun and interesting (Goodwin & Milier, 2013). In view of this, the current study attempts to answer the following overall research question:

What has been the impact of the use of Flipped learning and e-learning strategies in teaching the Scientific Research Unit on the development of achievement and student satisfaction?

This overall question can be divided to the following sub-research questions:

- To what extent are students satisfied with the use of e-learning strategy?

- To what extent are students satisfied with the use of the flipped classroom strategy?

- Are there any statistical differences in students' achievement before and after the use of the e-learning strategy?

- Are there any statistical differences in students' achievement before and after the use of the flipped classrooms strategy?

- Are there statistical function differences in students' achievement levels due to the different learning strategies used (e-learning, flipped classrooms)?

1.2 The objectives of the study:

The current study aims to identify the effectiveness of using flipped classrooms and e-learning strategies in teaching the Scientific Research Unit on achievement development and student satisfaction level.

1.3 The importance of the study:

The importance of this study is due to the compatibility with modern trends and the search for effective teaching strategies in teaching such as e-learning and reflective learning especially in the light of the Corona Pandemic state-of-the-art technology, in particular its effective use of state-of-the-art technology. The study is also important because it provides practical models of lessons developed in teaching the Scientific Research Unit in accordance with the e-learning and reverse learning strategy and the results of this study could provide relevant recommendations for developing the teaching of scientific research skills. This study also contributes to the activation of Blackboard's virtual learning environment in teaching students as an important source of learning.

1.4 Definition of basic term:

Flipped learning:

It can be defined as a non-traditional teaching strategy in which students are provided with short videos, audio or visual recordings, and presentations to learn about scientific research skills after watching lessons at home before class time, Discussions are then held between them via an app such as zoom or social networks about what they learned. The course professor provides an interactive environment in which students are guided and what they have learned is applied.

E-Learning:

It can be defined as an interactive education system that offers learners communication and information technologies, specifically Blackboard, and is based on an integrated digital electronic environment that displays courses via blackboard, provides guidance, repeated word, organizing tests, as well as managing sources and processes, and evaluating students.

Scientific research unit:

It can be defined as a unit of four topics aimed at acquiring the student the skill of preparing scientific research, and getting acquainted with some theoretical information related to it, and it ends with the student presenting a research project in cooperation with the rest of his group.

2. Literature Review

The emergence of both e-learning and reverse learning is due to accelerated technological developments, especially in recent years. And the accumulation of knowledge that calls for the need to diversify the methods and means of learning, as well as the conditions of learning in the context of the Krona pandemic, which forced the entire world to follow certain precautionary measures, and direct teaching was prevented in most countries of the world. The following is a brief presentation of e-learning and Flipped learning strategies.

E-Learning is an interactive education system that provides the learner with ICTs, relies on an integrated digital environment that presents curriculum through electronic networks, provides guidance, organizing tests as well as manages and evaluates sources and processes.

The importance of e-learning is to solve the problem of knowledge explosion and increased demand for education, expand access to education, enable the training and education of workers without leaving their jobs and contribute to breaking down psychological barriers between teacher and learner, as well as satisfy learner's needs and characteristics while raising the return on investment by reducing the cost of education. (Roman & Plopeanu, 2021)

E-Learning Characteristics:

The features of e-learning can be abbreviated as being provided via computer and its networks with digital multimedia content (written or spoken texts, sound effects, graphics, static or animated images, video footage) so that these media integrate with each other to achieve specific educational goals. This learning is administered electronically, providing several services or tasks related to the teaching and learning management process. It is less expensive than traditional education. It also helps the learner acquire his own knowledge, thereby achieving interaction in the teaching process (the learner's interaction with the teacher, with the content, with colleagues, with the educational institution, with the programs and applications) being available in a sense accessible at any time and from anywhere. (Caporarello and others, 2018)

Synchronizes e-learning:

Synchronizes e-Learning, an on-air or live education that needs to have learners simultaneously in front of computers, to have a discussion and conversation between the learners themselves, between them and the teacher. This discussion is done by various e-learning tools: applications of virtual learning environments, virtual classes - videoconferencing, audio - chat rooms. (Ali & Ahmad, 2018)

Asynchronies e-learning:

Asynchronies e-Learning is an indirect education, which does not require the presence of learners at the same time as the learner can obtain the study at the right time and with the effort he or she wishes to offer. It uses tools such as email, web, mailing lists, discussion groups, file transfer protocol, CD-ROMs, and applications of virtual learning environments such as Blackboard. (Ali & Ahmad, 2018)

E-Learning in Teaching:

E-learning is used in teaching in several ways: (Christian & Wibowo, 2021)

The auxiliary model (supplemented by Computer-assisted learning) uses some e-learning techniques as a support for traditional education. This is within or outside the classroom. Examples of its applications before teaching instruct the student teacher to view a particular lesson on the internet or on a CD-ROM. The teacher assigns students to search for certain information on the internet.

