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The Effectiveness of Gagne's Model on Innovative Thinking for EFL Secondary School Students

A B S T R A C T

Gagne's model of instructional design is based on the information processing model of the mental events that occur when adults are presented with various stimuli and focuses on the learning outcomes and how to arrange specific instructional events to achieve those outcomes. Innovative thinking is the ability to create something new. This study aims at, assessing the average level of the (4th) year secondary school students' achievement in thinking skill; finding out if there is any significant difference between the achievement of the experimental and control group in the posttest; finding out if there is any significant difference between the experimental group's achievement at the recognition and the production levels in the posttest; finding out if there is any significant difference among the five variables, vocabulary, grammar, clarity, accuracy and precision. In order to fulfill the aims of the study, the following null hypotheses have been posted; there is a statistically significant difference between the average level of the students' achievement and theoretical level of achievement in the posttest; there is a statistically significant difference between the mean scores of the control group, who are taught according to the conventional method and the mean scores of the experimental group who are taught according to the conventional method and the mean scores of the experimental group who are taught by using of Gagne's Model; there is a statistically significant difference between the mean scores of the experimental group's achievement at the recognition and the production levels in the posttest; there is a statistically significant difference between students' mean scores of the five variables, vocabulary, grammar, clarity, accuracy and precision in the posttest.

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فعالية نموذج جاني في التفكير الابتكاري لدى طلاب المرحلة الثانوية في اللغة الانجليزية

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الخلاصة:

يعتمد نموذج جاني للتصميم التعليمي على نموذج معالجة المعلومات للأحداث العقلية التي تحدث عندما

يتم تقديم محفزات مختلفة للبالغين ويركز على نتائج التعلم وكيفية ترتيب أحداث تعليمية محددة لتحقيق تلك النتائج. التفكير الابتكاري هو القدرة على خلق شيء جديد، والابتعاد عن أنماط التفكير التقليدية. تهدف هذه الدراسة إلى تقييم متوسط مستوى تحصيل طلاب الصف الرابع الإعدادي في مهارة التفكير؛ معرفة ما إذا كان هناك فروق ذات دلالة إحصائية بين تحصيل المجموعة التجريبية والضابطة في الاختبار البعدي؛ معرفة ما إذا كان هناك فروق ذات دلالة إحصائية بين تحصيل المجموعة التجريبية في الاعتراف ومستويات الإنتاج في الاختبار البعدي. معرفة ما إذا كان هناك أي اختلاف كبير بين المتغيرات الأربعة، المفردات والقواعد والأفكار والتهجئة. ولتحقيق أهداف الدراسة تم وضع الفرضيات الصفرية التالية: يوجد فرق ذو دلالة إحصائية بين متوسط مستوى تحصيل الطلاب ومستوى التحصيل النظري في الاختبار البعدي. يوجد فرق ذو دلالة إحصائية بين متوسطات درجات المجموعة الضابطة التي تدرس وفق الطريقة التقليدية ومتوسط درجات المجموعة التجريبية التي تدرس وفق الطريقة التقليدية، ومتوسط درجات المجموعة التجريبية التي تدرس باستخدام نموذج جاجنز؛ يوجد فرق ذو دلالة إحصائية بين متوسطي درجات تحصيل المجموعة التجريبية في مستوى الاعتراف والإنتاج في الاختبار البعدي. يوجد فرق ذو دلالة إحصائية بين متوسط درجات الطلاب في المتغيرات الخمسة وهي المفردات والقواعد والوضوح والدقة والإحكام في الاختبار البعدي.

الكلمات المفتاحية (التفكير الابتكاري . نموذج جاجين . التصميم التعليمي . تصنيف التعلم . إطلاق العنان للإبداع)

Chapter one

Statement of the Problem

Innovative thinking involves the development of dispositions which, among other things, include keenness of mind, zealous dedication to reason, and hunger or eagerness for reliable information. Innovative thinking refers to the development and application of interrelated cognitive and meta-cognitive skills involved in solving problems, understanding and expressing meaning, identifying relationships, assessing credibility of statements, identifying elements needed to draw reasonable conclusions, presenting the results of one's own reasoning coherently and self-consciously monitor one's own cognitive actions. Innovative thinking comprises the development of habits of mind (Costa & Kallick, 2009).

