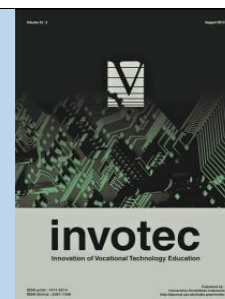




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THE EFFECT OF USING THE LEARNING CYCLE STRATEGY ON THE ACADEMIC ACHIEVEMENT OF TENTH GRADE STUDENTS IN VOCATIONAL EDUCATION IN JORDAN

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ABSTRACT

The study aimed to recognise the effect of using a strategy learning cycle on the collection of school students. The tenth primary in vocational education in Jordan, where it was chosen as the High School for Boys in Governorate Ajloun, was chosen in two divisions. In her school achievement of the people in tenth grade primary school, she randomly distributed these two divisions to form a control group and an experimental group. The first experimental group was taught it consists of 35 students using the learning cycle, While the subject was being taught, control sink It also consists of 35 students Using the usual traditional method to teach the two groups. A qualified teacher to do this, the trial period lasted eight weeks. Statistical analyses of the study data revealed that in the second semester of school year 2021/2022 AD, there were statistically significant differences in the achievement of tenth grade students in material vocational education and those who were consoled to use teaching strategy (learning cycle the traditional method); the differences in the collection were in favour of students who learned by the learning cycle strategy, compared to their peers who learned the traditional way.

1. Introduction

The last decades of the twentieth century witnessed rapid developments, which were reflected in the education system in terms of its role, philosophy, policy, curricula, and methods. Among the most prominent of these developments are the astonishing progress in all fields of science and technology and the emergence of the information age and globalisation, which are forcing those working in the field of education to renew and develop the educational system to keep pace with modern developments and coexist with them and invest in education. Turbo development has focused on the curriculum; Because it is considered the foundation of the educational process and the effective means to achieve its goals and the goals of education that aim to prepare individuals

capable of advancing the nation to the highest levels, and to adapt to these new changes and developments, through their knowledge of the means, methods and concerns, which allow students to self-learn and provide them with knowledge that helps them solve the problems they face (Khawaldeh, 2007; Al-Momani, 2019) that importance which enjoy with strategies instructional based to me the theory constructivism in a acquisition concepts scientific, operations science associated by acquiring picture intact and functional made of which axis search and the study from before many from researchers educators (Rababa & AL-Momani, 2021).

Therefore, lost accelerated pace research purposeful to me development acquisition methods concepts scientific, and goals from acquired, and science operations included in which ago beginning 80s from horn past, this acceleration led to me emergence collection from movements global fix educational scientific, perhaps from the most famous a movement standards for scientific education, as the standards movement sought to provide vision futuristic for culture scientific i have students, focused to understand concepts main, and learning constructivist active, and individual survey and collective, and to achieve this is vision developed the movement number.

From Standards in a six fields, as for most important recommendations which i went out a movement standards lost represented in a necessity understanding concepts scientific, employment operations science the basic and integrated in a building this understanding and to achieve that be seen many from researchers that utilization integration between strategies teaching from like that achieve number of goals learning the basic; so that from affair integration enable students from operations science picture functional from during diversification investigative activities; command which reflected positively on understanding proper concepts science they have what decrease from prospect their occurrence in a conceptual errors, and avoid them understanding the error or alternative (misconception) (Çepni et al., 2010; Al-Momani, 2022; Alrabadi & Al-Momani, 2022).

Our current era is witnessing a tremendous technological development and an information revolution that included all human life. This revolution posed a challenge to the educational system with the necessity of reforming it and absorbing the huge amount of knowledge, employing it and benefiting from it by preparing scientific and educational cadres that take an active role in development in all its dimensions and facing challenges (Salam, 2006; Al-Momani & Rababa, 2022).

In light of these developments, it has become imperative for education to provide more educational systems and to emphasize the scientific growth of individuals to raise the scientific level and keep pace with the requirements of the modern era (Al-Gharib & Behbehani, 2006). It does not mean what the learners learn? What really means is that the learners learn how to think? Thus, the basic message of the curriculum becomes the conduct of education by paying attention to the contents of the curriculum and methods of teaching and learning with the aim of developing the learner's creativity energies and leaving the culture of receiving information into a culture of building information, processing and transforming it from knowledge cognition is represented in the discovery of relationships and phenomena, which enables him to move from the stage of knowledge to the stage of metacognition, which is represented in contemplating knowledge and deepening its

understanding and interpretation, and exploring the dimensions of the phenomenon and inferring its hidden dimensions through living systems of research and investigation (Al-Jundi & Munir, 2001; Al-Momani, 2022).