The blended learning model involves the integration of traditional and electronic education, within the classroom or places equipped with e-learning techniques. It has the advantage of combining the advantages of traditional and electronic education, but the role of the teacher, in this case, is to guide and manage the educational situation and the learner is positive.

The pure E-learning model uses e-learning as an alternative to traditional education so that learning from anywhere and at any time is done by the learner, the network acts as a key medium to deliver the entire learning process. An example of its application is independent self-study (the student is studying the electronic course unilaterally). Or to learn with a group of colleagues, through a study or project completion using participatory e-learning tools such as blackboard.

Flipped Learning: Although reverse learning is modern and still shaping, its idea is simply that what is done within traditional education during

the class is done at home, and the student presents the subject outside the class, whether through an educational video recorded by the teacher for a particular lesson or readings about the lesson (Webb & Doman,2020), in which learning through online technology replaces direct teaching in the classroom.

Flipped Learning is not only the use of technology in the educational process but also a case in which appropriate and available technology is used to enrich the educational process and improve the student's attainment. Flipped learning seeks to integrate patterns of direct teaching and active learning that depend primarily on the student because the most important part of Flipped learning is the interaction that occurs in the classroom. (Sobral, 2021), inverted teaching is more like a state of mind through which the focus of the educational process is redirected from teacher to student and learned. Flipped learning rearranges and formulates time within and outside the classroom, to transfer teacher-to-student learning control (Lo & Hew, 2019).

The Flipped learning strategies are the student watching the teacher's pre-class educational video at home through a computer or mobile device Then the student takes notes and questions while watching the film, after which the student brings the next day to the class with a basic understanding to answer the questions and effectively implement activities with the help of teachers and students, through out-of-classroom learning to promote critical thinking and self-learning, and to build expertise and communication skills and collaborate with other students (Ibrahim, 2016).

The Flipped learning pattern seeks to reshape the educational process so that the traditional role of school and home can be changed to replace each other, which gave this pattern its name. In traditional learning that adopts the style of lecture, the teacher explains the teaching material during classes, students then go home to solve duties and deal with problems alone. or frustration at the inability to overcome problems at other times, In Flipped learning, the student follows videos explaining the educational material to understand the basic concepts and

ideas in the lesson and then comes to school to apply, discuss and solve problems with the help of the teacher and other students. Hence students interact differently with the teaching material than they used to in the traditional style; students interact with teaching material more deeply, which deepens their understanding and love of it as a result of their interaction with educational material, away from the surface that can be produced by simply listening to the teacher and preserve and understand the substance in the traditional environment (Su & Lai, 2021).

The importance of Flipped learning:

Al-Kahili (2015) stated that Flipped learning helps to acquire reporting and procedural knowledge (Build meaning, organize information, experience it, develop scientific skills, practice higher thinking skills and beyond thinking) and strikes the balance required to achieve qualitative learning, and that Flipped learning combines experience (previous learning) and practices procedural experience within the classroom, so the teacher is interested in three important aspects in creating meaningful learning: hearing, sight, and movement to deliver using the method of integrating technology and education at home, saving time for a class or lesson for activities rather than consuming it in a commentary that may be forgotten and activate brainstorming strategies, discussion, and laboratory experiments so that the student becomes the focus of teacher-assisted learning.

Flipped Learning Tools:

There are several tools for Flipped learning: Hashemifardnia & others, 2018)

-    Explain Everything is a great and easy-to-use tool for designing and activating dynamic interactive performances and lessons as well as creating and evaluating tests.

-    Know Mia is a site that allows teachers to create virtual classes that allow students to chat with each other on one hand, and with the teacher on the other, in addition, teachers can send advertisements to all students, exchange

documents, and display slides, and even create and evaluate tests.

- Edmodo is an educational platform that provides many lessons via videos done by teachers from all over the world and managed to create short new learning videos.

Features of both e-learning and Flipped learning:

Both e-learning and Flipped learning from other learning patterns have many advantages that consider the student's overall needs and possibilities for better learning based on the distinctive learning opportunities offered by modern technology. These strategies are:

- Give teachers more time to help students and receive their inquiries.

- Applying active learning with good employment of modern technology in the educational process.

- The role of the teleprompter teacher has evolved into a catalyst, guide, and assistant.

- Help students to self-learn according to their individual abilities and differences.

- Students who are shy of requesting a partial reinstatement of the lesson are suited, so they can repeat the lesson many times.

- It provides an interesting and enjoyable learning environment that helps attract students to learn.

