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## The effect of an educational curriculum using virtual reality glasses in improving some kinetic abilities and learning freestyle swimming for first-year primary school students

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### Abstract

The study aimed to pay attention to and exploit the new technologies and modern devices in teaching freestyle swimming by directing children to develop their awareness and understanding of the technological development that the world is dealing with. The two researchers prepared an educational curriculum using virtual reality glasses in order to provide an environment similar to the real environment that simulates the perceptions of children's minds in the world. Virtually to form a complete picture of freestyle swimming skills, and from here the problem came as a result of the children's excessive attachment and passion to modern and advanced devices and technologies and spending most of their time using modern technologies that are difficult for an adult to use, but we find that children are more capable of dealing with them, so the two researchers noticed this. The problem and the idea crystallized to solve this problem in using the positive side of this technology to improve some kinetic abilities and learn free-swimming skills. The experimental approach was adopted by designing the experimental and control groups on a sample of (20) children in the first grade of primary school, and they were chosen intentionally with a percentage of (47.619%) from their original population represented by the students of the first grade of primary school at Iraq International School for the academic year (2023-2024) who are continuing the regular and attendance hours. The sample was divided into two groups, experimental and control, and the experiment was conducted on the children of the experimental group for period of (6) consecutive weeks at the rate of two units per week. After completion, the results were processed with the SPSS system to form the conclusions and recommendations that it is possible to use smart glasses technology in practical lessons to learn freestyle swimming skills for children. The use of virtual reality glasses in swimming lessons helps improve some of the children's kinetic abilities and learning freestyle swimming, as the group that used the smart glasses technology outperformed the children who learned without it. It is necessary to increase interest in teaching children according to the virtual reality glasses technology, which provided them with excitement and excitement in swimming. Learning and searching for what is new greatly serves the learning process. and this achieves one of the sustainable development goals of the United Nations in Iraq which is (Quality Education).

**Keywords** | virtual reality glasses , kinetic abilities , free swimming.

### Introduction:

Societies improve as a result of interest in science and new technologies and devices that serve the educational process and in turn help to advance all human requirements, and this is an indicator of the advancement of society. (Ali Abdullah.) pointed out that “in recent years, the world has witnessed a great and comprehensive development and transformation in the fields of life in general and in the field of physical education in particular, as we live today in an era in which scientific developments have reached such a high extent that the traditional method no longer meets the requirements of this era” (1). (Sabah Latif Hasan, & Mawahib Hameed Numan.) explained, “Researchers and specialists, despite their different views, are seeking the best methods and methods for education in general and kinetic learning in particular, and to innovate modern educational methods for acquiring kinetic skills” (2). (Muhammad Jamila Sharif) (The modern era is witnessing a great scientific and technological revolution that has a positive impact on learning, especially in the sports field. Therefore, the idea of virtual reality came from the extent of the possibility for a person to disappear while sitting in his chair and go to another world, the world of imagination, and this is what we can call it in the sense that virtual reality It works to transfer human consciousness to a virtual and imaginary environment that is shaped electronically (10). Therefore, virtual reality glasses are a device that is worn on the head and completely covers the eyes to obtain a three-dimensional experience. It contains polarized lenses that display two images, one for each eye, which the brain combines into one image. This enables them to see the image from different angles and puts the user in an immersive situation so that the user feels... He is isolated from the outside world and fully integrated into the events of the virtual environment. (Hamid Al-Hamdani. Duraid Majeed.) pointed out that (swimming is one of the most beneficial sports because of its great benefit to human health physically, skillfully, and psychologically.