In the development of the curricula, the focus has been on its four components: objectives, content, methods, activities, and evaluation. However, the attention has been largely focused on teaching methods that relate to the learning-educational situation and are the means of interaction and communication with the student, or through which the student is provided with knowledge, skills, and directions. Determined by the content of the curriculum. Teaching methods of various types and forms are the real conductors or means of communication that convey the learning material, whether the content of the message is information, value, movement, or experience. From the teacher and students, or by the difference in the number of learners by it (Hamdan, 1985; Rababa & AL-Momani, 2021).

A number of scientific educators believe that students can be helped in solving the problems they face in understanding difficult scientific concepts, gaining a deep conceptual understanding of these concepts, the ability to apply and analyze scientific thinking skills, and increase their academic achievement.

The so-called metacognitive learning cycle strategy has emerged. Metacognitive learning cycle, which is based on the constructivist theory and John Favela's research, as this strategy combines the learning cycle model and metacognitive strategies, which emphasize the interaction between the teacher and learners during the educational situation, by helping learners to express their scientific ideas cooperatively and discussed (Blank, 2000).

I have numerous attempts have been made to formulate executive strategies that the teacher will follow in teaching room class to study asked for it scientific concepts and these strategies emphasize the active role for students in learning; Where are the learners? Conducting lots of group activities and experiments or work teams. It also confirms the intellectual participation of the attention to the activity so that meaningful learning occurs based on understanding. One of the most important of these strategies is the learning cycle which counts one of the important teaching methods in the educational process that has been proposed to develop an appropriate treatment for learning difficulties and improve the level of students' understanding. Robert Karplus and colleagues have adopted and It is based on the principles of cognitive development to piaget in building a learning cycle, where he learns students through their pre occupation and their performance They apply their previous experience, develop an interest, and show curiosity scientifically enthusiastic. They keep it towards the materials they have at hand (Trowbridge & Bybee, 1990; Al-Momani & Rababa, 2022), and prepare course learning from methods which get up on building cognitive and the derivative from theory constructivism which care by learning standing on building knowledge and steps use it, as is an app for theory piaget around the growth cognitive, as provides room wide to teach, to help the learners on acquisition aspects educational many as a development concepts and

gain skills operation and inclination toward subject from during development teach them and moving with it from learning indoctrination to me participation (Attia, 2008; Al-Momani & Purnawan, 2022).

This, a number of researchers have pointed out, including: Lawson et al. (1989), Renner & Marek (1990) the learning cycle is a method for planning lessons, for learning and teaching, and for curriculum development. In the field of vocational education teaching, this strategy is also a method of thinking and action, as it is commensurate with the way students learn, and it provides an excellent field for planning the effective teaching of vocational education lessons. A number of studies have supported the effectiveness of the learning cycle in encouraging students to think creatively and critically. It also facilitated the understanding of scientific concepts, the development of positive trends, and the improvement of students' acquisition of scientific skills (Lawson et al., 1989).

In this regard, Al-Khalili et al. (1996) indicated that the learning cycle is useful in reviving the joy of discovery among students, especially when they encounter natural phenomena; They observe carefully, investigate the phenomenon, conduct research, and expand their knowledge and abilities in formulating hypotheses or making predictions. This makes us required to consider the potential of that strategy and seek to employ it in vocational education lessons.

The educational approach to the learning cycle that was adopted in this study consists of three interactive stages are: the exploration stage, the concept presentation stage, and the concept application stage, and if the stages are followed sequentially, you will get strong theoretical support from Jean Piaget's theory of cognitive growth, applying the learning procedures in a constructivist way (Barman, 1992; Al-Momani & Jawarneh, 2022).

The following is a brief explanation of what takes place in each stage of this cycle:

1. Exploration phase: And where he interacts students directly with one new experiences that raise questions that may be difficult for them the answer then, through individual or group activities, they search for Answers to their questions, and in the process of searching may discover things and idea new relationships. While the role of the teacher here is limited to give instructions for students within narrow limits (Lawson et al., 1989). This stage corresponds to the representation of the knowledge of Piaget.
2. Concept presentation stage (Concept introduction phase): This stage begins with supplying students the concept or principle associated with the new experiences they encountered in the detection stage, and the process of introducing the concept or principle is carried out by the teacher or textbook or educational movie or hear a tape recording. Sometimes this stage is called the concept extraction stage, sometimes the teacher asks his students to try to reach an acceptable formulation of the concept themselves when possible. This stage is sometimes called the explanation stage. This stage corresponds to the compatibility in the formation of knowledge according to Piaget.
3. Concept application stage (Concept application phase): What lead this stage has a important role they are in the breadth of understanding students for the concept or principle intended to be learned and that through the exploration and concept presentation phases.