Criteria for selecting e-learning and Flipped learning patterns:

The choice of learning pattern is in response to the variables surrounding the educational process. Some researchers (Sobral, 2021) have pointed out that four key pillars must be available to apply e-learning or reverse learning effectively: With a flexible learning environment (Flexibility), Change in the Concept of Learning from teacher-centered learning to learner-centered, careful thinking of content division and analysis based on the nature of the subject and students and their previous relevant experiences, and the availability of competent teachers.

Previous Research Studies

1. Previous research studies in e-learning:

Roman & Plopeanu, (2021) conducted a study aimed at identifying effective online learning factors during the COVID-19 pandemic emergency. In addition to identifying any of the ways of learning: (traditional, online, hybrid) that Romanian students prefer to study economics in this unusual context. Using a sample of 1,415 students from five major Roman economic colleges, the results showed that psychological problems and growing concerns about the COVID-19 pandemic have a negative impact on the effectiveness of learning. The results also revealed that students with problems of ineffective Internet access, inadequate time due to other family problems, who do not have enough working space at home, and males are more likely to be less effective in the online learning process.

Orensa Siriani and Evendi (2019) Hoerunnisa, Suryani, & Efendi also conducted a study that sought to determine the effectiveness of using e-learning in multimedia classes to improve educational attainment and motivation for professional students. The semi-experimental curriculum was used in this study. The study sample included 10th-grade students at Sukohargo Vocational School, Central Java. This study was conducted on computer multimedia lessons, the pilot group consisted of 31 students, while the control group consisted of 33 students.

This study answered two key questions: (1) What is the effectiveness of e-learning in improving students' learning? (2) How effective is e-learning to improve students' motivation? Results have shown that the use of e-learning can significantly improve students' attainment and motivation for learning through the computer, and the use of e-learning can increase students' participation in learning.

Caporarello & Bigi (2018) focused on surveying the opinions of 277 university students about their views and experiences in e-learning. Results are unexpected and partly predictable: Firstly: Although a positive future direction for e-learning is recognized, students remain confused as to its meaning and have only limited awareness of its potential. Second: Despite the general knowledge of using it, there is still a high percentage of students who have not yet used e-learning and who are not interested in using it. Third: e-learning seems to offer more advantages than its drawbacks, yet there are still many areas to work on to make e-learning work for real. Based on these findings, the two researchers suggested that we develop some administrative matters for teachers and educational institutions.

In a study presented by Ali Hussain and Ahmed (2018), Ali, Hossain, & Ahmed aimed at analyzing the effectiveness of e-learning for students at the university level in Bangladesh. Data was collected through a questionnaire distributed to 700 students (94.9% of them using different e-learning tools, techniques, or platforms). Eight variables were used to measure the effectiveness of e-learning. The results of the study showed that e-learning is faster, saves time and cost, is suitable to operate independently, adds value to students' learning, is usable for active learning, is applicable outside the classroom and the quality of e-learning is satisfactory indicating the effectiveness of e-learning.

Previous research studies in Flipped learning:

Sobral (2021) conducted a study aimed at detecting the effectiveness of the use of the reverse learning strategy in computer applications and its impact on teachers' and students' perceptions and trends In order to achieve the study's objective, the researcher used the semi-experimental curriculum with the test scale for tribal and Baadi students. The researcher designed a questionnaire to survey students' attitudes and perceptions of reverse learning. The study sample consisted of a high school in Kentucky with a total of Kentucky. 62 students were distributed to two classrooms in

which they were taught using the reverse learning strategy. The study found students' satisfaction with the educational process and their deep understanding of content concepts in a more profound and focused manner and retention of concepts, especially sports, than more students who studied in the traditional way. Students had the experience of reversed learning.

The Webb & Doman study (2020) aimed to identify the impact of the use of the reverse row strategy on some components of self-organized learning and the trend toward technology-supported language learning. To achieve the goal, the researcher used the self-organized learning measure and the trend measure towards technology-supported language learning, a corresponding card to identify the benefits and disadvantages of experience, and the number of sample individuals reached (18) students in the sixth grade primary and the sample was divided into a pilot group with a total number of members (9) students, studied using the reverse grade strategy and a control group, numbering (9) students, studied in the usual manner, took 3 weeks and included 8 lessons from the Physical Processes Unit. The most significant results were the effectiveness of reversed learning in developing physical concepts and forming positive trends toward technology-supported language learning.

Al-Kashta (2016) also conducted a study in Palestine aimed at demonstrating the impact of the reversed learning strategy on the development of concepts and meditative thinking skills in the life sciences researcher of basic 10th-grade students, and the sample of the study consisted of (80) Female students for the 10th grade basic at Amna Wahab Girls' High School for the school year 2015/2016, distributed to two groups selected at random experimental level 38 Students and 42 control groups. To achieve the study's objectives, the researcher used the descriptive and experimental curriculum. The study tools were A test of scientific concepts, and a test of meditative thinking, and then the study reached the results, the effectiveness of reflective learning and its positive impact on the development of scientific concepts and meditative thinking skills of female students.

