

A comparative study between Dalton and Herbert models, to acquiring freestyle swimming skills for students

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Received: 28/04/2025

Accepted: 30/05/2025

Abstract

The importance of the research was represented in preparing educational units for freestyle swimming according to the Dalton and Harbert models for students and knowing the effect of the Dalton model and the Harbert model on acquiring the skill performance of freestyle swimming for students. The problem of the research was represented in the difficulty of learning the skill performance of swimming by students and the lack of use of modern educational models by teachers in teaching swimming to students. While the objectives of the research were to identify the effect of Dalton's model and Harbert's model on acquiring the skill performance of freestyle swimming for students. Also, to prepare educational units for freestyle swimming according to Dalton's and Harbert's models for students. The researchers adopted the experimental method with two experimental groups, in accordance with the requirements of solving the research problem, as the researchers adopted the experimental research method. The researchers recommend the use of modern educational models in order to achieve the best results and to get rid of traditional methods that focus on the teacher and do not allow the student to be part of the educational process and express his opinion.

Keywords: Dalton's Model: Harbert's Model: Acquisition Of Skill Performance.

1. Introduction

The development taking place in all areas of life in general, and especially in the educational field in particular, and the knowledge explosion taking place in various sciences, the educational and pedagogical field must have a part of this development. Moreover, success in the teaching process to achieve the required goals requires adopting regular and accurate planning, as educators, teachers, and workers in the educational field must have extensive knowledge of all its various scientific and practical aspects. If we can provide effective and useful educational models, strategies, methods, ways or teaching resources, this can provide a new opportunity for teachers to develop different aspects of students, such as physical, skill, psychological and moral aspects (Zaid, A.M.A., Neamah, I.A.H. 2021).

Modern teaching models that have recently emerged, including the Dalton and Harbert educational models, whose concept includes making the student have an effective role in the educational process as the second pole in the educational process. In addition to the teacher and the curriculum, it transfers the student's reality from being a mere recipient of the scientific material to being an actual participant in it, as it includes organizing the educational content and presenting educational concepts (Yawer, F. A., 2024).

Success in the teaching process to achieve the desired goals requires the adoption of regular and accurate planning, as educators or teachers must have extensive knowledge of all its different aspects. If we can provide useful models, strategies, methods or teaching resources, this can provide new opportunities for educators to develop different aspects of students, such as physical, skill, psychological and moral aspects (Yawer, F. A. & Saadoun, D. A., 2023). Among the modern teaching models that have appeared recently are the Dalton and Herbert educational models, whose concept includes making the student have an effective role in the educational process. As the second pole in the educational process, in addition to the teacher and the curriculum, and transferring the student's reality from being a mere recipient of the scientific material to being an actual participant in it, as it includes organizing the educational content and presenting educational concepts. Linking old information with new information, introducing it, using technology, and posing a set of questions prepared by the teacher in a scientific, accurate, and interesting manner. Students will be encouraged to try to arrive at model answers to these questions through research, investigation, and thinking to find solutions. It is worth noting that the process of answering questions and arriving at model answers will vary from one student to another (Yawer, F. A. & Alfarage, D. S., 2021).

Since swimming is a sport with a special characteristic that differs from other sports, and is considered one of the difficult activities, it has a special characteristic that differs from other sports, especially in the educational process, as it requires cognitive and motor skills that the learner must understand and master, because this sport has a special characteristic that distinguishes it from others, as it is practiced in an aquatic environment that is different from the environment in which other sports and activities are learned. Its skills require effective educational models for teaching and help learners form ideas and understand the complexity of movements and balance in the water due to the multiplicity of skills specific to swimming and due to the interconnectedness of skill performance in some complex techniques and when teaching swimming. It is essential for the teacher to present the scientific material in an easy and organized manner and to be primarily concerned with dispelling the specter of fear among the learners and instilling as many basic skills as possible in the lesson.