Innovative thinking demands high levels of abstract and logical thinking as well as commitment and attitudes or habits of mind to fulfil the standards and principles of good innovative thinking (Facione, 2009). Moon (2008) asserts

that innovative thinking and its relationship to the educational process has become a central issue. Since innovative thinking is a process which is involved in any research activity, it can be considered as a principal concept to education, especially at higher levels.

The study aims at:

1. Assessing the average level of the (4th) year preparatory school students' achievement in thinking skill
2. Finding out if there is any significant difference between the achievement of the experimental and control group in the posttest

It is hypothesized that:

1. There is a statistically significant difference the average level of the students' achievement and theoretical level of achievement in the posttest
2. There is a statistically significant difference between the mean scores of the control group, who are taught according to the conventional method and the mean scores of the experimental group who are taught by using of Gagne's Model.

Limits of the Study

This study is limited to:

1. The use of Gagne's model on thinking skills.
2. Iraqi EFL 4th year secondary school students in Diyala governorate at Al Musk Secondary School for girls.
3. During the first course, academic year 2023-2024

The Value of the study

1. It Provides a rich activity for EFL learners, particularly cognitive processes in writing on creative thinking skills and to enable them move out from conventional method to new one
2. Assisting EFL students in the development and enhancement of their mental capacities, as well as the production of better thinking in the target language on a variety of topics.
3. It Introduce valuable results to those interested in designing curriculums and encouraging them to consider the Gang's Model in Thinking

Plan of the study

The following steps were used in this study in order to verify its hypotheses and achieve its aims:

1. Identifying the specific steps of the Gagne's Model.
2. Selecting a sample from the EFL. 4th secondary school student from AL-Musk preparatory school and divided them into two equal groups experimental and control groups.
3. Equalizing the two selecting groups in different variables such as, parents' academic attainment, students' age and the students' previous year examination.
4. Teaching the experimental group the intended instructional material b using Gagne's Model, while teaching the control group the same material by using the conventional method.
5. Subjecting the involved groups of students to the constructed test attthe end of the instructional period.
6. Collecting the required data and treating it statistically.
7. Discussing the obtained results and stating some conclusions recommendations and suggestions.

Chapter Two

Theoretical Background

2.1 Concept of Gagne's Model of Instructional Design

Robert Gagné (1916-2002) was an American educational psychologist who helped to advance the science of instruction and learning. Gagné's work has had a significant impact on educational psychology, instructional design and learning and development. Gagné's Nine Events of Instruction are also known as Gagné's Nine Conditions of Learning, Gagné's Taxonomy of Learning, Gagné's Nine Levels of Learning and even the Gagné Assumption. Gagné's model revolutionised learning and development programmes and education as a whole (Clove, 2024).

The first step in Gagné's theory is specifying the kind of outcomes to be achieved. He categorized these outcomes into five types: verbal information, intellectual skills, cognitive strategies, attitudes, and motor skills. The second

step is to organise appropriate instructional events. Gagne's "Events of Instruction" consist of the following:

1. Gaining attention
2. Informing the learner of the objective
3. Stimulating recall of prerequisite learning
4. Presenting the stimulus material
5. Providing learning guidance

1- Gaining Attention

Attention is defined by Slavin (2009) as "active focus on certain stimuli to the exclusion of others." Learner's attention in the teaching/ learning transaction is very important ingredient for effective learning, yet it is a limited resource. In order for effective learning to take place, students must give up actively attending to other stimuli, shifting their priorities so that other stimuli are screened out. Some basic ways of commanding attention of the learners include the use of novelty as is often done with animation, a demonstration or some unexpected events (Gagne, et al, 2005). Slavin (2009) suggests that additional ways to gain students attention in class include usage of cues that indicate "this is important" by raising or lowering voice to signal that critical information is about to be imparted, application of gestures, repetition and body position, introducing lesson with demonstration in order to engage students' curiosity and informing the learners that what follows is important.

2. Informing the Learner of the Objective

Objectives tell students what final performance is expected, a state which provides expectancy and curiosity among the learners, Gagne et al (2005) have it that "presenting students with learning objectives communicates an expectation of the knowledge and/ or skills they are expected to perform." It also argued that "students cannot tell when they have accomplished a learning task and experience the satisfaction of that accomplishment unless they know what final performance is expected of them" (Slavin, 2011). Therefore, these calls upon teachers in the instructional processes to clearly state specific objectives that their learners are intended to meet.