Al-Khalifa (2015) conducted a study in the Eastern Region, aimed at the impact of reversed learning on the acquisition of computer course concepts and the self-learning skills of secondary students in the Industrial Generation Zone during the second semester of the 2014/2015 academic year. To achieve the study's objective, the researcher used the semi-experimental approach to apply study tools, the number of female secondary students in the 36 Female students selected in a random manner. The sample of the study was divided into two experimental groups, which were taught based on reverse learning, and the female officer who was studied in the usual manner. The results showed that female students were satisfied with the teaching method, as well as taking responsibility for their self-education without relying on the teacher.

Zahrani (2014) also conducted a study in the courtyard, aimed at the effectiveness of using inverted learning in developing the knowledge level of the e-learning course of the students of King Abdul Aziz University Faculty of Education during the second semester of the 2013/2014 academic year, To achieve the study's objective, the researcher used the semi-experimental curriculum with tribal and postgraduate measurement University of King Abdul Aziz, and a sample study consisted of students from the Faculty of Education at King Abdul Aziz University. 62 Students who were randomly divided into two pilot groups 33 students studied based on reverse learning, in addition to providing students with electronic sources of learning and videos that are provided to students before and after the lecture, and an officer with a total number of members 29 students who were taught using the traditional lecture method, the collection testing tools applied to the two groups were tribal and extraordinary. The research's findings indicated a positive impact on the acquisition and development of levels of cognitive concepts. (Bedouin, 2015)

2.1 Comment on previous studies:

Previous studies are similar in that they are experimental alum studies, and current research is consistent with those studies being experimental research. Previous studies also aimed to reveal the effectiveness of the use of the e-learning strategy and the reverse learning strategy in student attainment and current research aims at identifying the impact of the use of the reverse learning and e-learning strategies in teaching the scientific research unit on the development of achievement and the level of student satisfaction.

3. Methods:

Researchers in this study have used the semi-experimental design, adapted to the nature of its subject, to identify the impact of flipped classroom and e-learning strategies in teaching the scientific research unit on the development of achievement and student satisfaction to first-year university students and defines the degree of students' achievement after using the learning strategies and the level of satisfaction with them.

Research community: The study community is one of the 450 students in the first year of university programs at Imam Abdulrahman bin Faisal University for the year 2021/2022.

Research sample: Study tools were applied to the study sample of 59 students who used the e-learning method, and 47 students who used the flipped classrooms method.

Search Tool

The researchers designed the scientific research unit within the course of learning and research skills to suit the two learning strategies used (e-learning and flipped classroom). The researchers also prepared two questionnaires to identify satisfaction with the use of the e-learning strategy and flipped classrooms strategy, they included 20 items for each questionnaire. Each item in the questionnaire corresponds to three levels of response, as in the following table:

High Agree	Agree	Disagree
3	2	1

Validity and stability of the search tool

- Stability

The stability was calculated in three different ways: Cronbach Alpha, the halftime segmentation through "Spearman-Brown Coefficient", and the internal consistency of all the resolution phrases: the "alpha" constant coefficient was "0.92" and the halftime constant "0.91".

- **The validity of internal consistency**

Validity was calculated to identify student satisfaction with the use of the e-learning strategy and to identify student satisfaction with the use of the flipped classroom strategy by establishing the correlation factor between each of the terms of the identification and the overall degree of the questionnaire, as shown in the following table:

Table 1: Internal consistency of the questionnaire to identify students' satisfaction with the use of the e-learning strategy

Items	Correlation
Students need to learn some topics through e-learning.	0.87**
E-learning eliminates the sense of dread and psychological stress.	0.83**
I see no positive impact of e-learning.	0.77**
I think e-learning increases my motivation to learn.	0.87**
I feel like e-learning is a tiring and stressful thing.	0.78**
I think e-learning enables me to learn a lot of experience in a short time.	0.81**
I see e-learning as a feature of leveraging modern technologies to support teaching and learning processes.	0.84**
I wish universities could use e-learning as one of the basic means of learning.	0.77**
If e-learning is optional, I would choose to avoid that kind of learning.	0.85**
E-learning has increased the attainment level of experience with the Learning and Research Skills Course.	0.88**
I wish to use e-learning in all curricula.	0.87**
I think it's hard to use e-learning as a tool to learn important scientific materials at the university.	0.77**
I'd rather universities use other ways of teaching than e-learning.	0.76**
Lack of desire to learn through e-learning	0.82**
I think the educational role of e-learning is overestimated.	0.83**

I think the use of e-learning in universities weakens the teaching process.	0.76**
E-learning may delay and complicate simple scientific experiences.	0.79**
I think it is necessary to train all university professors in the use of e-learning in teaching.	0.85**
I think e-learning provides me with clear, step-by-step, material learning procedures.	0.86**
In general, I can learn all the courses through an e-learning strategy	0.84**

From the table (1), all items of the questionnaire are statistically significant to the overall degree of the questionnaire at an indicative level (0.01), indicating the instrument's sincerity.