Research Problem:

The researchers noted through their review of research, studies, scientific sources, and personal interviews with experts and specialists in the field of specialization, and through their experience in the field of teaching and swimming, as they are physical education teachers. The difficulty of students learning the skill performance of swimming and the lack of use of modern educational models by teachers in teaching swimming to students, as well as the lack of knowledge and practice of teachers of these educational models, also, the lack of teaching models and modern concepts that depend on the active participation of students, which differs from indoctrination, which lacks student motivation and the creation of an educational

environment that works to excite the learner. Making the learner an active and essential part of the educational process is also considered by activating mental processes, thinking, investigation, analysis, searching for information, linking previous concepts with new concepts, and linking and forming conceptual relationships between the learner's cognitive structure to achieve meaningful learning. Given the privacy required by swimming, it differs from other sports, as it is practiced in an environment different from the normal environment like other games, and the fear and dread of entering the water, especially for students who do not know how to swim.

Research objective:

- 1- Identify the impact of Dalton's model on students' acquisition of freestyle swimming skills.
- 2- Identify the impact of Harbert's model on students' acquisition of freestyle swimming skills.
- 3- Prepare freestyle swimming instructional units for students based on the Dalton and Harbert models.

Research hypothesis:

- 1- There are no statistically significant differences between the results of the post-tests in freestyle swimming skill performance between the first experimental group and the second experimental group.

Research field:

Human field Third-year students / College of Physical Education and Sports Sciences, morning studies, University of Sulaymaniyah / for the academic year 2023-2024.

Time field: from (7/3/2024) to 20/4/2024).

Spatial field: The indoor swimming pool of the College of Physical Education and Sports Sciences / University of Sulaymaniyah.

Definition of Terms

Dalton's Model: "A model based on the idea of transforming academic subjects into units, allowing each student to progress at their own pace, leaving students free to study topics that suit them." (Zayer, Saad Ali, et al,(2014))

Herbert's Model: "This model is based on a continuum of facts, meaning that each fact can strengthen its significance by relating it to other facts, ultimately becoming concepts and generalizations." (Al-Mahdi, Magdy Salah,2019)

Methodologies for research and field operations:

Research Methodology:

The researchers adopted the experimental method with two experimental groups, in accordance with the requirements for solving the research problem. The researchers adopted the experimental research method, which is defined as "the method in which we treat and control an independent variable to observe its effect on a dependent variable, while observing the resulting changes and interpreting them, whether the experiment included an independent variable and a dependent variable or more than one independent variable or more than one dependent variable." (Zayer, Saad Ali, et al.(2016)).

Adl Abdullah also believes that in order to reach solutions to the current problem, the researcher adopted the experimental method, which is defined as “a type of research in which the researcher controls one or more variables to create a deliberate and controlled change to the specified conditions and explains the results of this change” (Al-Fartousi, Ali Samoum and others,(2015).

Glenn Zorpette (2013, 47) points out that “the experimental design imposes on the researchers foundations, conditions, and methodological steps that they must adhere to in order to maintain its internal and external integrity from the influence of extraneous variables to ensure verification of the hypotheses of his experiment without interference in the effect of the factors, and to adhere to the procedural and statistical control of these factors or extraneous variables.” (Al-Samarrai, Iftikhar,(1983)

The experimental design below shows the distribution of the two experimental groups and the work steps carried out by the researcher, which are governed by the hypotheses of the current study, as shown in Figure (1).

Table (1) shows the experimental design of the two research groups.

Design	Group	Step 1	Step 2	Step 3	Step 4	Step 5
Two-group experimental design	Experimental Group 1	Freestyle Swimming Equivalency Pretest	Working according to Dalton's model	Post-test	Statistical analysis	t-test value
	Experimental Group 2	Freestyle Swimming Equivalency Pretest	Working according to Harbert's model	Post-test		t-test value

Devices, Tools, and Methods Used in the Research:

Devices and Tools Used in the Research:

- (1) Lenovo Laptop. (1) Nikon Digital Video Camera.
- (2) Stopwatches. (1) Korean-made Plasma Display Screen.
- Colored Measuring Tape. - (3) Whistles. - Papers and Pens.
- (1) Camera Stand. - Colored Floor Sticker. - Posters and Illustrations. - Data Show

Research Methods

Personal interviews. - Arab and foreign sources. - Expert opinion survey form on determining the validity of tests and educational units. - Data collection form. - Tests and measurements. - The Internet

Field Research Procedures:

Scientific Foundations:

Validity:

Validity is defined as the truth or degree of accuracy with which a measuring instrument measures the thing being measured or the phenomenon it was designed to measure. (Fouad Abu Hatab,(1984)

The researchers sought the help of surveying the opinions of experts and specialists in the field of testing, measurement, curricula, teaching methods, and swimming, by presenting them with skill tests to learn their opinions. It became clear that the tests designed measure what they

were designed for, a basic condition of the scientific conditions for tests, which is content validity.