Swimming is a popular sport practiced by most people in the world, males and females of all ages, and it is a sport practiced by children at all age levels). (12), swimming requires “a sufficient amount of kinetic abilities such as flexibility, balance, and coordination” (Ibtihal Ryadh Umran, & Intisar Kadhum Abdul-kareem.) (6), as (Alan Khourshid Rafeeq, & Vian Abdul-kareem Saeed.) confirmed that “swimming is one of the activities that has witnessed significant development.” In recent years, as a result of the diversity and multiplicity of educational methods and methods” (3). “Childhood is one of the most important stages in a person’s life, because it is the stage in which skill, physical and kinetic abilities are prepared and prepared, and through this stage the path of children’s growth in these abilities will be determined” (Dunia Ali Abdulhassan.) (5). “Because of the acceleration of childhood, childhood has become the focus of educational, psychological, and social research, the changes that have occurred in it, the importance of its nature, the experiences provided to the child during this period, and their impact on other stages of development” (Junad Majid, & Nuhad Mohammed.) (4). The importance of this research lies in preparing an educational curriculum using VR technology to improve some kinetic abilities and learning freestyle swimming for children, as studies in this field are usually limited to samples that are within the raw stages of learning, so the two researchers assumed that VR technology has a positive effect in improving some kinetic abilities. For children in the first grade of primary school, virtual reality glasses technology has a positive impact on learning freestyle swimming skills for children in the first grade of primary school.

The problem of the research is that it is no secret to anyone that Iraqi families suffer from an exaggerated attachment and passion of their children to modern and advanced devices and technologies, and they spend most of their time using modern technologies. Therefore, the two researchers noticed this problem and we

crystallized the idea of the research by employing the positive aspect of this technology in improving some kinetic abilities. Learning freestyle swimming for children, therefore, prompted the researcher to investigate some technologies, and this technology (virtual reality glasses) was chosen, which pushes the child towards excitement, adventure, and the experience of living in the world of virtual reality, through which it is possible to find solutions to this problem and facilitate the learning process in addition to saving effort and time. Accordingly, the research aims to prepare an educational curriculum using VR technology to improve some kinetic abilities and learn free swimming for first-grade students, identify the effect of virtual reality glasses technology in improving some kinetic abilities for first-grade students, and identify the effect of virtual reality glasses technology in learning free swimming for first-grade students. First primary school. As for the research hypotheses, the educational curriculum using virtual reality glasses has a positive effect on improving some of the kinetic abilities of first-year primary school students. The educational curriculum using virtual reality glasses has a positive effect in learning freestyle swimming for first-year primary school students.

#### **Research fields:**

- Human field: First grade primary school students at Iraq International School for the year (2023-2024)
- Time range: (1/11/2023) until (7/1/2024)
- Spatial area: Iraq National School swimming pool / Baghdad.

#### **Definition of terms:**

Virtual reality glasses: (Kazem. Muhammad Ali.) (they are glasses that contain special type lenses and rely on smart display devices to operate them and display video clips and video clips, as these glasses work between the reality that you see and the assumption that the glasses create). (11)

#### **Method and procedures:**

The experimental method was used to suit the nature of the study, and the research population

was determined in a deliberate manner, represented by the children of the first grade of primary school in the Iraq National School within the sector of the First Karkh Education Directorate for the academic year 2023-2024, who are continuing the regular attendance period, amounting to (42) children, naturally distributed into two divisions (A). And (B), the research sample was chosen randomly so that the number reached (20) children, with a percentage of (47.619%) from their community of origin, and then two corresponding groups were chosen from them. Each of these groups reached (10) children, and then one of them was chosen by a simple random method to be The experimental group from Division (A) and the other from Division (B) were its control, as these procedures were to avoid bias in this distribution and selection, as they were chosen from the remaining number (5) children for the exploratory experiment sample, and they represent (22.727%) of the original population, Homogeneity was not performed because they are from one age group.

Then the proposed approach was applied to the research sample represented by Division (A-B). The two researchers adopted free swimming tests (Appendix 2) and tests of some kinetic abilities (Appendix 1). The children's performances were photographed before and after and presented to two arbitrators (3), and the performance results for each were extracted. A child from freestyle swimming tests and some kinetic ability tests. The two researchers prepared an educational curriculum using VR technology and employed its vocabulary in order to achieve the desired positive effect, at the rate of two units per week for (6) consecutive weeks, with a total of (12) educational units in order to reach the desired goal.