Table (2): Internal consistency of the questionnaire to identify students' satisfaction with the use of the flipped classroom strategy

Items	Correlation
Students need to learn some subjects through flipped classroom.	0.77**
Flipped classroom eliminates the sense of dread and psychological pressure.	0.87**
I see no positive impact of flipped classroom.	0.87**
I see that flipped classroom increases my motivation to learn.	0.77**
I feel that flipped classroom is a tiring and stressful thing.	0.75**
I think flipped classroom enables me to learn about a lot of experiences in a short time.	0.86**
I see flipped classroom as a feature of utilizing modern technologies to support teaching and learning processes.	0.85**
I wish universities could use flipped classroom as one of the basic means of learning.	0.83**
If flipped classroom were optional, I would choose to avoid that kind of learning.	0.82**
Flipped classroom has increased the attainment level of experiences included in the Learning and Research Skills Course.	0.78**
I wish to use flipped classroom in all curricula.	0.77**
I think it's hard to use flipped classroom as a tool for learning important scientific materials at the university.	0.81**
I prefer universities to use other ways of teaching rather than using flipped classroom.	0.73**
Lack of desire to learn through flipped classroom.	0.78**
I think there is an overestimation of the educational role of flipped classroom.	0.81**
I think the use of flipped classroom in universities weakens the teaching process.	0.75**

Flipped classroom may delay and complicate simple scientific experiences.	0.83**
I think it is necessary to train all university professors in the use of flipped classroom in teaching.	0.81**
I think flipped classroom provides me with clear, step-by-step, material learning procedures.	0.83**
In general, I can learn all the courses through the flipped classroom strategy.	0.85**

From the table (2), all items of the questionnaire are statistically significant to the overall degree of the questionnaire at an indicative level (0.01), indicating the instrument's sincerity.

Statistical Analysis and Processing

The researchers used the relatively gradual statistical model; With a view to judging the computational averages of satisfaction with the use of its learning strategy and items, as follows:

High	Accept	Low
2.3-3	1.8-2.29	1-1.79

The researchers used the statistical program (SPSS) to process the study's data and answer its questions.

Results and Discussion:

- To what extent are students satisfied with the use of e-learning strategy?

To answer this question, the percentage of students' responses in terms of approval or disapproval, calculation of averages and standard deviation for each item has been calculated and arranged between all items of the questionnaire.

Table (3): Percentage of students' responses in terms of Agree or Disagree of the measure of satisfaction with the use of the e-learning strategy

E-Learning				
N	Items	Disagree	Agree	High Agree
1	Students need to learn some topics through e-learning.	13.6	44.1	42.3
2	E-learning eliminates the sense of dread and psychological stress.	44.1	37.3	18.6
3	I see no positive impact of e-learning.	61.0	23.7	15.3
4	I think e-learning increases my motivation to learn.	59.3	39.0	1.7
5	I feel like e-learning is a tiring and stressful thing.	50.8	28.8	20.3
6	I think e-learning enables me to learn a lot of experience in a short time.	44.1	35.6	20.3
7	I see e-learning as a feature of leveraging modern technologies to	15.3	55.9	28.8

	support teaching and learning processes.			
8	I wish universities could use e-learning as one of the basic means of learning.	39.0	39.0	22.0
9	If e-learning is optional, I would choose to avoid that kind of learning.	33.9	33.9	32.2
10	E-learning has increased the attainment level of experience with the learning and research skills course.	32.2	52.5	15.3
11	I wish to use e-learning in all curricula.	83.1	10.2	6.8
12	I think it's hard to use e-learning as a tool to learn important scientific materials at the university.	16.9	22.0	61.0
13	I'd rather universities use other ways of teaching than e-learning.	32.2	37.3	30.5
14	Lack of desire to learn through e-learning	28.8	47.5	23.7
15	I think the educational role of e-learning is overestimated.	30.5	55.9	13.6
16	I think the use of e-learning in universities weakens the teaching process.	25.4	40.7	33.9
17	E-learning may delay and complicate simple scientific experiences.	23.7	50.8	25.4
18	I think it is necessary to train all university professors in the use of e-learning in teaching.	11.9	44.1	44.1
19	I think e-learning provides me with clear, step-by-step, material learning procedures.	49.2	39.0	11.9
20	In general, I can learn all the courses through an e-learning strategy	69.5	23.7	6.8
Average All items		38	38	24