Reliability:

Reliability : Is a quality that a good measuring instrument must possess. Reliability refers to the extent to which a test score is consistent and does not vary from time to time, i.e., consistency between data collected by applying the test or scale to the same individuals and under the same conditions, as much as possible. (Abu Al-Naja Ahmed Ezz El-Din,(2015)

The researchers divided the individuals of the exploratory experiment sample after conducting the test by splitting them in half among the individuals of the group, where they were randomly distributed into two groups, classifying them into the odd numbers group and the even numbers group equally. Pearson's correlation coefficient was used between the individuals of the two groups, and the value of the correlation coefficient reached (0.94), which is a strong relationship, indicating that there is a strong correlation between the two groups, which is a high percentage, and this confirms the stability of the test.

Determining the skill tests to be researched:

Through the researchers' review of sources, references and previous studies and through their experience in the field of teaching methods and swimming, a set of skill tests for freestyle swimming was identified that are compatible with the vocabulary of the scientific subject and the academic subject prescribed by the college and the curriculum for swimming as a scientific subject. Freestyle swimming tests were identified that possess a high degree of validity, reliability and objectivity. These tests were presented to experts and specialists to seek their opinions on the validity and selection of what they deemed appropriate for measuring skill variables. Tests that achieved an agreement rate of 90% or more were selected.

Freestyle Swimming Skill Tests:

1. Regular breathing test for 10 seconds. (Muhammad, Adel Abdullah,(2016)
2. Horizontal forward buoyancy test.
3. Streaming test (forward glide). (Ezz El-Din, Abu Al-Naja Ahmed,(2003)
4. 25m freestyle swimming test.

Freestyle Swimming Technical Performance Scorecard:

Abu Al-Naja Ahmed Ezz El-Din (2003 AD) indicates that evaluation is an integral part of the educational process itself. It is a continuous and necessary process for the learner because by evaluating his performance he can determine his level and compare this level with the effort he has made, which motivates him to make more effort to reach more achievement. It is also a necessary process for the teacher so that he can determine the level of his students. (Abu Al-Naja Ahmed Ezz El-Din,(2015)

Observation is one of the evaluation tools that researchers rely on to test the technical performance of learners. The researchers relied on using a form to evaluate the technical performance of freestyle swimming for beginner students, prepared by (Yawer, F.A. 2024).

The freestyle swimming form was divided into the same division in which freestyle swimming skills are taught, which consists of the skill (body position - leg strokes - arm strokes - breathing - coordination), the experts* evaluated the skill scores for each part of the skills and the total evaluation of the skills is (100) points divided according to the importance of each swimming skill and the degree of importance and difficulty, where (16) points were given to the body

position skill, (16) points to the leg stroke skill, (24) points to the arm stroke skill, (20) points to the breathing skill, and (24) points to the coordination skill.

Exploratory experiment:

"An exploratory experiment is a preliminary study conducted by the researcher on a small sample before conducting his research with the aim of selecting research methods and tools." (Yawer, F.A., and Alfartusie, A.S. 2025)

In addition, so that researchers can identify the obstacles that they may face through the practical procedures of their research, because the exploratory experiment is practical training for researchers to identify the negatives and positives that researchers encounter during the conduct of tests in order to avoid them and not make mistakes. In order to provide a clear, comprehensive, and accurate picture of the test items used for the research, as well as to identify the time required to conduct the tests and the capabilities of the support team, and after determining the research sample and tests as a preliminary experiment on a representative sample of the community to be tested, the researchers conducted a pilot experiment with the support team.

