Proposed Educational Program Using some Technological Innovations for Learning Crawl swimming

Prof. Dr. Hadeer Said Abd El Azeem
faculty of sports science for girls helwan university
hadeer_said@pef.helwan.edu.eg

Prof. Dr. Gihan Hamed Sayed Ismail
faculty of sports science for girls helwan university
gehan.hamed@pef.helwan.edu.eg

Prof. Dr. Wael Ramadan Abd El Hameed
faculty of education helwan university
wael_ramadan@edu.helwan.edu.eg

Researcher. Reem Samir Soliman Abd El Moamen
reem_samir@pef.helwan.edu.eg

الملخص :

يهدف البحث إلي التعرف علي تأثير استخدام بعض المستحدثات التكنولوجية علي تعلم سباحة الزحف,استخدمت الباحثة المنهج التجريبي بتصميم مجموعتين إحداهما تجريبية و الأخري ضابطة لملائمتها لطبيعة البحث, أشتمل مجتمع البحث على (350) طالبة من الفرقة الثانية بكلية التربية الرياضية للبنات –جامعة حلوان , وقامت الباحثة باستخدام بعض المستحدثات التكنولوجية المتمثلة في الأتي تطبيق مايكروسوفت تيمز و تطبيق زووم لتعليم سباحة الزحف من خلال البرمجيات و الفيديوهات التعليمية لسباحة الزحف التي تم اضافتها من قبل الباحثة داخل هذه التطبيقات الألكترونية, وأظهرت النتائج أن المستحدثات التكنولوجية ذات تأثير فعال في امكانية التقدم بالمستوي المهاري في سباحة الزحف علي البطن، وتوصي الدراسة بإجراء المزيد من البحوث التجريبية بإستخدام المستحدثات التكنولوجية لمختلف مهارات السباحة ولجميع المراحل العمرية.

Abstract:

This study aims to explore the impact of using certain technological innovations on learning the crawl swimming technique. The researcher employed the experimental method using a two-group design: an experimental group and a control group, as it suited the nature of the study. The research sample consisted of 350 second-year female students from the Faculty of Physical Education for Girls at Helwan University. The researcher utilized technological innovations such as Microsoft Teams and Zoom applications to teach the crawl through educational software and instructional videos specifically designed and uploaded by the researcher

within these digital platforms. The findings revealed that technological innovations have a significant and effective impact on improving the skill level of crawl swimming. The study recommends conducting further experimental research utilizing technological innovations for teaching various swimming skills across different age groups.

Proposed Educational Program Using some Technological Innovations for Learning Crawl swimming

Introduction and Research Problem

Our modern society is witnessing rapid developments and massive technological advancements that have influenced all fields of knowledge and science. These technological techniques and innovations, with their various forms, manifestations and numerous practical applications, have become an integral part of the national characteristics of modern societies, which has led to the emergence of e-learning. E-learning is one of the most important teaching strategies of the time, as it allows students to have access to learning from anywhere, at any time, and in any way according to their needs, abilities, and learning pace. With the development of the Internet and its availability at high speeds, e-learning patterns have changed to include more effective aspects, which led to the emergence of what is called the second generation of the web (web2.0), which is concerned with running social software applications such as Facebook, blogs, wikis, and others.**(EssamMansour,2018,p.16)**

The scientific and technological revolution is considered a new entry in the teaching and learning processes, and it has become necessary to develop the educational process to keep pace with this enormous scientific progress. The concept of educational technology means an integrated system that has an impact and achieves the desired return, which is more than a method and approach using modern educational means. **(Abd El Khalek El Nabawy,2001, p.35)**

Therefore, the rapid development you notice today in the sports field through following the recorded world and Olympic records is evidence of technological progress in all sports fields. Scientific development in general

contributes in one way or another to the development of physical education by using scientific methods and modern technological innovations in an implementational way in the sports field. Research and studies in the sports fields that aim to improve performance and develop teaching methods have shown that the use of technology in the education field is a must to keep pace with the development of other fields. The reliance of any educational system on educational means is no longer a form of entertainment; but rather has become a necessity to ensure the success of these systems and an integral part of its structure. Therefore, specialists in the education field must adopt an educational policy linked to modern technology. **(Abd El Ghaid Ahmed, Ibrahim Walid,2002, p.26)**

Web200 technologies such as Weblogs, Wikis, Facebook, Microsoft Teams, and Zoom Workplace are important technological innovations that are characterized by interactivity and flexibility, as they provide a wide digital space that facilitates communication and information exchange, allowing subscribers to express their opinions and reach all Internet subscribers around the world. **(Ibrahim Ahmed,2013, p.113-153)**

