

# The Effect of Dorman's Strategy on Technological Enlightenment Among Third-Stage Intermediate Students

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## Abstract

*The aim of the research is to identify the effect of Dorman's strategy on technological enlightenment among third-year intermediate students. For the purpose of verifying the aim of the research, the researcher has developed the following null hypothesis: There is no statistically significant difference at the level (0.05) between the average grades of the experimental group students who study according to Dorman's strategy and the average grades of the control group students who study according to the usual method according to technological enlightenment. In addition, a technological enlightenment scale was prepared, which consisted of (36) items. The researcher has confirmed its apparent reliability by presenting it to the arbitrators, and then the scale has been experimented on two exploratory samples for the purpose of extracting Psychometrics characteristics. The research experiment has been applied to the first semester of the academic year (2023-2024). After the end of the experiment, the technological enlightenment scale has been applied. Then the students' answers have been corrected and treated statistically using the second test (t-test). The two samples have been independent, and the following results reached: A statistically significant difference at the level of (0.05) between the experimental and control groups in the scale of technological enlightenment in favor of the experimental group.*

**Keywords:** Effect, Strategy, Dorman, Technological Enlightenment

## INTRODUCTION

### First: Research problem

Our current age witnesses a scientific, technical and technological revolution in all areas and fields, as this revolution advances the liberation of man from ancient traditional methods to modern technological methods, and in light of the researcher's work as an instructor and through his 15-year modest experience. It was found that the teaching methods in their usual content are not sufficient for the purpose. It was found that the method adopted in teaching is the method of recitation based on memorization and indoctrination, in which the students' role is passive. To ensure that the problem still exists, the researcher has distributed a survey questionnaire to a number of (15) teachers of biology for the third intermediate grade, distributed among (8) schools located in the city of Baghdad- Al-Karkh the third, and their service is not less than five years in the field of teaching biology for the third intermediate grade, and through their discussion by analyzing their answers, the researcher has determined the research problem in answering the following question: **What is the impact of Dorman's strategy on technological enlightenment among third-grade middle school students?**

### Second: Importance of Research

As the countries of the world today are witnessing tremendous developments and rapid changes in various fields of human knowledge and all its scientific applications, and the increase and multiplication of knowledge in all its many branches, until the science has become a tremendous force that intervenes in all areas of human life. The nature of the scientific era we are experiencing imposed an important responsibility for education towards preparing human cadres capable of sound thinking and taking appropriate decisions to confront scientific and technological progress (Fouda, Al-Baali, 2006:141) .

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"The teacher is required to renew his strategies in light of his experiences and capabilities available to him, and that the successful method lies in how to transfer science and knowledge, whenever the method is appropriate, the educational goals fulfilled through it will be of great depth and of great benefits." (Yousif, 2018:4).

The technological program, according to Dorman's strategy, makes the social environment interactive, free from fear and anxiety and it is considered one of strict disciplines matters that diminishes the feeling of security and comfort, as the use of the brain to change according to the technology integration strategy, as it can increase the student's vitality, activity, and investment of his energies, in order to use other aspects of the brain other than the traditional aspects that were based on memorizing and repeating words for the purpose of a testing only (Zayer, et al., 2017: 159).

Actually this strategy has positive reviews in the domain of education, as it aims to develop social relationships between learners. It also works to reduce the tension that can occur between them. It also contributes to building good and positive bonds between groups of students, which helps develop their academic achievements, as it works to raise their motivation and create positive attitudes towards the teacher, the subject, and the institution. (Yousif, Mahood, 2020: 6).

The huge increase in technology has led to have the student enlightened in technology, because technological enlightenment is vital for students and society, which is an inevitable necessity for students so that they can keep up with the times and keep up with the technological changes going on around them. It is one of the basics that cannot be dispensed with in the field of preparing the student for good citizenship (Nashwan, Mahdi, 2006: 106).