First exploratory experiment:

The researchers conducted a pilot experiment for skill tests on a sample of students with the support team in the college swimming pool. After changing their clothes, they conducted the pilot experiment for skill tests for freestyle swimming for each of the following tests that were agreed upon by experts and specialists: (regular breath hold 10/sec, horizontal buoyancy, forward flow). The Exploratory experiment test was conducted on Thursday 7/3/2024 at exactly ten o'clock in the morning in the closed swimming pool of the College of Physical Education and Sports Sciences - University of Sulaymaniyah on (10) students from outside the research sample in order to determine the validity of the tests and their suitability for the research sample and the possibility of applying them to the sample members.

The two identification units

In order to start with a single starting line, and given that swimming has a special feature that is different from other sports, as it is practiced in an aquatic environment that is different from the natural environment, before starting the tests, the learners must be familiarized with the basic principles of entering the water. Providing a general idea about swimming and how to adapt to the water due to the fear that most learners have of the water, and preparing them psychologically and physically to take the equivalency tests when starting to implement the educational units.

First introductory unit:

The researchers conducted the first introductory unit on Sunday (10/3/2024) in the indoor swimming pool of the College of Physical Education and Sports Sciences at the University of Sulaimani. The two research groups were given a brief explanation of what freestyle swimming is, its definition, its importance, and what the basic skills of freestyle swimming are. The skill of going into the water was given, dispelling the specter of fear from the learners, providing a safe environment, reassuring the learners, and guiding and directing them in a way that ensures adherence to the instructions and directions of the teachers.

The second introductory unit:

The second introductory unit was implemented on 12/3/2024, and the previous skill was re-explained, and a new skill was given, which is the floating skill, and how to perform the skill, and exercises were given for this skill.

Equivalence test for the two experimental groups

Table (2) shows the arithmetic means, standard deviations, and calculated t-value.

Variables	Dalton Model		Harbert Model		T Calculated Value	Sig Level	Sig Type
	Mean	Std. Deviation	Mean	Std. Deviation			
10/Sec Breath Hold	4.0625	1.73085	3.2500	1.91485	1.259	0.731	Non Sig
Buoyancy Test	8.3557	3.02848	5.0650	1.97745	3.639	0.161	Non Sig
Forward Flow Test	4.7438	1.18826	4.2619	1.45329	1.027	0.482	Non Sig

Main Experience

Content of the Educational Units:

The researchers prepared the educational units for the first experimental group (Dalton's model), where the first experimental group consisted of (16) students, where the teacher, according to the steps of the Dalton model, the **first step** is the introduction or preamble: The teacher must be well acquainted with his scientific material from the cognitive and skill perspective.

- **Third Step:** Linking and Comparing: The teacher attempts to help the learner analyze and compare new knowledge and experiences, and recognize the similarities and connections between them and previous knowledge and experiences so that they can move on to the generalization step. **Fourth Step:** Application: This step involves applying the knowledge, skills, and general rules acquired, arriving at them from the lesson, making their meaning clear and improving the process of comprehension. **Fifth Step:** Generalization and Summarization: In this step, we arrive at general issues, general laws, and generalizations, forming a general idea from partial ideas, and moving from sensory perception to general perception, and from examples to general rules.

As for the second experimental group, which worked according to (Harbert's model), the first step was represented by: giving the main tasks to the learners and clarifying and explaining the subject that the students need in terms of precise details and correct performance of the skill and explaining it well. The second step: The teacher allocates appropriate places for the learners and distributes the students among them. The third step: The teacher prepares the pictures, drawings and maps, as required by the lesson topic, and distributes them to the groups as needed. The researchers showed the students the pictures and models, and they put them in the places where the teacher had distributed them, explaining the steps for each skill. The fourth step: The learners apply what was presented and explained by the teacher. Then, at the end of the work, the teacher directs a number of questions related to the work that was carried out by the learners, and the learners answer them and correct the concepts for some in the event that there are incorrect concepts.

Table (3) shows the distribution of educational unit sections in minutes, along with the percentages of educational unit sections.