The teacher in this era is exposed to something new daily in the educational technology field, especially software and the Internet. The more his sense of responsibility increases, the more he becomes perplexed about dealing with these technologies in a way that develops the talents and competencies of future generations. In order to achieve the development goals, it is necessary to prepare a new generation that can deal with this era's language, especially in the field of the revolution of technology, communications, and information, for they can be familiar with technology and harness it, as the power of technology lies in its performance and placement, not in its possession. **(El Far Ibrahim, 2000, p.35)**

Many studies have emphasized the importance of using educational technology applications in learning physical education, as it works to raise the efficiency of the educational process through the attractiveness of teaching and its effectiveness in stimulating and instilling activeness in learners by influencing the behavioral tendencies and scientific and social concepts of the learner. Also, educational technology can be considered a means of comparison, through motor analysis and building and developing

motor perception, or through performing the skill in a unified manner. It also reduces verbal defects and errors in performing the model, and it can be used to teach many learners and maintain the education effect for a long period while saving time and considering individual differences between learners. Its importance and effectiveness appear in teaching and it helps in creating a suitable educational environment.

(Azmy, Muhammad, 2001, p.45)

However, using computers and mobile phones in university curricula does not mean exploiting a set of complex devices, but rather exploiting the culture of operating information to extract good knowledge, analyze data, interpret phenomena, and produce specialized programs based on scientific foundations. Higher education and university in the era of developing information and communication technology, and the flow and acceleration of information, requires education that leads to the release of diverse human energies and enables them to receive and organize information; and use it well in thinking, expression, communication, production, and relationships building.

Mahdy Mahmoud Salem believes that the continuous and rapid use of computers, mobile phones, and other technological innovations in education helps create an active educational environment, in which the learner becomes a positive participant, as he can obtain different knowledge and information in a better and faster way, which increases his cognitive level. **(Salem Mahdy, 2002, p.161)**

MacLean, Daniel, and Abd El Hamid Sharaf indicate that the use of computers, smart mobile phones, and all technological innovations in the physical education field has many advantages, including effective assistance in teaching and learning some motor skills for sports activities and increasing students' motivation to learn them no matter how difficult they are, in addition to removing the fear and dread factor from these skills; and providing students with feedback that improve the teaching and learning processes, which leads to optimal performance. It also considers individual differences between students and self-education, as students can control the educational process to a large extent according to their level, hence, it is considered one of the most effective educational means**.**

(Maclean, Daniel) (Sharaf Abd El Hamid, 2000, p.123)

In line with the above, it has become necessary for the teacher to follow different methods and approaches to education, by which he can convey information in the shortest time and with the least effort, and continuously teach motor skills to achieve the desired goal.

Since crawl is considered a front for teaching swimming in the faculties of physical education, female students face obstacles in learning, especially since they are in a new environment, which is the aquatic environment, which is unfamiliar to their normal life, where the individual is exposed to a strange atmosphere that requires adaptation to mechanical, physiological and psychological factors. Hence, the research problem emerged through the researcher's work as a teacher assistant in the Water Sports Training Department at the Faculty of Physical Education for Girls - Helwan University; which is represented by the difficulty in learning the crawl , that a large number of female students suffer from, and a decline in the skill performance of the crawl for second-year female students, and their weak ability to obtain the correct performance due to their age stage and following the traditional method of teaching. Therefore, the researcher used some of the modern technological innovations and applied them outside the water environment to teach the aspects of crawl to female students by seizing the opportunities that female students always spend a lot of their time on computers and mobile phones she used new teaching methods, and focused on self-directed learning, by giving female students an educational program that contains a large group of videos for training and the optimum model for the crawl skill performance, through the Microsoft Teams application, and the Zoom Workplace application for continuous communication and follow-up with female students.

Research Objective:

The research aims to:

- Explore the effect of using certain technological innovations on learning the crawl technique through a proposed educational program.

Research Hypotheses:

- There are statistically significant differences between the pre-and post-measurement averages of the experimental group in front crawl

swimming through the use of some technological innovations in favor of the post-measurement.

- There are statistically significant differences between the pre-and post-measurement averages of the control group in front crawl swimming in favor of the post-measurement.
- There are statistically significant differences between the post-measurement averages of the control and experimental groups in front crawl swimming in favor of the experimental group post-measurements.

Research Terminology:

- **Technological Innovations:** are defined as everything new in the technological field that can be used effectively and positively in planning science lessons with the aim of improving and increasing the learner's ability to engage better in the educational process and achieve more effective learning outcomes**. (Aboraya, Hanan, Abd El Aziz, Doaa, 2020, p.394)**
- **Educational Technology**: an integrated system that includes humans, machines, ideas, opinions, and work methods, all of which work within a single framework to achieve a specific goal or set of goals**. (Mohamed Hussein, 2015, p.45)**
- **Skill Performance (operational definition):** It is the individual ability to execute a movement or a set of movements accurately, quickly, and smoothly to achieve a specific goal in the practiced sports activity.