### **Based on the Above, The Importance of The Current Research Is Summarized As Follows**

The current research can contribute to developing the methods of teaching science in general and biology in particular, which are followed in our schools, to address in turn the shortcomings of the traditional methods and methods used. Therefore, the current research can contribute to raising the level of technological enlightenment for third-year intermediate students.

This research, based on the researcher's knowledge, is considered the first research done in Iraq that deals with the impact of Dorman's strategy on technological enlightenment among third-year intermediate school students.

### **Third: Aim of the Research**

The paper's goal is to identify the effect of Dorman's strategy on technological enlightenment among third-year middle school students.

### **Fourth: Hypothesis of the Research**

There is no statistically significant difference at the level (0.05) between the average grades of the experimental group students who study according to Dorman's strategy and the average grades of the control group students who study according to the usual method according to technological enlightenment.

### **Fifth: Limitations of The Research**

**Human limit:** third-year intermediate students.

**Time limit:** First semester for the academic year (2023-2024) AD.

**Place limit:** Al-Karama Secondary School for Boys, it is an official school related to the General Directorate of Education in Baghdad / Al-Karkh the third.

**Cognitive limit:** The first seven chapters of the biology textbooks scheduled to be taught to the third intermediate grade by Ministry of Education, 10th edition, 2021 AD.

## **Sixth: Definition of the Terms**

### **The Effect**

Terminologically defined by (Shehata , Al-Najjar 2003) as it is an outcome of desired or not desired change occurring to a student due to process of education (Shehata , Al-Najjar 2003: 22)

Procedurally it is a change confronted by the third stage intermediate students owing to learning Dorman strategy as to understand Biology.

### **Strategy**

The terminological definition: (Ahmed Aziz, 2018) defined it as a set of practical measures taken by the teacher in light of principles and hypotheses in accordance with the structure of the educational material and the needs of the students to achieve the desired educational goals at a specific time. (Ahmed, Aziz, 2018:504)

The procedural definition of the strategy: The researcher defines the strategy procedurally as a set of procedures and actions that the researcher performs to define and choose teaching objectives in accordance with the steps of Dorman's strategy in order to achieve the previously planned objectives and help students of the experimental group to achieve that.

### **Dorman Strategy**

The technical definition: (Al-Tamimi, 2024) defined it as "a strategy that works with an accelerated learning system through various technological tools inside the classroom, each system contains three screens that are controlled by special licensed software that manages these three screens to ensure that students' energies along with their information are preserved (Al-Tamimi, 2024 :266).

The procedural definition of (Dorman's strategy) is a set of coordinated and integrated procedures of educational methods and tools prepared by the researcher and used to present the educational material in still and moving images, written text, and video and music through three screens, which is controlled by a computer.

### **Technological Enlightenment**

The technical definition was defined by (Sabri and Tawfiq, 2005) as the minimum necessary technical expertise, including knowledge, skills and trends that must be available to the student that enable him to deal with modern technological applications and interact with them positively" (Sabri,Tawfiq , 2005 :33 ).

The procedural definition of technological enlightenment is the degree obtained by the student after answering the technological enlightenment scale prepared by the researcher for the purposes of the current research.

## **Seventh: The Theoretical Background Of The Research:**

### **The First Axis: Educational Media And Their Importance In Learning And Teaching**

"Constructivist theory explains how information is built in an individual when he or she receives this information through experience that an individual goes through in order to adapt to the world" (Abboud; 2023 :27).

Given that the computer imitates the human brain, cognitivists have been interested in implicit learning, in contrast to behavior that represents apparent action. The constructivist theory is concerned with the processes inside the mind and the presentation of information, as information is the basic element in every system because it links raw information in order to access more processed information (Al-Qala, 2006 :70).

Al-Jabban, Mutai'i (2004) mentioned that media that rely on modern technologies in education, such as audio-visual tapes, computer programs, and other means of clarification, can be more useful than printed material (Al-Jabbani, Mutai'i, 2004: 119).