3-Stimulating recall of Prior learning

Prior learning is the fundamental pillar of the idea of "from known to unknown." Tackman and Monetti (2011) contend that "it is the old information and the new information combined that enables an attentive, expectant student to achieve mastery of a task." Slavin (2011) maintains that "new learning invariably builds on prior learning" and maintains that the success of new learning will depend on three factors: whether the necessary prior learning has already taken place, the student knows what prior learning to try to remember and apply and that the student can remember the necessary prior learning.

4-Presenting the Stimulus

Stimulus (stimuli in plural) is an environmental condition that activates the senses. The senses of the learners must be activated for effective learning to take place (Slavin, 2009). It is "an activity or information that presents the content of what has to be learned" (Reiser et al. 2007). In an attempt to present the stimulus, "the teacher must determine what new stimulus information is required by an objective and how to present that new stimulus information so that students can perceive and retain it (Tuckman and Monetti, 2011).

5- Providing Learning Guidance

Guidance is an important practice that affects students' life and particularly their academic performance. Nyaga, Oundo and Kamoyo (2014) argue that guidance and counselling services contribute to better growth of students' academic competence. They call for educational institutions to strengthen these services for holistic development of students and provide adequate physical and human resources that are crucial in promoting the provision of guidance and counselling services. Furthermore, they argue that employment of adequate numbers of professionally well-trained persons for guidance and counselling is of prime importance if guidance and counselling services need to excel in schools. Tuckman and Monetti (2011) have it that "to properly combine old and new information and to make it possible for the result to be entered into long-term memory. Students must be given help or guidance." They also advise that teachers must plan the technique they will use to guide the learners in a given task and how they will present these techniques. "The essence of learning guidance is to provide support for learners in making connection between what they know and what is being learned" (Gagne, et al (2005).

2.1.2 Advantages of Gagne's Model

1. Khadjooi and et al (2011) mention the following advantages:
2. The sequential steps provide a clear framework for instructors to present information, guide learners through practice activities, and offer feedback. This structure ensures learners encounter the essential elements needed to develop critical thinking skills.
3. The model emphasizes active participation through activities like recalling prior knowledge, practicing skills, and engaging in feedback sessions. This active involvement fosters a deeper understanding of concepts and refines critical thinking abilities.
4. By outlining learning objectives upfront, instructors can tailor activities and assessments to target specific critical thinking skills.
5. The model emphasizes activating prior knowledge, which creates a solid foundation for building new thinking skills. This is crucial because critical thinking relies on existing knowledge and understanding of concepts.

2.1.3 The Teacher's Role in Using Gagne's Model

Khadjooi and et al (2011) mention the following roles:

1. The teacher asked challenging questions and guided the class through presentation-related training.
2. The teacher explained what they should learn to accomplish their goals
3. To help students understand the material, the teacher connected that knowledge to what they already knew.

2.1.4 Students Role in Using Gagne's Model

1. Students actively participate by responding to the instructor's prompts and questions throughout the instructional events.
2. The model highlights the importance of providing opportunities for students to practice the acquired knowledge and skills.
3. Students are encouraged to self-assess their learning and actively seek feedback from the instructor to improve their understanding.
4. Students are encouraged to connect new information to their existing knowledge and experiences. This helps them solidify understanding and transfer learning to new situations.

2.1.5 Taxonomy of Learning Outcomes

Gagné posited that not all learning is equal and each distinct learning domain should be presented and assessed differently. Therefore, as an instructional designer one of the first tasks is to determine which learning domain applies to the content. The theoretical basis behind the Conditions of Learning is that learning outcomes can be broken down into five different domains: verbal information, cognitive strategies, motor skills, attitudes, and intellectual skills.

2.1.6 Gagné's Domains of Learning

Verbal information includes basic labels and facts (e.g., names of people, places, objects, or events) as well as bodies of knowledge (e.g., paraphrasing of ideas or rules and regulations). Cognitive strategies are internal processes where the learner can control his/her own way of thinking such as creating mental models or self-evaluating study skills. Motor skills require bodily movement such as throwing a ball, tying a shoelace, or using a saw (Johnson and Peacock).