Table (4): Averages and standard deviation per item and arrangement of all satisfaction measure items with e-learning strategy

N	Items	Mean	Std. Deviation	Level of satisfaction	Arrange
1	Students need to learn some topics through e-learning.	2.2881	0.69607	Accept	3
2	E-learning eliminates the sense of dread and psychological stress.	1.7458	0.75643	Low	15
3	I see no positive impact of e-learning.	1.5424	.75022	Low	18
4	I think e-learning increases my motivation to learn.	1.4237	0.53186	Low	19
5	I feel like e-learning is a tiring and stressful thing.	1.6949	0.79338	Low	16

6	I think e-learning enables me to learn a lot of experience in a short time.	1.7627	0.77324	Low	14
7	I see e-learning as a feature of leveraging modern technologies to support teaching and learning processes.	2.1356	0.65542	Accept	4
8	I wish universities could use e-learning as one of the basic means of learning.	1.8305	0.76907	Accept	11
9	If e-learning is optional, I would choose to avoid that kind of learning.	1.9831	0.81983	Accept	7
10	E-learning has increased the attainment level of experience with the Learning and Research Skills Course.	1.8305	0.67345	Accept	12
11	I wish to use e-learning in all curricula.	1.2373	0.56748	Low	21
12	I think it's difficult to use e-learning as a tool to learn important scientific materials at the university.	2.4407	0.77172	High	1
13	I'd rather universities use other ways of teaching than e-learning.	1.9831	0.79852	Accept	8
14	Lack of desire to learn through e-learning	1.9492	0.72928	Accept	9
15	I think the educational role of e-learning is overestimated.	1.8305	0.64734	Accept	13
16	I think the use of e-learning in universities weakens the teaching process.	2.0847	0.77210	Accept	5
17	E-learning may delay and complicate simple scientific experiences.	2.0169	0.70690	Accept	6
18	I think it is necessary to train all university professors in the use of e-learning in teaching.	2.3220	0.68079	High	2
19	I think e-learning provides me with clear, step-by-step, material learning procedures.	1.6271	0.69228	Low	17
20	In general, I can learn all the courses through an e-learning strategy	1.3729	0.61303	Low	20
Average All items		1.8550	0.70992	Accept	10

From tables (3,4) that the level of student satisfaction in the current study with the use of e-learning strategy generally came at an acceptable level with an average of "1.85". The level of student satisfaction in all items of the e-learning strategy satisfaction questionnaire varied between (low, acceptable, and high) in terms of identification. The results showed that student's level of satisfaction with the item "I think it's difficult to use e-learning as a tool for learning important scientific courses at the university was high and ranked first with an average of 2.4, reflecting students' unwillingness to mainstream e-learning strategy in courses in the student's specialization that may be important from their perspective. And followed by the item "I think it is necessary to train all professors in the use of e-learning in teaching was high level of satisfaction and an average of 2.3 reflects students' willingness to use the strategy, but with the

necessary support and training to use the strategy to achieve its desirability. The results showed that the item (In general, I can learn all the courses through the e-learning strategy "in the last with a low satisfaction level and an average of "1.37". This result is consistent with the first item of the ranking, which shows the study sample's orientation not to expand the use of the e-learning strategy.

The item "I believe that e-learning increases my motivation to learn" also came in the before last position with a low and average satisfaction level of "1.4". This result is consistent with the level of satisfaction of students with the study sample with the use of e-learning strategy at both the general and the item levels. The researchers attribute these findings to several reasons, including the state of the pandemic "COVID-19", which forced students to learn remotely from their homes surrounded by all its positive and negative, especially the students were not prepared in advance to apply this learning, they

were confused about distance learning and e-learning. This is evidenced by the level of student satisfaction in the study sample with the use of the e-learning strategy, resulting in a reluctance to use learning that relies on the use of modern technologies. "Distance education and e-learning", without knowing the difference between them. The current study showed students' satisfaction with the use of the e-learning strategy as illustrated by the average student response to the survey items. This demonstrates students' willingness to use the e-learning strategy due to prepare it and provide the tools needed for the success of the method. The current study agrees with the "Orensa" study 2019, which showed student satisfaction with the use of the e-learning strategy.

- To what extent are students satisfied with the use of the flipped classroom strategy?