These strategies can provide teachers in schools with clear tools with clear educational objectives that make learning more exciting, easier, more interesting and more effective, and help them develop positive attitudes towards learner influence and help them develop positive attitudes towards learner influence, transforming him from a passive recipient into an active and active learner in Generating knowledge and accessing new knowledge (Yousif,2019:2903).

### **Dorman's Strategy**

This strategy originated by the scientist Dorman, one of the leaders of training and education for more than twenty years in the Distinguished Education Project, accompanied by a team of education leaders, including analytical psychologists from the University of British Columbia. Dorman's strategy requires classrooms equipped with material and non-material equipment and materials. Also, there are training tools and expert teachers in developing students and preparing them to be active and dynamic, and they move according to their interests and speed, with the teacher continuing to manage and follow up on the students. It is noted that educators in this field pay attention to the most advanced subjects, and in particular, technological education, and through the use of e-learning where they have benefited from practicing and applying these tools (Al-Tamimi 2024 266).

### **Dorman's Strategic Objectives**

The student invests all his energies, and the students understand the information and experiences provided to them

Students contribute to organizing their education and skills.

The student is unique in his learning, relies on himself, and his own plans and independent learning.

Students take the initiative to change their cognitive structure to achieve understanding processes.

Organizing expertise, tools, and materials to fit together into a system that helps achieve achievement.

The student sees what he did not see before entering constructive learning situations.

The student has a clear goal and strives to achieve it with perseverance and determination (Qatami, 2013 :218).

"This strategy brings the student's attention to be focused on the lesson topic and important ideas and assist him connect new learning with previous one" (Abboud, 2023: 54).

### **The Second Axis: Technological Enlightenment**

Technological or technical enlightenment is an inevitable necessity for the average citizen in any society, so that he can keep up with the times and keep up with the technological innovations going on around him. It is one of the indispensable basics in the field of preparing the individual for a good environment, meaning that it is not limited to those working with technology only. The usual individual who does not use technology as his field of specialization or work is not fully prepared for fruitful participation in the course of his society's affairs without the presence of technological education that provides him with the appropriate amount of technological enlightenment (Sabri, Tawfiq, 2005 :35).

### **The Experiences That A Student Must Have To Be Technologically Enlightened**

Abu Odeh (2006) mentions a group of experiences for technological enlightenment, which are:

Understanding the nature of technology and its relationship with science and society.

Follow up on new and ongoing developments in various fields of technology.

Use technological applications and programs available in daily life to solve problems in a good manner that benefits the student and his community, and preserve those applications.

Mastering the mental and practical skills to deal with modern technologies and technological devices.

Determine the ethical limits in the use of technology and understand the social, cultural and legal implications of crossing those limits.

Mastering the use of technology, understanding its minimum, and dealing with it well.

Appreciating and valuing the role of technology and awareness of its importance in the educational field and other scientific fields (Abu Odeh ,2006: 29).

## PREVIOUS STUDIES

Although the researcher made many attempts to obtain similar studies through surveys of computer systems and networks and visiting scientific research centers and libraries, but he did not obtain an Arab or foreign study that dealt with the independent variable. The researcher therefore reviewed a number of studies related to the research variables individually in order to benefit from them in the research procedures. On this basis, Iraqi and Arab studies were obtained that dealt with the dependent variable, technological enlightenment. Previous studies were similar in adopting technological enlightenment as a dependent variable, such as the study of (Mohamed) (2015), (Abd, 2016), and (Aliwi, 2022), and differed with (Zaqout 2013) and his relationship to classroom performance, while the current research will adopt technological enlightenment as a dependent variable.

## Eighth: Research Methodology and Procedures

### Research Methodology

To achieve the goal of the research, the researcher adopted the procedures of the experimental method in his research, as it is the best means and through it to know the reasons for Phenomena and problems that appear or are discovered in any field of life (Al-Jubouri, 2012: 194). The current research aims to know the effect of the independent variable (Dorman's strategy) on the dependent variable (technological enlightenment) Therefore, the researcher adopted the experimental research method as it is the appropriate method for the nature of this research.