This expansion comes from what he does students from activities He plans it so that he helps them move effect learning and generalizing their previous experiences in new situations. This stage is characterized by the teacher science teacher it gives enough time to apply students what they learned on other examples. At this stage, the teacher can choose one or more of the following activities: directing students to conduct additional laboratory experiments to apply the concept, or performing a practical demonstration related to the application of the concept, or giving them homework. This step helps to consolidate the meaning of the concept, and to understand its relationship with other related concepts. This stage corresponds to the stage of organization in Piaget's theory (Al-Khalili et al., 1996).

From all of the above, we see that there is a great interest in students' concepts, and the safety of their formation and its survival and retention, and that most of the focus of scientific education research was on students rather than teachers. With this focus on the learner, we see that learning is the active process that takes place in the learner. From this point of view, the learning outcomes do not depend on what the teacher provides, as much as they are the result of the interaction between the student's information and activities. It is also clear from the foregoing that trends play a prominent role in the learning process, as they help students understand and interpret scientific knowledge, improve their performance and increase their motivation towards learning.

From here this study came as an attempt to investigate the effect of using strategy learning cycle, compared to the traditional method in helping children pulp in overcoming some the difficulties they face in understanding difficult scientific concepts, and providing them with a sound scientific understanding of these concepts as well investigation effect use in diagnosing school year in a vocational education.

1.1 Study problem and questions

Based on the foregoing, and since learning is an individual process that requires the interaction of previous knowledge with current ideas in the context of an appropriate surrounding environment that helps the student build his knowledge on his own. In addition, the process of acquiring knowledge is an active and continuous constructive process that takes place through to Modifying the individual's cognitive structures or systems, through the mechanisms of the self-regulatory process (representation and alignment) and targeting his adaptation to stress environmental knowledge.

As the inability to a lot of pulp to understand the concept scientific and comprehensible, and that the traditional method is used by professional education teachers in teaching these concepts scientific with its theoretical explanation without using any sensory means, and without looking to me its applications, and not engage tpulp in reach to her and realization relationships between them. Poetry researcher that over there need diamond to find new strategies to help learners in the various

educational stages, to learn concepts in an effective manner, by reconsidering their role during the educational process and considering them as active thinkers, and not limiting their role to remembering information and knowledge accumulated.

The problem of the study, in general, lies in the presence of a need to improve the methods and methods used in teaching scientific concepts in the subject of vocational education, by moving towards modern and constructive strategies that emphasize scientific understanding, such as the learning cycle strategy. And that Entire, in order to help thepulp in overcoming the difficulties they encounter in assimilation of difficult scientific concepts,and earn them sound scientific understanding. In short, the study problem was identified by the following main research question:

What is the effectiveness of using the learning cycle strategy on the academic achievement of tenth grade students in vocational education?

Within the framework of this main research question in the study, the study aimed to answer the following question:

Do Differs collection Tenth grade students in vocational educationqaTeaching strategy (learning cycle,Andtraditional way)?

1.2 The importance of studying

This study gains its importance from the importance of developing teaching methods, as it investigates the effectiveness of a teaching strategy that is important in confirming the interaction between the teacher and the learner in the educational process. This is in response to what educators are calling for at the present time to reconsider the curricula, rebuild it and present it with new teaching methods and approaches that emphasize the interaction between the teacher and the learner in the educational process.

This study is of importance to educational institutions, because it may add new information about teaching strategies, such as the learning cycle strategy, and its impact on facilitating subsequent learning. He has the extent of his misunderstanding in his knowledge structure and helps him in later learning, increasing the impact of learning and his academic achievement, and developing his positive attitudes towards professional education. Others aim to develop different teaching models in order to help improve the teaching-learning process.

1.3 Idiomatic and procedural definitions of the study

Reply in this study number of basic terms and the following procedural tariffs for these terms.

1.3.1 Learning cycle

Khawaldeh (2007) defines it as an educational strategy for designing, organizing, and teaching the subject matter, and it is an educational application of Piaget's theory of mental development and made up practically or procedurally it consists of three stages: exploration, and presentation of the

concept, application of the concept. The exploration phase confirms sensory experiences while the concept introduction stage emphasizes a positive learner to reach to me concept; as for the application stage, it employs the use of the concept in situations educational—learn it new.

Hossam El-Din (2002) defines it as a strategy that combines metacognitive strategies with Piaget's theory of cognitive growth, stresses the interaction between the teacher and the learner during the educational situation, and depends on activities in addition to the use of metacognitive strategies. Metacognitive strategies in each phase. From its phases, the exploration phase, concept presentation, concept application, concept evaluation.