Educational Unit Sections And Components	Number Of Weeks	Number Of Educational Units	Educational Unit Time (Min)	Total Time	Percentage
Preparatory Section	6	12	15/ Min	180 / Min	12.5%
Main Section Educational Aspect Practical Aspect	6	12	65 Min 15 Min 50 Min	780 Min 180 Min 600 Min	79.166%
Final Section	6	12	10/ Min	120 / Min	8.333%
Total		12	90/ Min	1080 / Min	100%

Post-tests:

After the end of the educational program period of (4) weeks, at a rate of three units per week, and the number of educational units prepared by the researchers and the time period allocated for them amounted to (12) educational units, the researchers proceeded to conduct post-tests on the two experimental research groups on Sunday, corresponding to 15/4/2024, at nine o'clock in the morning, with the researchers taking into account the same conditions of the pre-test. The researchers were keen to create appropriate conditions for the test in terms of time, place, the same support team (in the equivalence and post-test), and the tools and devices in order to control the extraneous variables and stabilize the variables as much as possible.

Statistical methods:

Statistics is "the science that studies the collection, presentation, classification, and analysis of data, and the use of the results in prediction, reporting, or investigation" (Aid Karim Al-Kanani, 2009, 81).

Because electronic programs are available, the researcher used the ready-made statistical package (SPSS v21).

Presentation and discussion of the results

This chapter will present, analyze, and discuss the results reached by the researchers for the purpose of verifying the research objectives and hypotheses, after the researchers carried out the practical and applied procedures of the research by applying the educational units they prepared to the two research groups. The researchers proceeded to statistically process the results of the tests that the researcher arrived at through the pre- and post-tests, as is clear from the following tables and the results that the researchers arrived at through the tables. The results contained in these tables are presented and analyzed and explained in graphic forms, and then discussed, supported by sources and scientific studies that confirm the validity of the hypotheses and objectives of the research and support the achieved results.

Presentation and discussion of the results of the post-test of the freestyle swimming skill performance for the two experimental groups.

Table (4) shows the arithmetic means, standard deviation, and calculated t-test value for the post-test for the two experimental groups in the freestyle swimming skill performance tests

Variables	Dalton Model		Harbert Model		T Calculated Value	Sig Level	Sig Type
	Mean	Std. Deviation	Mean	Std. Deviation			
10/Sec Breath Hold	11.875	2.500	9.187	2.136	3.269	.003	Sig

Buoyancy Test	12.812	1.515	10.187	1.905	4.314	.000	Sig
Forward Flow Test	18.750	2.594	15.937	2.434	3.161	.004	Sig
Breathing	15.562	1.824	13.937	1.730	2.585	.015	Sig
Coordination	18.562	1.896	15.437	1.9311	4.619	.000	Sig

It is clear to us through the results reached by the researchers as shown in Table (9), where we see the statistical values of the arithmetic averages, standard deviations, the value of (t-test), and the value of (Sig) in the post-test of the basic skills of freestyle swimming, which included the skill (body position, leg movement, arm movement, breathing, and coordination). For both groups, the first experimental group that worked according to (Dalton's model) and the second experimental group that worked according to (Harbert's model), it becomes clear to us that there are significant differences in the skill tests for freestyle swimming. By observing the arithmetic means, we note the superiority of the first experimental group that worked according to (Dalton's model) over the experimental group that worked according to Harbert's model, and that the significance of the differences is in favor of the first experimental group.

Therefore, the third hypothesis is rejected, the null hypothesis, and the alternative hypothesis is accepted, due to the presence of statistically significant differences between the first experimental group and the second experimental group, in favor of the first experimental group. The researchers attribute this superiority to the use of the Dalton educational model, which had a clear impact on the student's success in every step of each stage, whether through questions and answers, or through the processes of exploration, explanation, interpretation, and the use of educational technology. By displaying pictures, shapes, models and educational videos, and forming a clear picture of performance according to the learners' styles, each according to his own style, and taking into account the individual differences between learners, and finally through the evaluation process, all of this constitutes an incentive and motivation for the student.