2.1.7 Innovation

The word "innovation" comes from Latin and originally had three meanings to renew, to create something new, and to change. According to the "Modern Chinese Dictionary", innovation is to throw away the old and create the new. Innovation refers to the behavior of offering ideas that are different from conventional or normal thinking under existing thinking mode, improving or creating things, methods, elements, paths and environments that do not exist or are not perfect and can obtain certain beneficial effects by using the existing knowledge and materials in a specific environment, in line with the ideal needs or to meet the social needs, and the behavior can obtain certain beneficial effect. (Yank, et al. 2021)

2.1.8 Innovative Thinking

Innovative thinking has unique characteristics distinguishing it from general thinking, which are the four basic characteristics of innovative thinking: pioneering. Having staged features, comprehensibility and plasticity. Innovative thinking refers to the thinking process of solving problems in novel and original way, which is not restricted by existing conventional thinking. Through this kind of thinking, people can break through the boundary of conventional thinking. Think about problems with methods and perspectives that are unconventional or

are even against the grain, and put forward unique solutions, novel, unique and socially meaningful thinking results. Thinking determines the way out, the vision determines the outcome". Innovative thinking is an important prerequisite to realize innovation (Li, 2020).

There are three main approaches to the consideration of the term. This classification is presented in the (Fig. 3) below

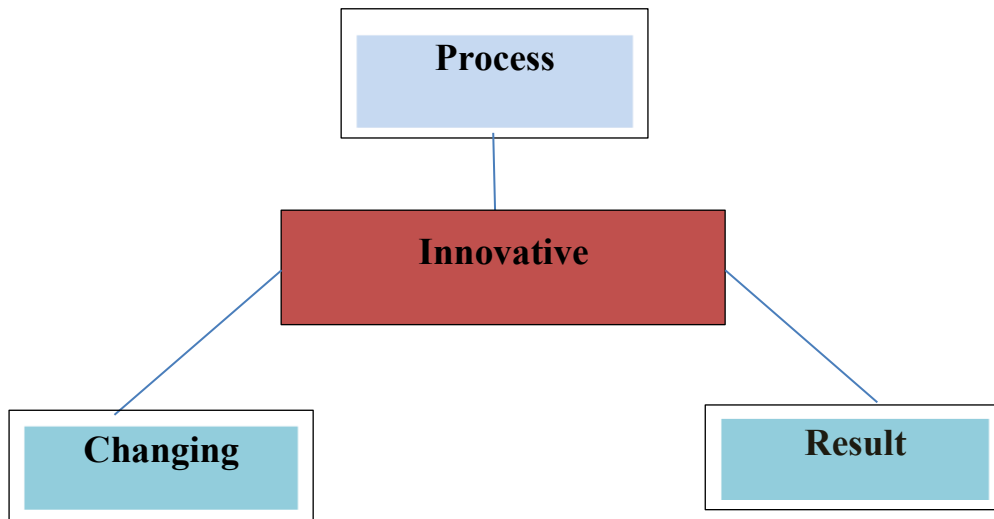


Figure 3: Approaches to the Definition of Innovation (Siauliai, 2013)

2.1.10 Steps of Developing Innovative Thinking Ideas

1. This innovation system is a process we go through stage-by-stage and activity-by-activity.
2. Clarify the challenge. Research to identify problems and opportunities. Start with a meaningful challenge, and gain insight. Get the opinion of the people you serve.
3. Formulate questions. Break that challenge down. Turn it into a series of questions, and organize them from more general to more specific. A large number of general questions will lead to a small number of specific questions.
4. Generate ideas. Use those questions to generate ideas. Gather a lot of them. Generate them yourself, and gather them from outside sources. Observe what ideas arise, but don't judge them yet.

5. Analyze and synthesize ideas. Sort these ideas out once you have a lot of them. Throw them into a funnel to narrow them down. Sift and winnow. Go from a ton of ideas to the ones you want to really develop.

2.1.1 Essential Innovation Thinking Skills

Innovation is an indispensable catalyst for success in any sphere – be it business, organization, or individual endeavors. The cultivation of innovation thinking skills is now more imperative than ever. Let's delve into the core components of these skills and explore effective strategies to nurture them for unparalleled success (Jain, 2023).

1. Unleashing Creativity

Creativity serves as the bedrock of innovation thinking skills, representing the capacity to think beyond conventional boundaries and conceive ideas with the potential to revolutionize industries and reshape the world. It transcends the mere generation of ideas, emphasizing the ability to connect disparate concepts for groundbreaking solutions to intricate problems. To harness your creativity, immerse yourself in diverse experiences, indulge in extensive reading, and expose yourself to a myriad of cultures and ideas.