And Jabr (2010) defines it as a model that combines metacognitive strategies with the learning cycle, which is a translation of some cognitive constructivist ideas, and the most important characteristic of it is that it allows the teacher and the learner to express their ideas in a cooperative manner and discuss them while training learners on questions across all stages of the course: Exploration Presentation of the concept, application of the concept, evaluation of the concept.

And it was known by courses and it mattered (Yenilmez & Ersoy, 2008) as: educational model with sequence pyramidal developer stationed on discovery concept then expand it and help students on building knowledge picture regular as well as on development ways of thinking and skills the operation.

Adam knows Bajracharya et al. (2009) on it style teach and learn focus on requester building know him from automatically himself and with direction from the teacher, it is mainly used to find out the facts concepts, and learning by practice, and make learning with meaning of and confirms on the ability students in a utilization curriculum scientific in a find on knowledge or expertise educational purposeful.

As for procedurally, the researcher adopts the definition of Khawaldeh (2007), which he defines as an educational strategy for designing, organizing, and teaching the subject matter, and it is an educational application of Piaget's theory of mental development and made up practically or procedurally it consists of three stages: exploration, and presentation of the concept, application of the concept. The exploration phase confirms Sensory experiences while the concept introduction stage emphasizes a positive learner to reach to me concept; As for the application stage, it employs the use of the concept in situations educational—learn it new.

1.3.2 Traditional way

Khawaldeh (2007) defines it as educational method (common) where the teacher is doing (vocational education teacher) main role In teaching vocational education / scientific concepts, while the role of the learner is a (negative) role in general. It mainly includes the teacher's use of the verbal presentation method, questions to provoke discussion in a specific way that leads to clarification of the concepts and ideas of the lesson, practical presentation, and other educational material presentations for the purposes of verification, confirmation of the validity of cognitive products, and questions from the textbook for the purposes of class assessment and homework.

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1.4 Collection

Know him (Webster, 1981) the student's achievement in the classroom, in terms of quantity and quality.

It is defined Al-Zoubi & Younes (2015) as a level of achievement, competence or performance in education and school work that the student reaches during the educational process and is assessed orally or through the use of various specialized tests for that.

As for procedurally, the researcher defines it as being outcome of what the student learns of concepts, generalizations, and skills scientific from a book vocational education for the tenth grade for the academic year (2018/2019). And it has been measured procedurally the mark the student gets on the test achievement in a material vocational education from prepare and design researcher for purposes this study.

1.5 Vocational education subject

It is one of the subjects approved by the Jordanian Ministry of Education for the basic stage from the fourth grade to the tenth grade in all schools in the Kingdom, which is taught by a qualified and specialized teacher who holds an academic degree.

1.6 Study limits and limitations

This study is determined by a number of factors, the most important of which are:

1. This study was limited to tenth grade students at ibbin iblin comprehensive secondary school for boys in Ajloun Governorate for the second semester of the academic year 2018/2019.
2. The nature of the study procedures in terms of their tool in how they are developed, their ability (accuracy) to measure what they were designed to measure, and their characteristics and application procedures, all of which are considered partially determined for the validity and generalization of the results in general.
3. He taught and applied the two teaching strategies used by the vocational education teacher in the concerned school, and the success of the application depends on the cooperation of the teacher, the school principal and its students with the researcher.

1.7 Previous studies

Several studies related to the topic of the current study and from various aspects of the learning cycle strategy were referred to, and the following is a presentation of these studies:

The study Hamdan & Al-Hafi (2018), which aimed to in order to reveal the effect of the learning cycle strategy on the academic achievement of the third grade students, it relied on the quasi-experimental approach, where an educational program was designed according to the strategy of the learning cycle for the engineering unit from the mathematics book for the third grade, and an achievement test was designed that included (19) questions distributed over three sections: including a section for multiple choice, a section for spaces and short answers, and a section for drawing geometric shapes. The number of students reached (72) male and female students. The study concluded that there is a statistically significant difference between the average scores of students of the two groups (experimental and control) in the post and postponed application of the achievement test which was in favor of the experimental group students.

The study Al-Mashaaleh & Al-Qadri (2018) also aimed to investigate the effect of the integration between the two strategies of the five-year learning cycle of Baibi and the conceptual change of Stepan in acquiring science processes for first year secondary science students. The purposeful sample of the study consisted of (57) female students who were randomly assigned to the two study groups, the control group consisting of (27) female students, and the experimental group consisting of (30) female students. A science process acquisition test has also been prepared. To achieve the objectives of the study, arithmetic means and standard deviations were calculated for the performance of the study members, in addition to the accompanying unilateral variance analysis. The results showed that there were statistically significant differences between the average performance scores of the two study groups on the science acquisition test due to the variable of the teaching strategy, and in favor of the group that studied using the integration strategy.