Previous Studies:

1.**Asmaa Ahmed Mohamed Saleh (2020)** conducted a study aimed at designing an educational program using the analogies strategy and assistive tools to examine its effect on correcting errors in front crawl and back crawl swimming for female students at the Faculty of Physical Education. The researcher employed the experimental approach with two groups on a sample of 40 third-year students at the Faculty of Physical Education for Girls, Alexandria University. Key findings: There were statistically significant differences between the pre- and post-measurements of both the experimental and control groups in favor of the experimental group.

2.**Mohamed Hassan Rakha (2020)** conducted a study to investigate the effect of the "Think-Pair-Share" strategy, supported by mobile phone use, on learning rotational movements in front crawl and back crawl swimming for beginners. The researcher used the experimental approach with two groups on a sample of 20 learners from swimming schools, aged 10-11 years, in El-Gamil, Port Said. Key findings: The educational program using the "Think-Pair-Share" strategy, supported by mobile phone use, had a positive impact on improving the learning of rotational movements in crawl and back crawl swimming for beginners.

3.**Lotfy Ibrahim Mohamed (2020)** conducted a study to explore the impact of designing a smartphone application based on mobile learning on acquiring certain water polo skills. The researcher adopted the experimental approach with two groups on a sample of 40 second-year students at the Faculty of Physical Education for Boys, Zagazig University. Key findings: The use of the smartphone application based on mobile learning positively contributed to enhancing cognitive achievement and skill performance in specific water polo skills.

4.**El-Shabrawy Ali Mohamed (2019)** conducted a study to examine the effect of an educational program using an electronic learning package on learning breaststroke swimming and improving cognitive achievement among young learners. The researcher utilized the experimental approach with two groups on a sample of 20 learners. Key findings: The experimental group, which learned breaststroke using the electronic learning package, outperformed the control group, indicating the effectiveness of the educational program in enhancing breaststroke learning.

5.**Heri, Z., Ratno, P., & Hardinoto, N. (2023)** conducted a study aimed at developing audiovisual instructional media for crawl swimming using the PKO program at Universitas Negeri Medan. The study employed the four-stage research and development (4D) model. The key findings indicated that the developed instructional media were effective and received positive evaluations from both experts and users.

6.Sengoku, Y., & Nomura, T. (2007) conducted a study aimed at determining the effect of a computer-assisted instructional program on children's learning motivation and learning strategies in swimming. The researchers employed an experimental design with two groups, involving a sample of 20 children learning to swim at a private club. The key findings revealed that the experimental group demonstrated a significant increase in achievement-related motivation, indicating that the use of the computer-based program enhanced children's motivation for learning.

Research Procedures:

Research Methodology:

The experimental method was used by designing two groups: one experimental and the other control, due to its suitability with the research nature.

Research Community:

The research community included (350) female students from the second year at the Faculty of Physical Education for Girls - Helwan University. they were chosen due to their limited prior experience in swimming, making them an ideal group to measure the effectiveness of the educational program.

Research Sample:

The research sample was chosen using the purposive random method of (50) students distributed as follows; the experimental sample (20) students, the control sample (20) students, the pilot study (10) students from within the research community, and from outside the research sample, and Table (1) shows the description of the research sample.

Table (1) Research Sample Description

Total Sample		Main Study Sample				Pilot Study Sample	
		Experimental group		Control Group			
Number	%	Number	%	Number	%	Number	%
50	100	20	40	20	40	10	20

Research Sample Homogeneity

The researcher conducted homogeneity among the individuals of the research sample in the following variables as shown in Table (2):

1. Height, weight, age, intelligence.
2. crawl swimming 25m.
3. Evaluation of the crawl swimming performance level.

Table (2) Arithmetic mean, standard deviation and torsion coefficient for age, weight, height, 25m crawl swimming, and skill level measurements for crawl swimming and intelligence test for the research sample member (N=50)

Variables	Measurement Unit	Mean	SD	Flaten	Torsion Coefficient
Age	Year	19.64	0.80	-0.83	0.51
Weight	KG	63.07	5.16	0.82	0.71
Height	CM	165.82	7.92	- 0.78	0.45
25m Front Crawl	Grade	3.90	1.08	0.89	- 0.19
Front Crawl Skill Level	Grade	16.27	2.90	- 0.54	2.23
Intelligence Test	Grade	51.12	1.27	-0.61	-0.60

Table No. (2) shows the torsion coefficient is limited between (-0.60-2.23)

This means that the variables achieve the moderate curve as they are limited between +3, confirming the degree of homogeneity among the whole sample members in the variables of growth and skill level for crawl swimming.