The application included the planning mentioned in the educational unit of each lesson as follows:

- Preparatory Section (10 minute): It is similar for both the experimental and control groups
- The main section (25 minute): in two parts:

- The educational aspect (5 minute): includes children watching the required skill using virtual reality glasses technology
- The applied aspect (20 minute): includes practical applications viewed using virtual reality glasses.
- Final section (5 minute): similar for both experimental and control groups.

### **Exploratory experiment:**

The exploratory experiment is one of the basic and important things for conducting any research, as it is a small part of the main experiment, as through it we can clarify a number of factors related to the time of the research, the results, and the circumstances surrounding the phenomenon that the researcher wishes to study, as well as in order to avoid the difficulties and obstacles that the researchers may face during the conduct of the study. The main experiment, in addition to identifying the strengths and weaknesses, so the two researchers followed the pure steps of scientific research to make the work appear accurate.

The exploratory experiment was conducted on the research sample consisting of (3) children on November 1, 2023.

### **Main experience:**

After verifying the tools and equipment used and after reviewing the circumstances surrounding the test, the main experiment is carried out on the research sample after avoiding the obstacles that may have appeared in the exploratory experiment, taking into account the basic conditions for developing an educational curriculum that achieves the goal and developing educational units that are applied as follows:

- Duration of the educational unit in weeks: 6 weeks.
- Number of total educational units: 12 educational units.
- Number of weekly educational units: 2 units.
- Weekly teaching days: Sunday, Wednesday.
- Teaching unit time: 40 minutes.

### **Post-tests:**

The post-tests were conducted on the research sample in the closed swimming pool in the Iraq School, taking care to provide the same conditions and requirements that took place in the pre-test, using the same devices, tools, and the same assistant work team after completing the educational curriculum.

### **Results:**

**Table .1** It shows the equality of the two research groups (experimental and control) in the research variables

No.	The exams	Experimental group		Control group		Value (t) Calculated	Level Sig	Type	Sig
		Mean	Standard deviation	Mean	Standard deviation				
1	10 sec apnea test	2.9	1.595	2.7	1.159	0.320	0.752	Non sig	
2	Horizontal buoyancy test	1.9	0.875	1.6	0.843	0.780	0.445	Non sig	

Table (1) above shows that the error level values for the research variables are greater than the significance level (0.05), which indicates that there are no significant differences in the research

tests between the experimental and control groups, which indicates the equality of the two research groups, and starting with a single starting line for the two groups.

Table 2 shows the difference of the arithmetic means, its standard deviation, the calculated (t) value, and the significance of the differences for the free swimming tests between the pre- and post-tests for the experimental group.

Variable	Measruing unit	Arithmetic mean of difference	Standard deviation of differences	Value (t) Calculated	Level Sig	Type Sig
10 sec apnea test	Second	6.7	1.567	13.520	0.000	Sig
Horizontal float test on the abdomen for 10 seconds	Second	7.2	1.229	18.521	0.000	Sig
Flow test	Meter	4.6	1.349	10.775	0.000	Sig
Evaluating the technical performance of free swimming	Meter	6.8	0.421	51.00	0.000	Sig

Degree of freedom (10-1=9).

Significant if the error level is smaller than the significance level (0.05).

**Table .3** It shows the difference of the arithmetic means, its standard deviation, the calculated (t) value, and the significance of the differences for the free swimming tests between the results of the pre- and post-tests for the control group.