### Experimental Design

Experimental design is considered one of the steps adopted in experimental research. Each experimental research has its own design in order to ensure the accuracy of the results (Abdel Hafeez, Hussein, 2000: 112).

Scheme (1) The approved design for the research

Group	Two Groups equivalence	Independent variable	Dependent variable	Dependent variable measurement
Experimental	- Previous information	Dorman Strategy	Technological enlightenment	Technological enlightenment scale
Control	- Age multiplied with months - Intelligence Testing	Usual method		

### The Research Community

Defining the research community is one of the main tasks in the experiment. The research community is all individuals or people who are the subject of the research problem (Obaidat et al., 1992 :109). The research community was determined by third-grade intermediate students in intermediate and secondary day schools affiliated with the General Directorate of Education in Baghdad/Al-Karkh the third for the academic year (2023-2024 AD).

### Research Sample

Al-Karama Secondary School for Boys in alIskan area was chosen to represent the community, numbering (179) students in the third intermediate stage. The researcher chose the school intentionally and randomly from among the schools in the research community after obtaining the approval of the General Directorate of

Education of Baghdad Governorate / Al-Karkh the third for two groups (two sections) out of four sections for the third intermediate stage in secondary school, where group (D) was chosen to represent the experimental group, numbering (41) students, which will be taught according to Dorman's strategy, and group (C) to represent the control group of (40) students who will study in the usual way, and thus the sample size becomes (81) students.

## Control Procedures

### The Internal Safety of The Experimental Design

In order to ensure the internal safety and that the research is honest and accurate in the sense that the difference between the two research groups can be attributed to the independent variable and not to any extraneous variable or other factor, therefore the researcher has conducted an equivalence between the two groups (experimental-control) in some variables with direct relationship in conducting the experiment which are (chronological age, intelligence test, previous information test and Technological Enlightenment measurement). Table (1) shows the equivalence results with a degree of freedom of 79.

**Table (1) Arithmetic means and standard deviations for the experimental and control groups in the valence variables.**

Equivalent variables	Arithmetic means		standard deviations		T value		Significance 0.05
	Experimental group	Control group	Experimental group	Control group	Calculated	Scheduled	
Previous knowledge	15.8049	15.9500	3.57924	2.6128	0.208	2.00	Insignificant
Age with months	179.6585	178.6000	11.90926	10.01486	0.432	2.00	Insignificant
Intelligence testing	38.9341	37.7500	6.75187	6.09645	0.618	2.00	Insignificant
Technological Enlightenment Measurement	77.4146	77.2000	9.48150	9.32105	0.103	2.00	Insignificant

### The External Safety of The Experimental Design

This means the process of controlling variables, which means removing any influence of any variable that may affect the conduct of the experiment or its results, except for the independent variable (Ammar, 2007: 265). After the internal soundness of the research variables was confirmed after conducting the equivalence of the sample, the researcher sought to control the extraneous variables and ensure the external soundness of the design, and that the research results are correct and belong to the independent variable, so the researcher carried out the following procedures:

The conditions of the experiment and the accidents accompanying it.

Experimental extinction.

Processes related to the maturity of the sample members.

The impact of experimental procedures, including:

Confidentiality of the research experience.

Study Material.

Educational Means.

Duration of the experiment.

Place of the experiment.

Classes and their distribution.

## Research Requirements

Determining the content (the scientific material is one of the requirements for research. Determining the scientific material before starting to implement the experiment in the first seven chapters of the biology textbook for the third intermediate grade, which is included in the annual plan for teaching the biology curriculum in the first semester of the academic year (2023) - (2024) for the third intermediate grade. The scientific material was distributed in the form of topics for the weekly classes. Two classes per week for both groups (experimental and control).

Formulating behavioral objectives: The researcher formulated (177) behavioral objectives based on Bloom's classification within the cognitive field of the four levels (remembering, comprehension, application, and analysis). They were presented in their initial form to a number of arbitrators, specialists in life sciences teaching methods, and teachers. Biology subject, to ensure its correct formulation, accuracy, and suitability to the level at which it was developed for this purpose. In light of their opinions and suggestions, the agreement was based on no less than (85%) of the arbitrators' opinions. The proposed amendments were taken into account, as some of the objectives were amended along with the level that measures them to take their final form.