Equivalence between the two research groups:

Equivalence was conducted between the experimental and control research groups in the 25 m swim and the skill performance of crawl swimming for the research sample members, and Table No. (3) shows this.

Table (3) Arithmetic mean, standard deviation and "t" value of the research variables (n1=n2=20)

Variables	Measurement Unit	Experimental Group		Control Group		T Value	Significance level
		Mean	SD	Mean	SD		
25m Crawl	Grade	3.88	0.48	3.91	0.97	0.45	Not significant
Crawl Skill Level	Grade	16.25	2.34	16.22	1.52	0.35	Not significant
Intelligence Test	Grade	51.16	1.11	51.08	1.44	0.83	Not significant

*** Table t-value at significance level 0.05 = 1.684**

The previous table shows that the "T" values are not significant, as they were all less than the tabular "T" values at a significance level of 0.05. This indicates the equivalence of the research sample individuals in the research variables.

Data Collection Tools and Methods

First: Used Devices:

- Restameter: To measure height to the nearest half cm.
- Medical scale: To measure weight to the nearest half km.
- Computer and mobile phones to access Microsoft Teams and Zoom Workplace to view educational videos containing front crawl swimming exercises prepared by the researcher.

Second: Forms:

- Experts' names attachment (1).
- Committee to evaluate the performance level of crawl swimming attachment (2).
- Expert opinion survey form on (program suitability, proposed educational exercises) attachment (3).
- Data recording form (age, height, weight) attachment (4).
- Intelligence test form attachment (5).
- Form for evaluating the crawl swimming skill performance level for the research sample attachment (6).

The experts' opinions reached the following:

- The suitability of the proposed educational program exercises to improve the front crawl skill performance.

- Agreeing on (40 exercises).

The proposed exercises for the educational program and educational units and their time distribution in their final form are attachments (7, 8):

Principles of Program Development

In designing the proposed program, the researcher considered the following principles:

1.Ensuring that the program achieves its intended objectives.

2.Aligning the content with the program's goals.

3.Maintaining the sequential progression of the skill when presented, whether through educational videos integrated into Microsoft Teams or Zoom during practical lectures.

4.Adhering to the principle of gradual progression from simple to complex when teaching the skill.

5. Structuring the verbal instructions for skill execution in a clear and easily understandable manner.

6.Allowing students to independently access the Microsoft Teams or Zoom application and select the desired training content from the available list.

7.Designing the training videos to stimulate students' imagination.

8.Utilizing the training videos to enhance students' motivation.

9. Ensuring that the program contributes to creating an enjoyable and engaging learning experience for students.

Evaluation of the skill performance level for the crawl.

The researcher reviewed scientific references and previous studies in the water sports field for the purpose of designing a form to evaluate the skill level of the crawl.

The form was presented to the supervision committee to ensure the suitability of the performance evaluation form. This form contains (11) stages to evaluate the front crawl swimming skill performance level, Divided into: (Floating – Leg Kicking – Arm Movements – Breathing –

Coordination), attachment (6). The skill performance and performance distance were evaluated by a panel of three faculty members, attachment (2). The researcher calculated the arithmetic mean of the judges' scores for each stage of the skill performance in crawl swimming. The scores were distributed as shown in the following table:

score	Evaluation Aspect	score	Evaluation Aspect
1 points	Heel exit only above water	1 point	Body position: horizontal
3 points	Coordination of arm movements with legs	1 point	Head aligned with body level, maintaining forward gaze
2 points	Proper exhalation underwater	2 points	Water entry with fingers first, in front of the shoulder (end of the recovery phase)
3 points	Coordination of arm movements with legs and breathing	3 points	Completion of pull, push, and release phases correctly
2 points	Maintaining steady leg rhythm while breathing	2 points	Arm relaxation during the recovery phase
10 points		Swimming distance: 25 meters	
Total Score: 30 points			

An Educational Program using some Technological Innovations

Duration for implementing the proposed educational program

The researcher reviewed the scientific references and previous studies related to the research, and by referring to the supervisory committee, the duration for implementing the proposed educational program was determined as follows:

1. Experiment duration (10) weeks.
2. Number of educational units (10) at a rate of (2) educational units per week.
3. Unit time (60) minutes.
4. Time distribution of the educational unit for the two research groups, (60) minutes divided as follows:
   - Watching educational videos for the skill performance of crawl swimming (15) minutes.
   - Time for administrative work and warm-up (10) minutes.

- Time for the main part (practical application) (30) minutes.
- Closing time (5) minutes.
- The first educational unit: (2) Lessons

Objective: to enhance the body's streamlined position (floating).