Because he discovers his success directly through the evaluation stage, which increases his passion and arouses his motivations and tendencies to learn more and more, especially in the sport of swimming, because of its uniqueness, enjoyment and excitement, which increases the enthusiasm of learners to work in an atmosphere different from other atmospheres in which learners practice their sports activities and the feeling of learning. And his ability to swim, as swimming is a sport that is loved by everyone, young and old, and everyone wants to learn it, and this is what gave great motivation to learners to want to learn in a scientific and smooth way and with studied scientific steps, with the presence of professors specialized in teaching swimming and correct guidance and giving feedback and correcting mistakes by strengthening the cognitive aspects of learners.

Khan also emphasizes the importance of using blended learning with technology and electronics and describes the technologies as "an innovative way to deliver accessible, well-designed, interactive, learner-centered learning environments to anyone, anywhere, anytime by leveraging the features available in many digital technologies". In addition to other types of educational materials suitable for open and flexible learning environments (Khan, B. 2005)

Abu Al-Naja states that the teaching process requires extreme precision and interconnected scientific foundations, highly specialized at the theoretical and practical levels, and precision in performing skills at the applied level. The more scientific and practical foundations are available in teaching, the more positive results we will obtain in building the learner. (Abu Al-Naja Ahmed Ezz El-Din, 2015)

Sherif Abdel Moneim points out that the world in which we live is distinguished by the tremendous cognitive development as a result of scientific progress and as a result of this scientific progress and the new trends and modern ideas that prevail over it, which open horizons for learning about everything that is new and modern, in addition to the repercussions that we witness in all areas of life. Keeping pace with this development is considered one of the features of this era, as our societies are witnessing a scientific renaissance and widespread development in all fields in general and in the educational field in particular. (Yawer, F.A. 2024))

Jonassen and others also believe that technology supports learning if it satisfies the needs of learners and when interaction with educational technologies is under the control of the learner and that technology works as an intellectual and exploratory tool that enables, The learner builds meaningful learning based on linking previous information with new information and forming stable cognitive structures.

The two researchers also agree with (Weil) that meaningful verbal learning must take place through the reception process, and teachers must present the scientific material to the learner in an organized, arranged, gradual, and successive manner so that the learners can receive the most useful material. Therefore, the teacher must present the educational material to the learners in a way that consolidates the cognitive structures within each cognitive organization in the learner's mind, as well as making the material meaningful to the learner. This is achieved by the teacher assisting the learner in making a dual connection between their own cognitive structure and the structure of the academic discipline they wish to learn(Weil, M. 2000).

The researchers also agree with (Saad Zayer and others) that the presentation of the material and information provided by the teacher if the knowledge or experience is not available to the students, so the subject is new to them, includes structures, concepts and facts that were not familiar to the students before, and this organizer includes more details and explanatory ideas that clarify the new academic subject in order to retain it in his cognitive structure. (Zayer, Saad Ali, et al.2016)

Conclusions and Recommendations:

Conclusions:

- 1- The first experimental group, which used Dalton's model, outperformed the second experimental group, which used Harbert's model.
- 2- The Dalton model was superior in raising the level of cognitive achievement in freestyle swimming among students in the College of Physical Education.
- 3- The effectiveness of Dalton's model in teaching students basic freestyle swimming skills in post-tests of students' cognitive achievement in freestyle swimming.
- 4- The effectiveness of Dalton's model in acquiring freestyle swimming skills among students in the College of Physical Education.
- 5- The effectiveness of the educational units prepared by the researchers in developing students' freestyle swimming skills.

- 6- The effectiveness of the educational units prepared by the researchers in developing students' freestyle swimming skills.

Recommendations:

- 1- The researchers recommend the necessity of urging physical education teachers, both male and female, to use modern teaching models, strategies, methods and techniques that make students the focus of the educational process and a positive participant in it.
- 2- The necessity of using modern educational models in order to achieve the best results and get rid of traditional methods that focus on the teacher and do not allow the student to be part of the educational process and express his opinion.
- 3- Conduct similar studies to this study that include other sports or variables not addressed in this study.
- 4- Conduct similar studies to this freestyle swimming study on other samples, such as females, and compare their results with the results of the current study.

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