## Research Tool

One of the requirements of this research is to prepare a tool to measure the dependent variable and determine the extent to which the research goal and hypotheses have been achieved. This tool is a measure of technological enlightenment: The researcher built a technological enlightenment scale for third-year intermediate students, according to the following steps:

**Objective of the Measurement:** The technological enlightenment measurement aims to measure technological enlightenment among third-year intermediate students.

**Adopting a definition of the Standard Topic:** The researcher adopted a definition of technological enlightenment as follows: "It is the minimum amount of experience that the student must have that enables him to deal with technological applications".

The necessary technology, including modern knowledge, skills, trends, and interacting with it positively (Sabri, Tawfiq, 2005 :33)

**Determining the Dimensions of the Measurement:** After the researcher reviewed the literature and studies and determined the definition of technological enlightenment, an agreement was reached with a group of experts, arbitrators, and specialists in education, teaching methods, and psychology to identify three dimensions of technological enlightenment, to build scale items appropriate to the chronological age of the research sample. The dimensions are the cognitive dimension, the skill dimension, and the emotional dimension.

**Formulating the Measurement Items:** The researcher relied on the theoretical framework of the research, where he formulated a number of scale items according to the three dimensions (cognitive dimension, skill dimension, and emotional dimension), so that they are compatible or consistent with the definition, and the paragraphs were formulated in an appropriate manner commensurate with the level of third-grade students. The items of the measurement in its initial form were (36).

**The Areas and Items of The Measurement Were Presented to The Arbitrators:** after the researcher identified the areas of technological enlightenment and drafted the items of the measurement in light of the three areas and in its initial form, (4) paragraphs were deleted and some paragraphs were modified, and so the measurement became (36) items.

## Test Instructions

**Answer instructions:** The researcher prepared a page in the introduction to the Technological Enlightenment Scale that includes its instructions directed to third-year intermediate students, and three answer alternatives were identified. The paragraphs are: (rarely, sometimes, often), and answer instructions have been prepared, as the student reads each paragraph carefully and clearly and expresses personal feeling without being influenced

by your colleague's point of view, and puts a mark (✓) in front of the paragraph, appropriate, and not leave any paragraph without answering it, and answering it with pencil.

- **Correction instructions:** The researcher prepared three alternatives for answering the paragraphs (Rarely, sometimes, often). The grades (1,2,3,) have been given consequently

For positive items, and the grades (3,2,1) have been given for negative items.

### **Exploratory Application Of The Measurement**

#### **The First Exploratory Application Of The Measurement**

The researcher applied the measurement on Wednesday 4.10.2023 to a random sample consisting of (30) third-year intermediate students in Al-Aflath Middle School for Boys, randomly selected from the research community, and it became clear through this application. The measurement's instructions are clear to students, its phrases and items are understandable, and the approximate average time for answering the measurement (45) minutes was calculated for the first five students and the last five students.

#### **The Second Exploratory Application of The Measurement**

After the researcher confirmed the validity of the Technological Enlightenment measurement items and the answer instructions and their clarity for students, the researcher applied the measurement a second time on Thursday, October 5, 2023, to a random exploratory sample composed of (115) third-grade students in Al-Jamahir Middle School for Boys, it was supervised in cooperation with the school administration.

### **Validity Of the Measurement**

#### **Apparent Validity**

The apparent reliability of the measurement was calculated by presenting the measurement to a group of specialized arbitrators, and based on the agreement of the arbitrators, the researcher concluded that the validity of the measurement is apparent and that it measures what it was designed to measure, and thus the measurement became in its final version consisted of (36) items, and the measurement score was (108) grades.