2. Mastering Critical Thinking

Critical thinking is of innovation thinking skills, empowering individuals to scrutinize and assess ideas with precision. This skill enables the identification of strengths and weaknesses within different solutions, facilitating informed decision-making grounded in evidence and logic.

your critical thinking skills, adopt a relentless questioning approach. Avoid accepting information at face value and consistently seek evidence to substantiate claims. meticulously, objectively evaluate the strengths and weaknesses of proposed solutions, and hone the ability to make decisions based on a robust analytical foundation. This approach ensures the identification of the most viable ideas and solutions.

3. Fostering Collaboration

Collaboration stands as a pillar of innovation thinking skills, necessitating effective teamwork. It allows for the amalgamation of diverse strengths and expertise, fostering the development of superior ideas and solutions.

Collaborative efforts also assist in identifying blind spots and mitigating biases that may impede innovative thinking. (Jain, 2023).

2.1.112. The process of Innovative Thinking

(Jain, 2023) Innovative thinking is a process of looking at issues, topics and ideas in new and creative ways. It involves coming up with new solutions to age-old problems, as well as looking at ideas from a different perspective. Innovative thinking can be broken down into the following components:

Divergent Thinking: This is the process of looking at existing ideas, concepts and solutions from a different perspective and finding new ways to approach them. It involves generating a wide range of ideas, solutions and alternatives to problems.

Creative Problem Solving: This involves identifying the problem, gathering information related to it, brainstorming solutions and then selecting the best one. This can be done through brainstorming sessions, collaborating with others, and using various problem-solving techniques.

Systematic Thinking: This is the process of using a logical, structured approach to problem solving. It involves breaking down the problem into smaller components and then looking for solutions to each individual component.

Analytical Thinking: This is the process of breaking down information and data into smaller pieces in order to gain insights and understand it better. It involves looking at data from multiple perspectives in order to identify patterns and draw conclusions.

2.1.3 Characteristics of Innovative thinkers

According to Ola et al (2020) there are the following characteristics

a- They are communicators

Creativity and confidence are expressed in some ways through both listening and communicating. This is often why creative thinkers are good communicators. Collaboration is additionally important for this type of thinking, and good communication is crucial for work performed as an element of a team.

b- They are open-minded,

An open mind could be a mind that appreciates criticism, is prepared for brand new solutions and concepts, and is not frightened of evaluating ideas. An individual who is open-minded is willing to be told from both successes and mistakes, having the ability to grow and develop

2.1.6 Innovative Thinking in Education

Educational reform movement in the United States since 1950s (American Association for School Administrators, 1959). It is indisputable that children should start learning from early stage for sustainable development. Learning turns meaningful when it takes place from theoretic knowledge to the context of practice. Knowledge was enriched, based on experience from situation and social values (Rankin & Brown, 2016).

2.1.17 The Role of the Teacher in Teaching Innovative Thinking

1. Teachers should foster a learning environment that encourages curiosity, experimentation, and creativity. They can do this by introducing open-ended questions, promoting critical thinking exercises, and allowing students to explore different perspectives and solutions.
2. Teachers should also serve as facilitators, guiding students rather than just providing answers. They can introduce students to real-world problems and challenges that require innovative solutions, encouraging them to think outside the box.
3. Furthermore, teachers should be supportive mentors, providing feedback and encouragement to help students build confidence in their innovative abilities. By creating a classroom culture that values innovation and celebrates failures as learning opportunities, teachers can play a key role in developing students' innovative thinking skills.
4. Certainly! In addition to creating a conducive learning environment and serving as facilitators and mentors, teachers can take specific actions to foster innovative thinking: to work on projects that require them to research, design, and implement solutions to real-world problems. This approach allows students to apply their knowledge creatively.
5. Foster collaboration among students by promoting group work and team projects. This can help students learn from each other, share ideas, and build upon one another's strengths

CHAPTER THREE

Methodology

3.1 Research Design

Experimental design is "the blueprint of techniques that enable the researchers to examine hypotheses by obtaining at accurate findings about the relationship between independent and dependent variables" (Best and Khan, 2006).

Table 2: The Experimental Design of the Study

Groups	Indepent	Dependent Variable	Post test
Experimental	Gagenes model	Innovative Thinking	Post test
Control	Communicative method	Innovative Thinking	Post test

A population, according to Creswell (2012:142), is a group of people who share a characteristic. A target population (also known as a sampling frame) is a set of people (or organizations) who share a similar attribute that the researcher may identify and analyze. A sample is a subset of the target population that the researcher intends to research in order to make generalizations about the target population.