Also came a study Souman (2017), which it aimed to investigate the effect of employing the learning cycle strategy on acquiring grammatical concepts and developing inferential thinking among tenth grade students in Jordan compared to the usual method. The study sample, which was chosen at random, consisted of (65) students divided into two divisions: an experimental group consisting of (32) students who studied using the learning cycle strategy, and a control group consisting of (33) students who studied using the usual method from the tenth grade students in the Second Amman Education Directorate for the year academic year 2015/2016 to achieve the goal of the study, the researcher designed the study tools represented in: the grammatical concepts acquisition test, the inferential thinking test, the teacher's guide for teaching grammatical concepts using the learning cycle strategy, the results showed a statistically significant difference between the two groups in favor of the experimental group that was studied using the learning cycle strategy; Compared to their peers who learned the usual way. The results also showed a statistically significant difference at the level of ($\alpha = 0.05$) in inferential thinking attributed to the teaching strategy in favor of students who learned according to the learning cycle strategy.

And I aimed study Alsarayreh (2017) to check up effectiveness teaching using course learning seven in a achievement development and direction toward material biology i have students class the tenth primary in Jordan for a sample of (445) a student a student from students class the tenth in a School Jafar high school For boys and school girls muta high school, and divided to me two groups, experimental (14) asking a student and an officer (77) asking female student, done teaching the group experimental using course learning and teaching the group the officer using method traditional. To achieve goals studying, it was completed prepare test collection, the application was done on my group studying, showed effectiveness of the study results teaching using learning cycle in a development achievement of students.

As I aimed study Tannous (2014) to me find out effect learning cycle strategy constructivism in a understanding concepts scientific and gain skills thinking investigative i have students basic stage in a light concept self academic they have comparison the way ordinary formed the study sample from (11) student in a class VIII basic, divided randomly to me two experimental groups and officer, has i showed consequences studying excellence learning cycle strategy constructivism on method ordinary in a understanding concepts scientific and gain skills thinking investigative female students study people.

The study Jassim (2014) also aimed to identify the effect of Using the strategy of the metacognitive learning cycle to develop reading comprehension and achievement in biology for second-grade intermediate students. The experimental design with partial control was used for the two groups (experimental and control) that controlled each other with a post-test. The sample was chosen at random, numbering (50) female students of the second grade average, and the experimental group represented (25) students who studied according to the strategy of the metacognitive learning cycle, and the same in the control group that studied according to the traditional method, and to verify the objective of the study, an objective achievement test was prepared It was a multiple-choice type with four alternatives consisting of (30) items, and the results showed the superiority of the experimental group that was taught according to the strategy of the metacognitive learning cycle over their peers in the control group that studied in the traditional way in the achievement test.

The study aimed at Al-Shugairi & Al-Faraji (2014) to me knowledge effect strategy course learning in the collection and thinking lateral I have students class the second average in a Material Education Islamic, use the two researchers curriculum demo, and adopted experimental design the adjust partial for two groups experimental and officer and chose a sample search Intentionally, in fact (36) a student for the experimental group and (36) a student for the group female officer, coined the two researchers 160 (goal behaviorally accredited in the field Cognitive to levels) knowledge, and assimilation, and the app on classification bloom (bloom) has took experience chapter darcy complete, prepared the two researchers test dimensionally to measure the level collection the students in a material education islamic component from (40) paragraph objective, the study found that over there a difference the indication Statistic between averages the two groups experimental

and the officer and for the sake of the group Experimental Which I studied according to the learning cycle strategy in the post achievement test.

And I aimed the study of Siribunnam & Tayraukham (2009) to me knowledge effect teaching using learning cycle strategy and traditional in a development thinking analytical and collection scientific and trends toward to learn chemistry i have students class fifth in Thailand. Formed study sample from (471) a student was chosen in a way random cluster, showed results that use the learning cycle strategy led to me development thinking analytical and collection scientific.

And Lord (1999) in a study that aimed to explore the effect of teaching by the constructivist method (the learning cycle) on the achievement of a course in the environment, in which a model was followed. Bybee it consists of five stages: engagement, exploration, interpretation, expansion, and evaluation. The study was applied to four classes, which were divided into two groups: the first was the control group, and the number of students in its two divisions (45 and 46) was taught in the traditional way. As for the second group, the number of students in its two divisions was (46 and 48) students. It followed a model Bybee prepared according to the phases of the learning cycle. A level check was conducted for the two groups, where the arithmetic mean was the same for the two groups. The same teacher taught the two groups, and a questionnaire was prepared to reveal the students' attitudes towards these two strategies. The students of the two groups were also subjected to a multiple-choice test at the end of the study application. The results of the study indicated that the experimental group that was taught by the constructivist method (the learning cycle) had a higher achievement than the control group that was taught in the traditional way. The results of the poll also showed that 80% of the students of the experimental group indicated that the class was interesting and that the constructivist method helped them to comprehend and understand the material they studied, and to master it better than their peers who studied the traditional way.