- The second educational unit: (2) Lessons.

Objective: to focus on the body's streamlined position (floating) while improving leg kicks skill performance.

- Third educational unit: (2) Lessons.

Objective: To improve the leg kicks skill performance.

- The fourth and fifth educational units: (4) lessons.

Objective: Improving the arm movement skill performance.

- The sixth educational unit: (2) lessons.

Objective: Linking arm movements with leg kicks.

- The seventh educational unit: (4) lessons.

Objective: Improving the breathing skill performance.

- The eight educational units: (2) lessons.

Objective: Focusing on improving the breathing and arm movements skill performance.

- The ninth and tenth educational units: (2) lessons.

Objectives: Improving coordination for crawl swimming.

The researcher took into consideration applying the exercises to the two groups under the same conditions in terms of time and place, and as follows:

A. Experimental Group:

Implementing educational exercises for crawl swimming using some technological innovations (educational training videos created for the students to view through the Microsoft Teams application and the Zoom application).

B. Control Group:

Implementing educational exercises for crawl swimming without using technological innovations. The researcher trained the two groups under the same conditions to control the variables that might affect the research results.

Research Implementation Steps:

❖ **Pilot Study**

The pilot study was conducted on (10) female students from the research community and outside the basic sample during the period from Thursday 29/9/2014 to Sunday 3/10/2024 with the aim of:

- Identifying the time taken to perform the measurements.
- Identifying the obstacles the researcher may encounter while implementing the basic research experiment.
- Ensuring the suitability of the tools and training for the research sample.

❖ **Pre-Measurement**

The pre-measurement was conducted at the Faculty of Physical Education for Girls Helwan University as follows:

Conducting skill performance level evaluation for the crawl swimming on Thursday 10/7/2024 by a committee consisting of three faculty members from the Department of Water Sports Training at the Faculty of Physical Education for Girls - Helwan University Attachment (2), and a form was applied to evaluate the crawl swimming skill performance level Attachment (6).

❖ **Research Implementation**

The educational units were implemented in their final form, attachment (8), where the experimental group was trained using some technological innovations: the Microsoft Teams application and the Zoom application. The control group was trained using the exact program, but without the technological innovations, from Tuesday 8/10/2024 to Tuesday 17/12/2024.

❖ **Post-Measurement**

After completing the program application, post-measurements were conducted to evaluate the front crawl swimming performance level on Wednesday, 18/12/2024, and by the same committee consisting of three faculty members from the Department of Water Sports Training at the Faculty of Physical Education for Girls - Helwan University.

Results Presentation

Table (4) Significance differences and percentage of change between the pre- and post-measurements of the experimental group in evaluating 25m crawl swimming and skill level (n= 20)

Variables	Measurement Unit	Experimental Group		Control Group		T Value	Skill Level
		Mean	SD	Mean	SD		
25m Crawl	Grade	3.88	0.48	7.44	1.42	6.11	91.75%
Crawl Skill Level	Grade	16.25	2.34	23.16	0.74	4.16	42.52%

***Tabular t-value at significance level (0.05) = 1.729**

Table No. (4) shows statistically significant differences in favor of the post-measurement of the research sample in the variables under study.

Table (5) Significance differences and percentage of change between the pre- and post-measurements of the control group in evaluating 25m crawl swimming and its skill level (n= 20)

Variables	Measurement Unit	Experimental Group		Control Group		T Value	Skill Level
		Mean	SD	Mean	SD		
25m Crawl	Grade	3.91	0.97	6.12	0.82	8.16	56.52%
Crawl Skill Level	Grade	16.22	1.52	20.16	1.49	4.14	24.29%

***Tabular t-value at significance level (0.05) = 1.729**

Table No. (5) shows that there are statistically significant differences in favor of the post-measurement of the research sample in the variables under study.

Table (6) Significance differences between the experimental and control groups in the post-measurement to evaluate the skill level (n1=n2=20)

Variables	Measurement	Experimental	Control	T	Significance

	Unit	Group		Group		Value	Difference
		Mean	SD	Mean	SD		
25m Crawl	Grade	7.44	1.42	6.12	0.82	3.92	Significant
Crawl Skill Level	Grade	23.16	0.74	20.16	1.49	5.88	Significant

*** Table t-value at significance level 0.05 = 1.684**

Table (6) shows statistically significant differences in the skill level evaluation of crawl swimming between the two post-measurements of the experimental group and the control group in favor of the experimental group.