Variable	Measruing unit	Arithmetic mean of difference	Standard deviation of differences	Value (t) Calculated	Level Sig	Type Sig
10 sec apnea test	Second	5	1.247	12.677	0.000	Sig
Horizontal float test on the abdomen for 10 seconds	Second	4.7	1.059	14.030	0.000	Sig
Flow test	Meter	2.5	0.707	11.180	0.000	Sig
Evaluating the technical performance of free swimming	Meter	4.4	0.843	16.5	0.000	Sig

Degree of freedom (10-1=9).(\*) Significant if the error level is smaller than the significance level (0.05)

**Table .4** It shows the arithmetic mean, the standard deviation, the calculated (t) value, the percentage of error, and the significance of the differences in the free swimming tests between the experimental and control groups in the post-test.

Variable	Experimental group		Control group		Value (t) Calculated	Level Sig	Type Sig
	Mean	Standard deviation	Mean	Standard deviation			
10 sec apnea test	9.6	0.516	7.7	0.483	8.497	0.000	Sig
Horizontal float test on the abdomen for 10 seconds	9.1	0.737	6.3	0.823	8.009	0.000	Sig
Flow test	7	0.816	5	0.666	6	0.000	Sig



Evaluating the technical performance of free swimming	8.4	0.699	5.9	0.875	7.055	0.000	Sig
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Degree of freedom (20-2=18). (\*) Significant if the error level is smaller than the significance level (0.05).

**Table .5** It shows the arithmetic means, standard deviations, calculated T-value, Sig score, and significance for the pre- and post-tests of kinetic abilities for the control group.

Tests	measruing unit	Mean Pre-test	Standard deviation	Post-test Mean	Standard deviation	Arithmetic mean of difference	Standard deviation of differences	(T) Calculated	Level Sig	Type Sig
Flexibility	centimeter	1.21	0.159	1.37	0.149	1.60	0.516	9.798	0.000	Sig
Balance	second	27.10	1.663	24.30	0.823	2.80	1.032	8.573	0.000	Sig
Compatibility	second	3.30	0.483	2.65	0.108	0.650	0.568	3.618	0.006	Sig

First experimental n = (10) degree of freedom (n – 1) significance level (0.05)

**Table .6** shows the arithmetic means, standard deviations, calculated T-value, Sig score, and significance for the pre- and post-tests of kinetic abilities for the experimental group.

Tests	measruing unit	mean pre-test	standard deviation	post-test mean	standard deviation	arithmetic mean of difference	standard deviation of differences	(t) calculated	Level Sig	Type Sig
flexibility	centimeter	1.190	0.152	1.72	0.122	0.530	0.674	sig	0.000	sig
balance	second	26.70	2.213	21	1.763	5.70	0.674	sig	0.000	sig
compatibility	second	3.240	0.327	2.130	0.063	1.103	0.280	sig	0.000	sig

Second experimental n = (10) degree of freedom (n – 1) significance level (0.05)

**Discussion:**

It is clear from the tables above that there are significant differences in the results of the tests for free swimming and tests of kinetic abilities between the pre-test and the post-test for the experimental and control group. There are significant differences in the results of the tests free swimming and tests of some kinetic abilities between the experimental and control groups in the post-test and in favor of the post-test. The two researchers attribute the reason for this to the fact that the educational program using virtual reality glasses has a significant impact on learning freestyle swimming skills and improving some

kinetic abilities, as the educational curriculum using VR glasses is the cornerstone on which educational units are built to develop the basic skills of learners, and the educational curriculum accompanied by VR technology is distinguished. It is clear to understand and understand and does not take a long time, in addition to having an aspect of suspense and excitement, and this is what the two researchers were keen on in preparing the educational curriculum using VR technology, which worked to improve some kinetic abilities and learning free swimming, as (Adly. Ahmed Eid.) emphasizes, “Kinetic abilities are the basis for success.” The process of