Hanley (1997) conducted a study on students of a district school metropolitan district in the state of Kentucky, USA, I aimed to compare the effect of both the learning cycle and the traditional method in increasing the achievement of specific concepts in ecology. The sample of the study included ten groups: Five of them were studied using the traditional (control) method, while the remaining five were studied using the (experimental) learning cycle. The results of the students were evaluated using an achievement test of the multiple choice type, and three open-ended questions. The results of the study revealed that there were no statistically significant differences in students' achievement due to the method of teaching. As for the results of the achievement on the open-ended questions, the results of the first question showed statistically significant differences attributed to the method of teaching (the learning cycle), and significant differences were found on the answer to the second question attributable to the teacher and the method of teaching together. As for the third question, there were no significant differences attributed to the teacher. While significant differences appeared due to the method of teaching.

Compare Hedgepeth (1997) in a study that has the effect of the learning cycle, and the traditional method of achievement in a course in earth sciences for eighth-grade students. The

sample members, which numbered 125 students, were divided into four groups: the first group (the control group) studied the traditional method that adopted the textbook; The other three groups (experimental) were studied using the learning cycle. The four groups were subjected to a pre-test and a post-test prepared by the researcher. The results of the post achievement test revealed significant differences between two groups of groups that were taught using the learning cycle, and groups that studied using the traditional method. As for the third group that was studied by the earth sciences teacher (who is the most experienced teacher), his experimental group had higher educational attainment than the other groups that studied using the learning cycle and the traditional method.

The study Tammam (1996) also aimed to identify the impact of the use of the learning cycle in teaching scientific concepts related to the subject of light on the achievement of first year preparatory students, and the survival of the learning effect. The study sample consisted of two control groups consisting of (68) male and female students who studied the topic of light in the traditional way, and an experimental group consisting of (69) male and female students who studied the topic of light using the learning cycle. The study tool consisted of an achievement test that consisted of (30) multiple-choice items. It included three types or levels of questions that covered the level of remembering, understanding, and application. After completing the teaching, the students of the two groups were given an achievement test in the scientific concepts related to the subject of light. Three weeks after the first application of the test, it was applied again to measure the learning effect survival.

Performed by Rubin & Norman (1992) a study aimed at comparing the effect of using three educational strategies (learning cycle, modeling, and the traditional method) on the achievement of middle school students in a European school in integrated science skills and the ability to deductive reasoning. The study sample consisted of (327) students from sixth to ninth grades who were divided into two groups, an experimental group and a control group. One of the two experimental groups was taught by the learning cycle method, and the other group was taught by the modeling strategy. These two groups were taught by teachers who were trained in the modeling strategy and the learning cycle, and the third group (the control group) was taught by teachers who were not trained in the teaching strategies (modeling and the learning cycle) using the traditional method. The results of the study indicated that the students who learned the modeling strategy outperformed the students who learned the learning cycle strategy and the traditional method in their achievement of integrated science skills. The students who were taught by teachers trained in the learning cycle strategy and the modeling strategy also showed superiority in their achievement of integrated science skills compared to the students of the control group. The results of the study also indicated that there were statistically significant differences in students' achievement of integrated science skills due to the level of mental development (perceptible and transitional).

It is extracted from the previous review of previous studies, which indicate the importance of this method in the teaching process, especially increasing student achievement.

This study comes to contribute to testing the effectiveness of this teaching strategy in learning the scientific concepts included in vocational education for tenth grade students in Jordan.

2. Method and Procedure

2.1 Study approach

This study is a quasi-experimental field study. The main variable of the study is the teaching strategy and it has two levels:

1. Learning cycle strategy
2. The traditional way

Its dependent variable is:

1. Achievement in vocational education

2.2 The study population and its sample

The study population consisted of all tenth grade students in government schools affiliated to the Directorate of Education in Ajloun Governorate, in the second semester of the 2021/2022 school year. has reachedgh Their number is (3892) students

As for the sample of the study, it consisted of (70) students distributed in two divisions of the tenth grade four classes at Ibbin Iblin Comprehensive Secondary School for Boys. These people were randomly assigned to form the experimental groups:

- A - The first experimental group (n = 35), which was taught with a strategye learning cycle.
- C - The second experimental group (n = 35) was taught in the usual traditional way.

2.3 Study tool

One tool was used in this study, which is the achievement test in vocational education, and the following is a description of this tool.