#### **The Discriminatory Power Of The Items**

After applying the measurement to the second exploratory sample of (115) students, the researcher arranged the scores descending from the highest value to the lowest value, then a percentage of (27%) was taken from the highest grades and a percentage of (27%) was taken from the lowest grades. Then the second test was applied for two independent samples to test the significance of the differences between the upper group and the lower group for each item, and then their calculated scores were compared with the tabular value of the second test at a significance level (0.05) with a degree of freedom (60). It was found that all items of the measurement is distinctive, and the goal of analyzing the measurement's items is to verify the validity of each item in the measurement and improve its quality and its ability to exclude invalid ones (Allam, 2006, 267).

#### **Construct Reliability**

The researcher relied on the use of the Pearson's correlation coefficient, and the values of the correlation coefficients were calculated for the relationship of the item score to the total score of the measurement. Abdel Rahman (1998) points out that to find the validity of the measurement statistically, the Pearson correlation coefficient and the level of statistical significance were found between each item of the measurement and the full scale score, in order to reveal that each item of the measurement goes in the same direction of the measurement itself. (Abdul Rahman, 1998:207)

#### **The Stability of The Measurement**

The researcher used (Cronbach's Alpha) coefficient to calculate the stability of the measurement, as its value reached (91), which confirms the stability of the measurement (Abu Allam, 2001: 490), and thus the



technological enlightenment scale became ready for application on the experimental group and the control group

### Procedures For Implementing the Experiment

The experiment was implemented by taking several measures, which are as follows:

The experiment began on Sunday, October 15, 2023, by applying equivalence to the two research groups. Actual teaching began on Sunday, October 22, 2023, and the experiment ended on Sunday, January 14, 2024, in the classroom. The first semester of the academic year (2024-2023) at two classes per week for both the experimental group and the control group.

The technological enlightenment measurement was applied to the first exploratory sample in the first week on Wednesday (4.10.2023 )

The technological enlightenment measurement was re-applied to the second survey sample on Thursday (5.10.2023)

Take the previous knowledge test in biology on Sunday (15.10,2023)

Take the intelligence test (Raven) on Tuesday (17.10.2023)

The technological enlightenment measurement was applied to the experimental and control research groups on Thursday (11.1.2024).

### Statistical Methods

The researcher adopted the statistical methods used in the research in addition to using the statistical program SPSS version (23), as follows:

T-test for two independent samples (T-test)

Alpha Cronbach's equation to extract stability.

Pearson's correlation coefficient to extract constructs reliability.

Effect size: To know the size of the effect of the independent variable on the dependent variable.

### Presentation And Interpretation of Results

#### First: Presentation Of the Results

For the purpose of verifying the reliability of the null hypothesis, which states that: (There is no statistically significant difference at the level (0.05) between the average grades of the students in the experimental group who study according to Dorman's strategy and the average grades of the students in the control group who study according to the usual method according to technological enlightenment, and after applying the technological enlightenment measurement and correcting the students' answers, the researcher calculated the arithmetic mean of the scores of the students of the two groups on the technological enlightenment measurement, and are shown in Table (2) showing these results:

Table (2) The arithmetic mean of the scores of students in both groups on the technological enlightenment measure

Group	Number	arithmetic mean	Standard deviation	Degree of freedom	T value		Significance 0.05
					Calculated	Tabular	
Experimental	41	78.58537	15.77811	79	3.42069	2	Significance
Control	40	67.075	14.45841				

We notice from Table (2) that the students of the experimental group who study Dorman's strategy outperformed the students of the control group who study according to the usual method in the measure of technological enlightenment, and Figure (1) shows the averages for the two groups.