3.2 The Sample

Ary et al (2010) define sample as a group of people, items or events that are chosen for a study from a population, usually in such a way that they represent the large group from which they are selected .

Table (3.2): The Population and Sample of the Study

Experimental	10	38
Control	10	38
Total	20	76

3.3 Instructional Material

The material which has been taught to the two groups of students consists of first three units of the student's textbook, English for Iraq for fifth preparatory students, which has eight units and each unit includes ten lessons, each fourth unit is a revision of the previous-three units.

unit one (lesson 8, topic: Babylon Festival; lesson 10, topic: New Year's party.

unit two (lesson 4, topic: The Swimmer, lesson 8, topic: The Internet; lesson 10, topic: Mobile Phones)

unit three (lesson 6, topic: The environment; lesson 9, topic: The Arabian Oryx; lesson 10, topic: Cars are bad for us!).

The experiment of this study has been done in the first semester of the academic year 2023-2024 during a period of eight weeks, i.e. from the 14th of November 2021 till the 14th of January 2022. The experimental group is taught using the Gagne's model in teaching English Innovative thinking while the control group is taught by using the conventional method.

3.4 Construction of the Posttest

The students in both groups are posttested at the end of the experiment. The overall exam is conducted by the researcher in Al-Musk secondary school, in a comfortable environment, using the identical testing process.

First question: there is passage and five questions related to the passage, students read the passage and answer the questions. The question score out of 20 for each item four marks

The second question: Think and write about two topics, students must write about both topics. The question score out of 20 for each item

The third question: Read the phrases in the box and look at the pictures. Students explain the same order as the pictures.

Rubric for Scoring Students' Performance

A rubric is an assessment tool that has a description of the expected performance for each criterion in order to achieve a grade or certain outcomes. As stated by Churches (2015) a rubric is a systematic method to collect data

regarding knowledge and skills. Garfalo, et al., (2016) agreed that rubrics can be used to measure certain behavior.

3.8 Validity of the Posttest

Validity refers to the exam's truthfulness, and it is essential because students need to be confident that the test is actually testing what it promises to test (Brown, 2001:388). When adopting a research instrument, there are several principles to consider. One of these qualities is validity, which is a measure of "how well an instrument measures what it is supposed to measure" (Bergman, 1981: 150).

3.9 Pilot Study

Richards and Schmitt (2010) explain that Pilot testing is a method of conducting preliminary testing to determine the suitability and usability for a limited number of examinees, clarify the instructions, determine how long it takes to respond to the questions, determine the test difficulty level, and compute the reliability of test items. While Mackey and Gass (2005) argue it as a crucial means of reviewing the feasibility and utility of the data collection procedures and making any necessary adjustments before they are employed with the sample of the study.

The aim of conducting the pilot study is to:

1. Define the work capacity of the test and the clarify of its instructions,
2. Evaluation the time requires to answer the test.

3.10 Reliability of the Posttest

Heaton (1988: p, 155) defines reliability as "the degree to which a test consistently measures whatever it measures". "If the same exam is administered to the same students or matched students on two separate times, the results should be identical. "Reliability isn't only about the material of the test; it's also about how the test is scored" (Gay et al, 2010: p, 144) Item Analysis

3.11 Item analysis

It is a technique of evaluating test items based on specified features. It helps determine the degree of difficulty and discrimination's power.

3.12 Difficulty Level (DL) of the Posttest

The difficulty level is determined by the percentage of students that answered each item correctly (Rosas, 2000:3). For a given number of tests, item difficulty refers to the degree to which an item appears to be complicated or facilitated.

3.13 Discrimination Power (DP) of the Posttest

Discrimination power means, "calculating the degree to which the results of a given item correlate to the results of the entire test" (Alderson, 1995). This explains that if both high-skilled and low-skilled students accurately assess an object, it is said to have weak discrimination power. The degree to which an object differentiates between excellent and bad testers is referred to as item discrimination.

CHAPTER FOUR

Analysis Of Data and Discussion Of Results

An Introductory Note

4.1.1 Result Analysis for the First Hypothesis

To analyze the data related to the first hypothesis which states that There is a statistically significant difference between the average level of the students' achievement and theoretical level of achievement in the posttest, the independent sample test has been used. Therefore, the first aim of the study namely: Assessing the average level of the (4th) year School students' achievement in innovative thinking will be achieved.