learning and improving skill performance using various means and devices, and developing the level of kinetic abilities plays an important role in learning and acquiring a kinetic skill. In addition, it has proven effective in reducing the time required to learn a kinetic skill” (9). (Al-Maliky, A. L., & Huda Abdul-samea) pointed out, “Our lives have been affected by technological development and computer technology, as it is one of the modern means that can be used” (8). “The role of the teacher is highlighted in transferring and using modern methods to the learner, as he is the main focus” (Dahham. Nahed Abboud: Hashem. Mona Abdel Sattar) (7). Scientists and researchers have confirmed that the use of different learning methods and strategies in the educational process makes the learner a positive participant to a large extent, while the teacher remains the main pillar of the educational process, as he cannot be dispensed with in any way. Educational means are any “tool or communication channel that transmits information between The sender and the receiver, as “those working in the fields of education realized the importance of change and development that brought about effective growth in the means to serve the goals of education and overcome educational problems, which are represented by the breadth of human knowledge, and that the educational means went through different stages, and each stage had a name that suited that stage, as it was They are called “(audio-visual aids) (and aids for learning) (and means of communication) (and teaching and learning aids) (and educational technology). (Inaya. Ghazi) (13). These methods have contributed to providing assistance to many learners in learning different movements, as scientific research in this field has led to the creation of many, many proposed educational methods, such as tools and devices, whose great benefits have been proven in facilitating the success of kinetic learning processes, as well as the preparation of special educational programs or curricula using these methods. Tools and devices:

All of these tools and devices do not eliminate the role of the teacher in the educational process, nor are they a substitute for it. Rather, they are a strategy or a method used by the teacher to develop and strengthen this role by working to develop the level of education and facilitating the path for the learner to achieve the goal he wants to achieve. Therefore, it has become necessary to use educational means, including educational videos, especially in the field of swimming, as it is one of the difficult activities to learn due to the water environment, as its proper use contributes greatly to teaching and developing the learners’ ability to quickly learn and master skills, in addition to helping to shorten the learning time. And make the learning process more effective.

#### **Conclusions:**

- Virtual reality glasses technology has a positive effect in improving some children’s kinetic abilities.
- Virtual reality glasses technology has a positive effect on learning freestyle swimming skills for children.

#### **Recommendations:**

- The necessity of using modern technologies, such as technology (virtual reality glasses) within the curriculum for learning swimming.
- Interest in conducting similar studies on samples from other age stages
- The possibility of using other techniques in learning types of swimming

#### **Author’s declaration:**

**Conflicts of interest:** None

We confirm that all tables and figures in this article are ours and written by the researchers themselves.

**Ethical-Clearance:** this manuscript approved by local ethical committee of physical education and sport sciences college for women on (April /2024)

#### **Author’s contributions:**

All contributions of this study were done by the researchers (N.A. and M.H.) who get the main

idea and work on writing and concluding also with number of experts, Saeed Ahmed (Physical Education and Sport Sciences / University of Baghdad) in Statistics, Haifaa Ahmed in revision, Hussein Nasir in translating, Huda Shihab in proofreading.

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### Appendix (1)

Kinetic abilities tests: (Nassif, Mazen Kazim) (14)

The first test: flexibility test

The second test: balance test

Third test: compatibility test

### Appendix (2)

Skill tests for freestyle swimming (Yahya, Suhair Raad) (15)

- 1- Testing the skill of holding oneself
- 2- Horizontal buoyancy test on the abdomen
- 3- Front sliding test
- 4- Technical performance test for 15-distance freestyle swimming

Educational unit

Grade: First Primary Week: Third

Educational unit: 5. Time: 40 minutes

Educational goal: Learn arm strokes

Section	Time	Activity	Organizing	notes
Primer	minute 10 minutes 3 minutes 7	Attend the children to the place designated for learning to swim  Walking - jogging - jogging with rotating arms - exercises for the legs - exercises for the torso - exercises for the arm - exercises with a colleague to strengthen the arm - jogging, fast running, shower		The introductory section is applied similarly to the experimental and control groups
Main section	minutes 25 minutes 5  minutes 20	<ul style="list-style-type: none"> <li>- The skill of the arms is displayed using smart glasses technology</li> <li>- Performing the skill of arm strikes in the air</li> <li>- Performing the arm strokes skill with the help of a colleague</li> </ul>		<p>The main section is applied to each group separately</p> <p>The control group does traditional lesson exercises</p>