2.4 Achievement test

This test, in its final form, consisted of (35) paragraphs of a multiple-choice type, and was designed to measure academic achievement in the metalworking unit from the vocational education book for the tenth grade before and after the experimental treatment, as a list of specifications was prepared that includes the three levels of the cognitive domain (knowledge, comprehension, and application).

2.5 The validity of the test:

The two researchers prepared a test consisting of (38) paragraphs in its first form, and then presented it to a jury consisting of (4) faculty members in the Department of Educational Sciences at Ajloun University College, and from two supervisors of the vocational education subject, one of whom holds a doctorate degree and the other a master's degree In the specialization of vocational education curricula and methods of teaching them, and (4) professional education teachers in the field, and thus the number of arbitrators was (10) arbitrators with specialization, and in light of the arbitrators' observations, some paragraphs were modified by linguistic and scientific reformulation and the deletion of some paragraphs, and the test became in Its final form consists of (35) paragraphs.

2.6 Test stability

To ensure the stability of the test, it was applied to a neutral section in one of the schools of the study community, which consisted of (35) students from the tenth grade students, and after two weeksreThe test was applied to them and the reliability coefficient was calculated (0.87).

2.7 Study procedures

To answer the study questions, the researcher performed the following actions:

1. Choosing the application unit, which is the sixth unit entitled Metalworking in the vocational education book for the tenth grade in the second semester of the academic year 2021/2022 for experimental treatment.
2. Contacting Ibbin Iblin Secondary Comprehensive School for Boys to obtain its consent to cooperate in conducting the study, where the school director and the teacher of vocational education expressed their willingness to implement the study in their school.
3. Training the experience teacher to teach using the learning cycle strategy, through a guide for teaching the selected unit, discussing this guide, and implementing training sessions by practicing teaching according to the learning cycle strategy.
4. Giving the two study groups the pre-achievement test in vocational education to ensure that the two study groups are equal.
5. Applying the experimental treatment to the study sample, so that the experimental group is taught the strategy of the learning cycle, and the control group is taught in the traditional way. The selected content was taught in (16) class sessions at a rate of two lessons per week.
6. The researchers made field visits to the teacher in his school and followed up on his implementation of the proposed strategy in the experimental classes, and made sure that he used the traditional method in the control division.

7. The post-achievement test was re-applied in the subject of vocational education, after completing the teaching of the content, which took (16) class sessions over a period of (8) weeks.
8. The collected data were arranged and classified, according to the specific study design. Descriptive and inferential statistical analyzes were conducted using the statistical analysis system in the social sciences SPSS.

2.8 Healere statistics

To answer the study questions, the following statistical treatments were used:

1. Use one-way analysis of variance (1-way ANOVA) to verify the equivalence of the study groups in the tribal achievement in vocational education.
2. Use the accompanying analysis of variance (ANCOVA) on the results of students in the post achievement test in professional education to measure the effectiveness of the teaching strategy used in this study.

3. Study Results and Discussion

3.1 Results related to the equivalence of the study groups

To ensure the equality of the study groups before applying the study procedures for achievement, the pre-achievement test in vocational education was applied to the students of the study sample. A one-way analysis of variance was performed on the scores of the study sample students in the pre-achievement test that was conducted before starting the experimental treatment. Table 1 shows the results of this analysis.

Table 1. The results of the one-way analysis of variance for the scores of the study sample students on the pre-achievement test in vocational education

Indication level(h)	Valuesstatistician (q)	mean squares	degrees of freedom	sum squares	Contrast source
0.598	0.437	3.1121	2	4.059	between groups
		3.1121	112	645.453	within groups
		3.423	114	589,651	total

It is noted from the results of the one-way analysis of variance in Table (1), that there is no statistical significance ($h = 0.598$) for the value of "p" (0.437) related to the differences between the mean scores of the students of the two study groups. This primary result means that the two groups of students in the study sample are (statistically) equal in their mean scores in the pre-achievement.

3.2 Results related to the results of the two study groups after the experimental treatment

To answer the study question, which states:

Does the achievement of tenth graders in vocational education differ according to the teaching strategy (learning cycle and the traditional method)?

The researcher applied the post achievement test in vocational education upon completion of the experimental treatment, and the accompanying analysis of variance was used (ANCOVA) on the students' dimensional grades in vocational education, considering the students' tribal scores as a common variable. Table (2) shows the results of the (covariance) analysis of the accompanying variance between the students' posterior and tribal scores in the two study groups.