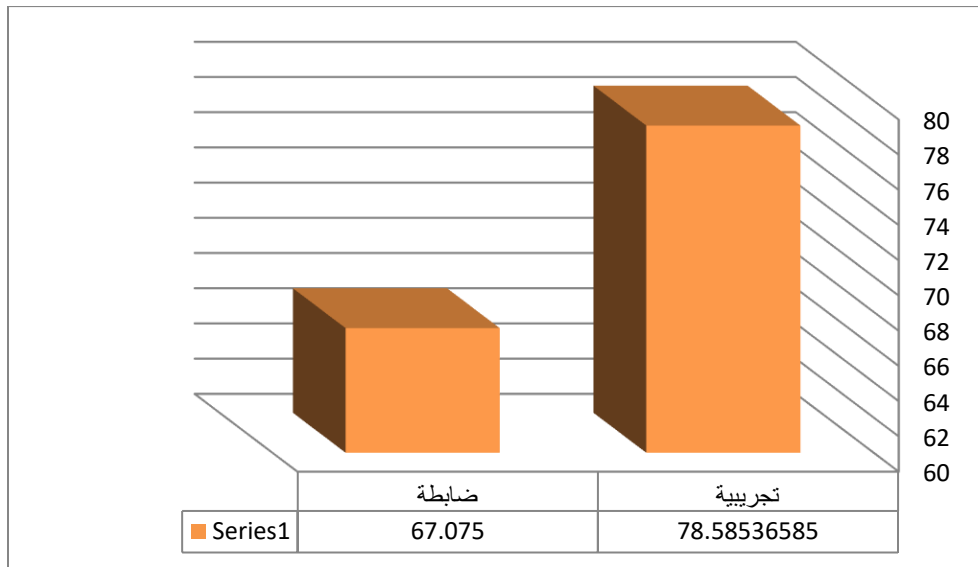


Figure (1) Averages of the two groups on the technological enlightenment scale

To know the extent of the impact of the independent variable (Dorman's strategy) on the dependent variable (technological enlightenment). The Eta square test ( $\eta^2$ ) was used to determine the size of the effect of this independent variable, and for the purpose of ensuring that the size of the difference obtained using (t-test) is a real difference due to the variable and not to other variables, and then calculate the value of (d), which expresses the size of this effect, and Table (3) shows the value of both ( $\eta^2$ ) and (d).

Table (3) shows the size of the independent variable's impact on the dependent variable.

Independent variable	Dependent variable	Value ( $\eta^2$ )	Value (d)	Size of effect
Dorman strategy	Technological enlightenment	0.129	0.82434	Very large

It is clear from Table (3) that the size of the effect of Dorman's strategy on the technological enlightenment variable is large, because the value of (d) amounting to (0.82434) is greater than (0.8), and this indicates that the effect of the independent variable Dorman's strategy in the technological enlightenment on third intermediate grade students was very significant in favor of the experimental group who were taught according to this variable.

## Second: Interpreting The Results of The Technological Enlightenment Measurement

The results indicate that the experimental group that studied according to Dorman's strategy was superior to the students of the control group who studied according to the usual method in measuring technological enlightenment. This could be due, according to the researcher's opinion, to:

The use of technological enlightenment may be an essential factor in stimulating the minds of students and their inclination to learn continues, as technology is an important factor in saving time. The use of display screens diversifies scientific activities, which saves the effort of the teacher and student to remain active while practicing the lesson (Ahmadi. 2009 :54)

Display screen technology is one of the modern teaching techniques and methods that are used in teaching and which makes students an important axis in the educational process and raises their technological enlightenment (Zayer, et al., 2017 :159)

These results are consistent with some of the results of previous educational studies in measuring technological enlightenment, such as the study (Aliwi ,2022).

## CONCLUSIONS

After the researcher applied the experience of the current research, analyzed its results, and tested the reliability of his hypotheses and their interpretation, it was concluded that Dorman's strategy had an impact on the technological enlightenment of third-year intermediate students in the Biology subject.

## Recommendations

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

Urging male and female teachers to adopt Dorman's strategy in teaching as a strategy that helps improve students' learning use technology while learning.

Preparing a guide for teachers of biology that contains modern strategies and methods of teaching that have been proven successful included Dorman's strategy.

## Suggestions

In light of the above for the current research, the researcher proposes to conduct the following studies:

The impact of Dorman's strategy on teaching for other study stages.

Making Studies similar to current research in chemistry and physics topics and at other levels.

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