		<ul style="list-style-type: none"><li>- Holding the edge of the pool and performing steady arm strokes.</li><li>- Performing the skill of arm strokes with the help of a floating board from the movement</li></ul>		
Educational aspect	minutes 5	A small game that serves skill End the lesson with a sports deal		The concluding section is similar for the experimental and control groups

### تأثير منهج تعليمي باستخدام نظارة الواقع الافتراضي في تحسن بعض القدرات الحركية وتعلم السباحة الحرة لتلاميذ الصف الاول الابتدائي

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2&1 جامعة بغداد / كلية التربية البدنية و علوم الرياضة للبنات – العراق  
3 الجامعة الاردنية / كلية العلوم الرياضية / قسم علوم الحركة والتدريب الرياضي – العراق

هدفت الدراسة الى الاهتمام واستغلال ما هو جديد من تقنيات واجهزة حديثة في تعليم السباحة الحرة عن طريق توجيه الاطفال على تطوير مداركهم واستيعابهم بالتطور التكنولوجي الذي يتناوله العالم ،قامت الباحثتان باعداد منهج تعليمي باستخدام نظارة الواقع الافتراضي وذلك بتوفير بيئة مشابهة للبيئة الحقيقية تحاكي مدارك عقول الاطفال في عالم افتراضي لتتكون صورة كاملة عن مهارات السباحة الحرة ،ومن هنا انت المشكلة نتيجة تعلق وولع اطفالها بشكل مبالغ فيه بالاجهزة والتقنيات الحديثة والمتطورة وقضاء اغلب اوقاتهم في استخدام التقنيات الحديثة والتي يصعب على الشخص البالغ استخدامها لكننا نجد الاطفال اكثر قدرة على التعامل معها لذلك لقد لاحظت الباحثتان هذه المشكلة وتبلورت الفكرة لحل هذه المشكلة في الاستخدام الجانب الايجابي لهذه التقنية لتحسين بعض القدرات الحركية وتعلم مهارات السباحة الحرة. واعتمد المنهج التجريبي بتصميم المجموعتين التجريبية والضابطة على عينة من اطفال الصف الاول الابتدائي بلغ (20) طفل واختيرت عمدية بنسبة (47.619%) من مجتمعهم الاصلي المتمثل بطلاب الصف الاول الابتدائي في مدرسة العراق الدولية للعام الدراسي (2023-2024) المستمرين بالادام المنتظم والحضور ، اذ قسمت العينة الى مجموعتين تجريبية وضابطة ، وتم التجريب على اطفال المجموعة التجريبية لمدة (6) اسبوع متتالي بواقع وحدتين في الاسبوع ، وبعد الانتهاء تمت معالجة النتائج بنظام SPSS لتكون الاستنتاجات والتوصيات بانه من الممكن استخدام تقنية النظارة الذكية في الدروس العملية لتعلم مهارات السباحة الحرة للاطفال وان استخدام نظارة الواقع الافتراضي في دروس السباحة يساعد على تحسين بعض القدرات الحركية وتعلم السباحة الحرة للاطفال حيث تفوقت المجموعة التي استخدمت تقنية النظارة الذكية على الاطفال الذين تعلمو بدونها ، ومن الضروري زيادة الاهتمام بتعليم الاطفال على وفق تقنية نظارة الواقع الافتراضي التي وفرت لهم اثارا وتشويق في التعلم والبحث عن ما هو جديد يخدم عملية التعلم بشكل كبير. وهذا ما يحقق احد اهداف التنمية المستدامة للامم المتحدة في العراق (التعليم الجيد).

مستخلص البحث

نظارة الواقع الافتراضي ، القدرات الحركية ، السباحة الحرة

الكلمات المفتاحية