Table 5: Percentage of students' responses in terms of approval or disagreement with the measure of satisfaction with the use of the flipped classroom strategy

flipped classroom				
N	Items	Disagree	Agree	High Agree
1	Students need to learn some subjects through flipped classroom.	44.7	40.4	14.9
2	Flipped classroom eliminates the sense of dread and psychological pressure.	40.4	51.1	8.5
3	I see no positive impact of flipped classrooms.	46.8	31.9	21.3
4	I see that flipped classroom increases my motivation to learn.	57.4	23.4	19.1
5	I feel that flipped classroom is a tiring and stressful thing.	31.9	44.7	23.4
6	I think flipped classroom enables me to learn about a lot of experiences in a short time.	34.0	40.4	25.5
7	I see flipped classroom as a feature of utilizing modern technologies to support teaching and learning processes.	29.8	53.2	17.0
8	I wish universities could use flipped classroom as one of the basic means of learning.	59.6	27.7	12.8
9	If flipped classroom were optional, I would choose to avoid that	36.2	29.8	34.0

	kind of learning.			
10	Flipped classroom has increased the attainment level of experiences included in the Learning and Research Skills Course.	61.7	36.2	2.1
11	I wish to use flipped classroom in all curricula.	76.6	19.1	4.3
12	I think it's hard to use flipped classroom as a tool for learning important scientific materials at the university.	8.5	23.4	68.1
13	I prefer universities to use other ways of teaching rather than using flipped classroom.	14.9	59.6	25.5
14	Lack of desire to learn through flipped classroom.	19.1	31.9	48.9
15	I think there is an overestimation of the educational role of flipped classroom.	17.0	63.8	19.1
16	I think the use of flipped classroom in universities weakens the teaching process.	27.7	48.9	23.4
17	Flipped classroom may delay and complicate simple scientific experiences.	29.8	38.3	31.9
18	I think it is necessary to train all university professors in the use of flipped classroom in teaching.	46.8	27.7	25.5
19	I think flipped classroom provides me with clear, step-by-step, material learning procedures.	68.1	25.5	6.4
20	In general, I can learn all the courses through the flipped classroom strategy.	68.1	10.6	21.3
	Average All items			

Table 6: Averages and standard deviation to all items and arrangement of all satisfaction on the use of the flipped classroom strategy

N	Items	Mean	Std. Deviation	Level of satisfaction	Arrange
1	Students need to learn some subjects through flipped classroom.	1.7021	0.71975	low	14
2	Flipped classroom eliminates the sense of dread and psychological pressure.	1.6809	0.62923	Low	15
3	I see no positive impact of flipped classroom.	1.7447	0.79312	Low	13
4	I see that flipped classroom increases my motivation to learn.	1.6170	0.79545	Low	16
5	I feel that flipped classroom is a tiring and stressful thing.	1.9149	0.74687	Accept	8

6	I think flipped classroom enables me to learn about a lot of experiences in a short time.	1.9149	0.77543	Accept	9
7	I see flipped classroom as a feature of utilizing modern technologies to support teaching and learning processes.	1.8723	0.67942	Accept	10
8	I wish universities could use flipped classroom as one of the basic means of learning.	1.5319	0.71782	Low	17
9	If flipped classroom were optional, I would choose to avoid that kind of learning.	1.9787	0.84672	Accept	6
10	Flipped classroom has increased the attainment level of experiences included in the learning and research skills course.	1.4043	0.53810	Low	19
11	I wish to use flipped classroom in all curricula.	1.2766	0.53981	Low	21
12	I think it's hard to use flipped classroom as a tool for learning important scientific materials at the university.	2.5957	0.64806	High	1
13	I prefer universities to use other ways of teaching rather than using flipped classroom.	2.1064	0.63362	Accept	3
14	Lack of desire to learn through flipped classroom.	2.2979	0.77781	High	2
15	I think there is an overestimation of the educational role of flipped classroom.	2.0213	0.60754	Accept	4
16	I think the use of flipped classroom in universities weakens the teaching process.	1.9574	0.72103	Accept	7
17	Flipped classroom may delay and complicate simple scientific experiences.	2.0213	0.79371	Accept	5
18	I think it is necessary to train all university professors in the use of flipped classroom in teaching.	1.7872	0.83239	Low	12
19	I think flipped classroom provides me with clear, step-by-step, material learning procedures.	1.3830	0.60982	Low	20
20	In general, I can learn all the courses through the flipped classroom strategy.	1.5319	0.83017	Low	18
Average All items		1.81702	0.7117935	Accept	11

From table (5,6) that the level of student satisfaction in the current study with the use of the flipped classroom strategy generally came at an acceptable level with an average of 1.8. The level of student satisfaction around the paragraphs of the flipped classroom strategy satisfaction questionnaire varied between (low, acceptable, and high) in terms of identification.