Results Discussion

Through the research hypotheses and based on the data and results that were reached and statistically processed, the researcher reached the following:

First Hypothesis Discussion:

Table (4) shows statistically significant differences in the evaluation of 25m crawl swimming and the skill level between the experimental group pre- and post-measurements in favor of the post-measurement, as the calculated (t) value was greater than its tabular value at the significance level (0.05), and the change percentage ranged between (91.75%: 42.52%),standard(0,48:1,42) (2,34:0,74)

The researcher believes that the experimental group's progress in the post-measurement compared to the pre-measurement is due to the use of some technological innovations (Microsoft Teams, Zoom), which helped to add a new visual form that students were not accustomed to before in the educational process, as these electronic innovations helped to convert information into drawings and videos that make it easier for students to understand and comprehend the crawl swimming without the need to read many texts in the technical or educational steps.

This is consistent with Mahdy Mahmoud Salem (2002) that the use of technological innovations such as computers, mobile phones, and other

technological innovations that are constantly and rapidly developing in education helps create an active educational environment, in which the learner becomes a positive participant, as he can acquire different knowledge and information in a better and faster way, which increases his cognitive level**.(Essam Mansour,2018,p.161)**

These results of the higher level of post-measurement than pre-measurement for the experimental group, align with the results of both studies of Asmaa Ahmed Mohamed 2020 (5) and Mohamed El-Shabrawy 2019 (11) that using an educational program via social media programs has a positive effect on the skill performance level for various types of motor skills.

Thus, the research first hypothesis is validated, which states:

There are statistically significant differences between the pre-and post-measurement averages of the experimental group in front crawl swimming through the use of some technological innovations in favor of the post-measurement.

Second hypothesis discussion:

Table (5) shows statistically significant differences in the evaluation of 25m crawl swimming and the skill level of crawl swimming between the control group pre- and post-measurements in favor of the post-measurement, as the calculated (t) value was greater than its tabular value at the significance level (0.05), and the change percentage ranged between (56.52%: 24.29%). Standard (0,97:0,82)(1,52:1,49)

The researcher sees that the progress of the post-measurement ahead of the pre-measurement in the control group is due to use of the followed method (explanation and model) which relies on the verbal explanation of the crawl swimming, followed by performing the model which adds to the students an initial conception of how to apply swimming and then comes the stage where students practice and repeats the crawl swimming parts besides regularity and continuity in education, and after that, collect feedback from the students. All of this will raise the student's level and their progress, in addition to the performance method, which the teacher constantly repeats while teaching, which led to progress in learning the crawl swimming.

In addition to that, the method followed, which depends on explanation and providing a practical model for crawl swimming, cannot be ignored, as it provides a set of exercises that are graded from easy to difficult and from simple to complex, and the students practice repeating the skill performance, which leads to learning the technical performance of crawl swimming correctly, and then has a positive impact on the crawl swimming skill performance efficiency.

This is consistent with Wafika Salem (1997) that when the teacher gives the learner a clear idea about the performance in a sound scientific way, this makes the learner's performance more effective, and that one of the best methods when learning skills is for the teacher to show swimming and perform a correct model of it, for the learner to discover his body movements. **(Salem Wafika, 1997, p.55)**

The studies of both Asmaa Ahmed Mohamed (2020) and Mohamed El-Shabrawy (2019) confirm that the method followed cannot be overlooked as it relies on indoctrination from the teacher to the learner with the presentation of the skill model, and this helps in learning soundly according to the skill technical performance.

Thus, the research second hypothesis is validated, which states:

There are statistically significant differences between the pre-and post-measurement averages of the control group in crawl swimming in favor of the post-measurement.

Third Hypothesis Discussion:

Table (6) shows statistically significant differences in the skill level evaluation of crawl swimming between the two post-measurements of the experimental group and the control group in favor of the experimental group.

The researcher attributes the progress of the experimental group over the control group in the post-measurement to the usage of the experimental group to some of the technological innovations represented in electronic applications (Microsoft Teams, Zoom), which helped the students acquire the correct motor perception of crawl swimming skill performance and also understand the parts of the crawl swimming outstandingly, as the educational units prepared with electronic application technology (Microsoft Teams, Zoom) provided pictures and videos of the crawl

swimming skill performance stages, supported by an organized illustration to cover the performance technical stages from its various aspects, in addition to providing the students with an opportunity to access the correct model more than once at the time they desire, and to use the information they obtain as positive feedback to improve and enhance the performance specifications and students learning speed.

The researcher believes that education using technological innovations has a positive impact on improving the skill performance level and learning outcomes, as it allows the learner the opportunity to participate positively in the educational process, as the learning process has been transferred from the teacher to the learner. It also considers the individual differences principle in terms of learning speed and ease of identifying and correcting errors in performance, which led to an increase in learners' motivation towards mastery in learning. When designing the program, the researcher considered providing an active educational environment controlled by the learner, as social networking applications via mobile phones or computers are considered among the most important applications that helped students interact with each other and the educational material.