Table 2. The results of the analysis of variance associated with the scores of the study sample students in the post and pre-test in the subject of vocational education

Indication level (h)	Valuesstatistician (q)	mean squares	degrees of freedom	sum of squares	Contrast source
0.453	1.09	14,345	1	12.879	Tribal
0.000	8.897*	143.376	2	287.654	heterogeneous Teaching strategy
		14,202	112	1432,763	The error
			113	1569.698	total

It is noted from the results of the analysis of variance accompanying Table (2), that there is a statistical significance (h = 0.000) for the value of "P" (8.897) related to a strategic impact teaching. This result means that there are statistically significant differences in the achievement of tenth grade students in vocational education due to the teaching strategy (the learning cycle and the traditional method); In other words, the tenth grade students achieve differently according to the strategy in which they learn.

In order to find out the strategy that has the greatest impact on the achievement of the students of the study sample in vocational education, the two-dimensional comparisons were made between the modified averages of the scores of the students of the two strategies (the learning cycle and the traditional method) using the method of testing the lowest significant difference (Least Significant Difference) (LSD) Table (3) includes the results of the mentioned pairwise comparisons (lowest difference test).

Table 3. The results of the dimensional comparisons between the modified averages of the scores of the students of the two teaching strategies in the post-achievement test in professional education

	Average Rate Strategy	The Strategy	
		Traditional	Learning Cyclee
Learning cycle	19.76	19.76	14.72
Traditional	14.72	4.21*	4.01*

* significant at level ($\alpha= 0.05$).

The results of comparing the averages of the scores of the students of the two teaching strategies using the least significant difference test method (Table 3) indicate that there is a statistically significant difference between the averages of the scores of the students of the learning cycle (19.76 marks) and the averages of the scores of the students of the traditional method (14.72 marks). This finding means that the outperformance is in favor of students who learn with the cycle strategy compared to their peers who learn the traditional way.

Thus, the results indicated that there were statistically significant differences between the mean scores of the study sample students who learned vocational education using the learning cycle strategy, and the traditional method. The outperformance was in favor of the students who were taught by the learning cycle strategy, compared to their peers who were taught the traditional method.

The researchers may attribute the interpretation of these results to the following:

Learning by learning is an active cognitive process that requires mental effort; The strategy emphasizes the active role of students in learning, as learners conduct many activities in groups or work teams. It also emphasizes intellectual participation in the activity so that meaningful learning occurs based on understanding, which increases the learner's ability to achieve academic achievement at its various levels.

The learning cycle is also concerned with both the content to be learned and the learner's knowledge structures and structures, so they are concerned with how to select and organize content experiences so that it is easy to represent the material to be learned in the learner's knowledge structures and to form new knowledge structures and thus knowledge growth occurs.

In addition to the learner's positivity, the teacher (the professional education teacher) has a key role in teaching the learning cycle, as the interaction between the learner and the study material would create an educational atmosphere that helps in understanding the educational material.

This, in addition to that the learning cycle is concerned with motivation, and emphasizes the operation of hands (Hands-on) which helps effective learning and improve (increase) achievement.

Teaching in the learning cycle enables the learner (the student) to come up with a formulation that he issues by himself about the relationships that he was able to perceive from the general and comprehensive concepts and the details, models and applications that he achieves. On the other hand, the traditional method used in schools is concerned only with the learned subject in general, and gives it an (absolute) priority in the educational-learning process; The primary role in it is for the teacher, which leads to memorizing learning, and it does not include any concern for individual differences between learners in general.

Therefore, the results indicate the superiority of teaching using the learning cycle over the traditional method in the students' achievement of the scientific material included in the chosen unit. These results are in agreement with the results of a study Hamdan & Al-Hafi (2018) and study Al-Mashaaleh & Al-Qadri (2018) and a study Souman (2017) and study Jassim (2014) and the study of Siribunnam & Tayraukham (2009).

3.3 Study recommendations

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

1. As the results of this study showed that teaching by the learning cycle strategy has an impact on achievement in the subject of vocational education, so the researchers recommend the use of this strategy in teaching.
2. Conducting training courses and training teachers to use the learning cycle in teaching.
3. That the Ministry of Education reduce the number of students in the population, and provide the concerns with the necessary materials and tools, so that the teacher can use this strategy because it requires a great effort in preparing for it.
4. Conducting corresponding studies that include other communities of students, with different educational levels, and for a longer period, and taking variables other than those studied as in
5. Acquisition of science processes, scientific tendencies, creative thinking, critical thinking and others.
6. Attention on the part of those concerned with education affairs in general and curricula and teaching methods in particular with modern teaching methods in teaching vocational education. As well as encouraging specialists in scientific education and teaching professional education, who may participate in writing textbooks in vocational education, to take advantage of this strategy when presenting scientific content, and when preparing the
7. teacher's guide / teacher of vocational education.

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