The results showed that student's level of satisfaction with the item" I think it's difficult to use flipped classroom as a tool for learning important scientific materials at the university" was high and ranked first with an average of 2.6, reflecting the unwillingness of students to mainstream the flipped classroom strategy into courses that can be important in their view and

that result is consistent with the level of student satisfaction with the use of the e-learning strategy followed by the item "Lack of willingness to learn through flipped classroom" and came with a high and average level of satisfaction 2.3 This reflects students' unwillingness to use the strategy. The results also showed that item "I believe that reflective learning provides me with clear step-by-step procedures for learning material" at the last level with a low and average satisfaction level of "1.4". The item "Reversed learning increased the attainment level of the experiences contained in the learning and research skills course" ranks penultimate with a low and average satisfaction level of "1.4".

The researchers attribute these findings to several reasons, including the state of the pandemic "COVID-19", which forced students to learn remotely from their high school homes for three previous classes before attending university "surrounded by all its pros and cons, especially since this method has not been prepared in advance for students, so that they have misunderstanding between distance learning and any other strategy aimed at activating self-

learning. This is evidenced by the level of student satisfaction with the study sample on the use of the flipped classroom strategy, which has led to a reluctance to use learning based on the activation of self-learning, active learning, and the use of modern techniques. The current study showed students' satisfaction with the use of the flipped classroom strategy as illustrated by the average response of students to the identification items, which demonstrates the willingness of students to use the flipped classroom strategy so that it is prepared and the tools needed for the success of the method. The results of the current study are consistent with the Superal 2021 study, the Web and Doman (2020) study and Zahrani (2014) study, which demonstrated students' satisfaction with the use of the flipped classroom strategy.

-Are there any differences in statistical function in students' level of satisfaction with the use of flipped classroom and e-learning strategies? To answer this question, the t-test was used to determine the significance of differences in the level of satisfaction across the flipped classroom and e-learning strategies.

Table 7- Group Statistics

	Method	N	Mean	Std. Deviation	df	F	Sig.
Mean	E- learning	59	1.8551	.19021	.02476	.759	.386
	Flipped classroom	47	1.8170	.19260	104		

Table (7) shows that there are no statistically significant differences at the "0.05" indicative level in the level of student satisfaction with the use of e-learning and flipped classroom strategies.

- Are there any statistical differences in students' achievement before and after the use of the e-learning strategy? To answer this question, the t-test was used to determine the significance of differences in students' level of achievement before and after the use of the e-learning strategy.

One-Sample Statistics   Table 8

	N	t	df	Mean	Std. Deviation	Sig. (2-tailed)

T1	59	19.910	58	12.2373	4.72097	.000	
T2	59	45.437		20.4407	3.45549		

Table (8) shows that there are statistically significant differences at the "0.05" indicative level of student achievement after using the e-learning strategy in favor of post-test. These results are consistent with Studies of Orensa (2019), Roman, Blubinho (2021) and Caporello , Peggy (2018).

-Are there any statistical differences in students' achievement before and after the use of the flipped classroom strategy? To answer this question, the t-test was used to determine the significance of differences in students' attainment before and after the use of the flipped classroom strategy.

Table (9) : One-Sample Statistics

	N	Mean	t	df	Std. Deviation	Sig. (2-tailed)
T1	47	10.4894	20.746	46	2.47485	.000
T2	47	19.1489	28.129		4.66709	

From Table (9) that there are statistically significant differences at the "0.05" indicative level of student achievement after using the flipped classroom strategy in favor of the post-test. These results are consistent with the studies of Super (2021), Web and Domane (2020), Skimming (2016), and Zahrani (2014).

- Are there any statistical function differences in students' achievement levels due to the different learning strategies used (e-learning, flipped classroom)? To answer this question, a t-test was used to determine the significance of differences in students' achievement levels due to the different learning strategies used (e-learning, flipped classroom).

Table (10) Group Statistics

	Method	N	Mean	Std. Deviation	Std. Error Mean
T2	E-Learning	59	20.4407	3.45549	.44987
	Fillip classroom	47	19.1489	4.66709	.68076

Independent Samples Test

	Levine's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig. (2-	Mean Difference

					tailed)	
Equal variances assumed	3.699	.057	1.637	104	.105	1.29174
Equal variances not assumed			1.583	82.474	.117	1.29174

From Table (10) that there are no statistically significant differences at the "0.05" indicative level in students' attainment level due to the different learning strategies used.

Conclusion

The main results of the current study have indicated that there is a considerable satisfaction level among students towards the use of E-learning and Flipped learning strategies, and there is a statistically significant difference in the level of student achievement in favor of the post-application of the achievement test for students who used the E-learning, and students who used flipped learning strategies. However, the content and learning materials should be well-prepared and appropriate to meet the requirements of (electronic, flipped) learning strategy before implementing it. Faculty members need to be trained on using the (electronic, flipped) strategy in their teaching. For students to benefit from the use of active learning and modern technologies, they need to be trained on this kind of learning strategy.

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