The proposed educational units were distinguished by dividing the crawl swimming in a logical sequence and linking it to the information in a linear manner in pictures, video recordings, and audio recordings. It also helped the students to increase their focus and ease of learning and understanding, as this contributed to creating a good educational environment by involving all the students' senses and stimulating their motivations towards learning and helping them to acquire the skills motor performance required in the swimming under study.

This is consistent with MacLean, Daniel, and Abd El Hamid Sharaf that the use of computers, smart mobile phones, and all technological innovations in the physical education field has many advantages, including effective assistance in teaching and learning some motor skills for sports activities and increasing students' motivation to learn them no matter how difficult they are, in addition to removing the fear and dread factor from these skills; and providing students with feedback that improve the teaching and learning processes, which leads to optimal performance. It also considers individual differences between students and self-education, as students can control the educational process to a large extent according

to their level, hence, it is considered one of the most effective educational means**. (Maclean,Daniel) (Sharaf Abd El Hamid ,2000,p.123)**

This also agrees with Azmy, Mohamed (2001) on the importance of using educational technology applications in learning physical education, as it works to raise the educational process efficiency through the attractiveness of teaching and its effectiveness in stimulating and instilling activity in the learner and building and developing the motor perception, or through performing the skill in a unified manner, and it also reduces verbal defects and errors in performing the model. It can also be used to teach many learners and maintain the educational effect for a long period while saving time and considering individual differences between learners. Its importance and effectiveness appear in teaching and helps create a suitable educational environment**. (Azmy, Muhammad ,2001, p.45)**

The study of Asmaa Ahmed 2020 , Mohamed Hassan Rakha 2020, Lotfy Ibrahim Mohamed 2020 , Al-Shabrawy Aly Mohamed 2019 confirms that the use of innovations and technological means has an effective impact on the possibility of progressing the skill level and forming a clear perception of movement performance, and thus led to a clear perception and obtaining motor skills, so learning was done better.

The superiority of the experimental group over the control group can also be attributed to motor learning theories, particularly the Closed Loop Theory, which emphasizes the role of feedback in enhancing motor performance.

•**Feedback**: As a fundamental component of the Closed Loop Theory, feedback enables learners to compare their current performance with the expected outcome, allowing them to identify errors and refine their skills. Modern technology facilitates instant and precise feedback, significantly enhancing the learning process.

•**Attention**: Technological instructional media incorporate visual and auditory elements that effectively capture learners' attention, thereby improving focus during skill acquisition.

•**Self-Repetition**: Technology allows learners to revisit instructional content and practice skills independently, reinforcing self-repetition and promoting motor skill retention.

Thus, the research third hypothesis is validated, which states:

There are statistically significant differences between the post-measurement averages of the control and experimental groups in crawl swimming in favor of the experimental group post-measurements.

Conclusions and Recommendations

First, Conclusions:

Based on the data and information that the researcher has reached and according to what the statistical treatments of this data indicated, and in light of the objectives and hypotheses of the research, the researcher reached the following conclusions:

1. Technological innovations have an effective impact on the possibility of progressing the crawl swimming skill level.
2. The proposed program using some technological innovations has a positive impact on improving the crawl swimming performance level for second-year female students at the Faculty of Physical Education for Girls, Helwan University.

Second: Recommendations:

In light of the results reached by the research and after presenting and discussing them, and in light of the research conclusions, the researcher recommends the following:

1. Conducting more experimental research using technological innovations for various swimming skills and all age groups.
2. Training those responsible for teaching, educating and training swimming in clubs, academies, sports schools and faculties of physical education on how to design and apply modern teaching methods that consider individual differences between learners in swimming.
3. Provide educational swimming pools with a special laboratory that includes all technological learning outlets, which could be used when learning swimming methods.

References:

1. Abd El Hamid Sharaf (2000): "Educational Technology in Physical Education", First Edition, Book Center for Publishing, Cairo.
2. Aboraya, Hanan, and Abd El Aziz, Doaa (2020): "Training Newly Graduated Science Teachers to Integrate Technological Innovations in Lesson Planning in Light of Digital Learning Requirements", Journal of Education, Sohag University - Faculty of Education, (73).

https://search.emarefa.net/ar/detail/BIM-1099521-%D8%AA%D8%AF%D8%B1%D9%8A%D8%A8-%D9%85%D8%B9%D9%84%D9%85%D9%8A-%D8%A7%D9%84%D8%B9%D9%84%D9%88%D9%85-%D8%AD%D8%AF%D9%8A%D8%AB%D9%8A-%D8%A7%D9%84%D8%AA%D8%AE%D8%B1%D8%AC-%D8%B9%D9%84%D9%89-%D8%AF%D9%85%D8%AC-%D8%A7%D9%84%D9%85%D8%B3%D8%AA%D8%AD%D8%AF%D8%AB%D8%A7%D8%AA-%D8%A7%D9%84%D8%AA%D9%83%D9%86%D9%88%D9%84%D9%88%D8%AC?utm_source=chatgpt.com >