In order to achieve achieving the first aim, a post achievement test is applied for (38) experimental students. Then, the calculated t-value and the tabulated t-value are achieved by using the T-Test formula for one sample test to estimate student's performance.

The result in table 15 shows that the students mean score is 68.315 higher than the theoretical mean 50 with a standard deviation of 12.134 degrees. Comparing with the tabulated t-value which is 1.69, the calculated t-value 9.304 is higher than the tabulated t-value with, a degree of freedom 37 at a level of significance 0.05. This means indicates that the achievement of the 4th

preparatory school students in innovative thinking performance is above the average level, thus the first hypotheses is accepted, as shown in table 15.

Table 15: Means, Standard Deviation, and t-Values of the Experimental Groups in the Pre and Posttest Achievement Test

N.	Mean Score	Theoretical Mean Score	T- Value		DF	Level of Sig
			Calculated	Tabulate		
38	68.315	50	9.304	1.69	37	0.05

4.1.2 Data Analysis for the Second Hypothesis

To analyze the data related to the second hypothesis which states: There is no statistically significant difference between the mean scores of the experimental group's achievement and the control group's achievement in the post- test, the independent sample test has been used. Therefore, the second aim of the study namely: Finding out whether there is any significant difference between the experimental group's achievement and the control group's achievement in the post-test, will be achieved.

According to the following results in table15, the mean scores of the experimental group are 68.315 and standard deviation is 12.134. While the mean scores of the control group is 62.763 and the standard deviation is 9.513. The calculated t- value 2.220 is higher than the tabulated t-value1.99 with a degree of freedom 74 at a level of significance (0.05).

Observing the values of T-calculated above, it is found that the calculated T-value 2.220 is much greater than the tabulated T-value of the field 1.99, and from this it can be concluded that there is statistically significant differences between the mean scores of the control group, who are taught according to the conventional method and the mean scores of the experimental group, who are taught by using Gagne's Model, for the benefit of experimental group. So, the second hypothesis is rejected.

Table 16: Means, Standard Deviation, and t-Values of the Two Groups in the Achievement Test

Group	N.	Mean	S.D	T- Value		DF	Level Of Sig.
				Calculated	Tabulated		
Experimental	38	63.315	12.134				
Control	38	62.763	9.513	2.220	1.99	79	0.05

4.1.3 Data Analysis for the third Hypothesis

To analyze the data related to the third hypothesis namely: There is no statistically significant differences between the mean scores of the experimental groups at the recognition level and that of the production level in the post test, the paired samples T-test statistics have been used.

Consequently, the related aim of the study namely: finding out whether there is any significant difference between the mean scores of the experimental group's performances at the recognition level and that of the production level in the post test, will be achieved.

The obtained results show that students' mean scores at the recognition level are found to be 35.578 and that at the production level is 32.868. The t-test formula for two paired samples is used to show that the calculated t-value is 2.070 and the tabulated t-value is 1.69 at the degree of freedom 37 and level of significance (0.05), as shown in table 3. It can be inferred that there is a significant difference between students' performance at the recognition level and that at the production level and for the benefit of the recognition level. So, the third hypothesis is rejected and the related aim is achieved.

Table 17: Students' Mean Scores, Standard Deviation, and T-Value of the Students' Performance at the Recognition and Production Levels

	N.	Mean	S.D	T-Value		DF	Level of Sig.
				Calculated	Tabulated		
Recognition	38	35.578	8.824	2.070	1.69	37	0.05
Production	38	32.868					

CHAPTER FIVE

Conclusions, Recommendations, And Suggestions

5. o Introductory Note

This chapter contains conclusions expressed in terms of the collected results, as well as some recommendations and suggestions for additional research.

5.1 Conclusions

The following conclusions can be formed based on the findings of this research:

1. Students in the fourth-year preparatory school have a high level of innovative thinking, as their mean score is significantly higher than the theoretical mean.
2. Gagne's Model appears to be an effective Model for improving students' achievement in innovative thinking compared to the conventional method.
3. Students performed better at the recognition level than at the production level in innovative thinking.
4. The Gagne's model encourages students to translate its tools through composition thinking, increasing innovative thinking, which is a major activity in today's education institutions.

5.2 Recommendations

In term of the obtained results and drawn conclusions, the following recommendations are put forward:

1. Specialists in teaching EFL are advised to use the Gagnes model in order to improve their students' achievement in various language skills

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