3. Ahmed Ibrahim (2013): The Effectiveness of a Program Based on the Second Stage Web (Web200) in Developing the Concepts of the Arabic Language Among Students of the College of Education and their Attitudes Towards Arab Studies in Education and Psychology (ASEP1) (31).
   https://saep.journals.ekb.eg/article_50199.html >
4. Ahmed Mohamed Abd El Ghaid, Walid El Din El Sayed Ibrahim (2002): “The Effect of an Educational Program Using Multimedia on the Performance Level of Crawl Swimming for Beginners Aged 6 to 8 Years”, Theories and Applications Magazine, Issue 44, Faculty of Physical Education for Boys, Alexandria University.
5. Asmaa Ahmed Mohamed Saleh (2020): "The Effect of a Proposed Educational Program Using the Similarities Strategy and Utilities on Correcting the Errors of Front Crawling and Back Crawling for Female Students in the Faculty of Physical Education, Journal of Comprehensive Education Research, Issue (2), pages 1-34, Faculty of Physical Education for Girls, Zagazig University.
6. Azmy, Muhammad (2001): “Methods of Developing and Implementing the Physical Education Lesson in the Basic Education Stage Between Theory and Application”, Dar Al-Wafa, Alexandria.
7. El Nabawy Abd El Khalek Salama (2001): “The Effect of Using Multimedia Computers on Learning Some Gymnastics Skills”, Unpublished Master’s Thesis, Faculty of Physical Education for Boys, Helwan University.

8. Heri, Z., Ratno, P., & Hardinoto, N. (2023). Development of audiovisual learning media for front crawl swimming technique based on the case method, PKO study program, FIK Unimed. Proceedings of the 5th International Conference on Innovation in Education, Science and Culture, Medan, Indonesia. https://eudl.eu/doi/10.4108/eai.24-10-2023.2342083 >
9. Hussein Abbas Mohamed (2015): E-learning and Traditional Education: Integration Requirements, Al Alamiya Publishing House.
10. Ibrahim Abd El Wakeel El Far (2000): "Computer Education and the Challenges of the Early Twenty-First Century", Dar Al-Fikr Al-Arabi, Cairo.
11. Lotfy Ibrahim Mohamed (2020): "Designing a Smart Phone Application Based on Mobile Learning and its Impact on Learning some Water Polo Skills", Faculty of Physical Education for Boys, Zagazig University.
12. Maclean & Daniel D: Use of Computer Based Technology in Health, Physical Education, Recreation, and Dance. Eric Digests No ED390874 http://www.ericdigests.org >
13. Mahdy Mahmoud Salem (2002): "Techniques and Methods of Education", First Edition, Dar Al Fikr Al Arabi, Cairo.
14. Mansour Essam (2018): "Electronic Blogs are a New Source of Information", Studies Magazine, 34(5) 39-113. https://www.researchgate.net/publication/304404258_almdwnat_alalktrwnyt_msdr_jdyd_llmlwmat >
15. Mohamed El-Shabrawy Aly Mohamed (2019): "The Effect of an Educational Program Using the Electronic Educational Era on Learning Breaststroke Swimming and the Cognitive Achievement Level of Swimming Beginners", Faculty of Physical Education for Boys, Zagazig University. https://search.mandumah.com/Record/1505990 >
16. Mohamed Hassan Hassan Rakha, (2020): "The Effect of the Think-Marry-Share Strategy Supported by the Use of a Mobile Phone on Learning the Rotational Front and Back Crawl Swimming for Beginners", Scientific Journal of Physical Education and Sports Sciences, Volume (1),

Issue (90), Pages 1-38, Faculty of Physical Education for Boys, Helwan University.
https://jsbsh.journals.ekb.eg/article_220624_e1317367249dadfcf6d7303e18c3d44f.pdf >

17. Sengoku, Y., & Nomura, T. (2007). Effect of a computer-assisted swimming instruction program on children's learning motivation and learning strategy. Japan Journal of Physical Education, Health and Sport Sciences, 52(2), 161-171.< https://www.researchgate.net/publication/266971578_Effect_of_computer_assisted_instruction_web_site_for_swimming_to_children's'_learning_motives_and_learning_strategy >
18. Wafika Mostafa Salem (1997): Water Sports, Maaref Establishment, s Alexandria.