Journal of Applied Sports Science
December 2022, Volume 12, No. 2
www.jass.alexu.edu.eg

The Efficiency of an Education Program Using Wheatley's Model on the Level of Skill Performance of the Underarm Pass in Volleyball

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Abstract

The research aims to identify the efficiency of applying the Wheatley model on an educational program concerning the level of the performance of the underarm pass (reception) in Volleyball. It also aims to identify the different opinions and approaches of using the strategy in teaching the underarm pass skill in Volleyball to the first-year students of the Department of Physical Education, College of Health and Sport Sciences, University of Bahrain. The researcher uses the empirical research method with experimental research design on two groups: an experimental group and a control group. The design uses the pre and post measurement on a sample of 40 first-year students from the Department of Physical Education, College of Health and Sports Sciences, University of Bahrain in the two groups. The sample is divided into two groups of 20 students each. The study was conducted between 18/2/2021 and 7/3/2021. The researcher concluded that the educational program using the Wheatley Strategy positively and effectively contributed in improving the level of the performance of the skill in Volleyball of the experimental group. It positively and effectively influenced the opinions and impressions of the experimental group as well.

Introduction and Significance of Study:

The success of the educational process depends on several factors. Such factors are the teaching method, the method of presenting educational experiences, the circumstances of the learning situation, and the learner's abilities, readiness and endeavors to acquire the educational experiences. Therefore, the current trends call for the usage of multiple modern methods to acquire the required skills, information and experience. They also call for shifting the attention to the learner as he/ she is the core of the educational process. This is because he/ she is considered an active, efficient and contributing factor. Thus, the learner must always be encouraged to think, pose questions, solve problems, and attempt to apply what he/ she has learned in other new situations (20: 71).

Mohamed Saad, Makarem Helmy, and Hany Said (2001), and Wafika Mostafa (2001) assure that the approach which depends on trial and application affects the learner easier and quicker. Therefore, new teaching methods have emerged that shift the core of activity from the teacher to the learner. The change does not only include the role of the teacher and the learner in the education process, but it also extends to the curricula, the teaching methods, and strategies. Thus, theories based on expanding the learner's knowledge have emerged. The main focus of these theories is the expansion and acquisition of knowledge. (16:25), (25: 32)

In this regard, Ibrahim ElMoemeny (2002) notes that the teaching method according to the theory of constructivism helps learners utilize constructivist ideas in the classroom. This is considered one of the modern advancements in teaching as it improves learning through changing the practices of the learners and teachers. (2: 11)

Mona AbdelSabour (2002) assures that the theory of constructivism focuses on the fact that everything the learner constructs acquires meaning. This encourages the learner to come up with his/ her perspective regarding learning through individual systems and experience. Thus, the theory focuses on preparing the learner to solve problems in unfamiliar situations and contexts. (1: 27)

Magdy Aziz (2004) states that the constructivist approach designs some teaching strategies which mainly focus on putting learners in real-life situations so they could find solutions through research. (21: 84)

Wadie Maximus (2003) states that there are several models which have emerged from the constructivist theory. Such models are (The Constructivist Model - Wheatley's Model - The Learning Cycle Model - The Authentic Learning Model - The Generative Learning Model). Wheatley's model is considered one of the models which help learners recall, connect, employ and reconstruct information in different situations. (31: 114)

Ayesh Zaytoun (2007) contends that despite the presence of several studies which utilize problem solving, Wheatley's model stands out as the most effective to achieve the desired goals. This is because the model consists of three stages: tasks, collaborative groups, and participation. It presents content in the form of problems and educational tasks

which induce thinking, reflect the main concepts, and help students acquire confidence as well as the ability to think and debate. (17: 30-37).

Atef Mohamed and Ragaa Ahmed (2006) present an analysis of Wheatley's model. Their analysis shows that the model begins with tasks including a situation which makes learners sense the presence of a problem. Then, they are divided into small groups and each group searches for solutions on its own. The process concludes with the groups sharing their findings, and discussing them. (16: 144)

Amina El Gendy (2003) illustrates that from the constructivist perspective, the teacher's role is not only limited to transferring knowledge. The teacher is also a guide and mentor in the processes of building the learner's individual knowledge. Consequently, the learner constructs, or forms meaning from the new information and events. This is a result of the interaction of the individual's prior knowledge, experience and constant observations, combined with the encouragement of learners to do miscellaneous activities so real learning occurs. (3: 6)

The Components and Stages of Wheatley's Model of Constructivist Learning:

This model consists of a number of stages.

1. Tasks:

Tasks are specified in the form of problems based on the main ideas and concepts of the main curriculum being taught. These educational tasks encourage critical thinking and discussion through activities in which students engage to accomplish their tasks and make proper decisions. (6: 11)

Both Hassan Zaytoun (2003) and Hanan Abdullah (2008) (12) agree that there are a number of conditions that should be available in educational tasks. Such conditions are (the problem should be real - it should be nonspecific - it should be suitable for learners - it should encourage learners to utilize survey methods - it should allow discussion - it should be closely related to the expertise of learners - it should lead to a specific result or fact). (11: 97)

There are several ways to put tasks forward to learners. For example, the problem could be written in business documents, or it could be presented to them in a manual as in the case of this research. Technology could also be employed.

2. Collaborative Groups

Working in small groups helps improve collaboration and communication skills among learners. It also helps them to discover the problem together. Learners are divided into several groups of 5 learners each. The members of each group work on creating a plan to solve the problem and execute the solution. This is based on the concept of social negotiations. It requires the learners to distribute roles among themselves, and the teachers to direct and guide them. The teachers pass by each group and sometimes direct them to re-evaluate what they have found (10: 138)

3. Participation

After the groups are done with the tasks, a discussion begins. The students of each group present their solutions and how they reached them. The groups discuss their solutions until they reach an agreement amongst all of them. Realistically, these discussions deepen their understanding of all the solutions and methods used to reach them. They also alter their thinking, and improve their communication and social skills.

Fayez Hamada (2005), and Mohamed Al Kasabani (2008) agree that participation is an important stage in this model for several reasons; it induces a state of intellectual stimulation among the students and encourages them to think, it improves their communication skills, it alters their expertise through the exchange of opinions between the teacher and the students, and it deepens the students' thinking. (19: 221), (23: 27)

Teaching using Wheatley's model has several properties:

- Posing the question or the problem.

Lessons are prepared based on the academic skills of the students. The preparation is based on important and meaningful questions or problems to the students.

- Real Surveys

Students analyze and identify the problem. They pose assumptions, collect information, run experiments, and come up with deductions and conclusions.

- Presenting some examples of solutions

Through teaching using Wheatley's model, students are required to present some examples of the solutions they have reached.

- Collaboration

This model requires working in small groups to encourage students to work and perform the task. It increases the chances of participation in order to improve thinking and social skills. (3: 421)

Hassan Zaytoun, Kamal Zaytoun (2003), and Mehrez Abdo (2006) agree that Whetley's model has several advantages. It helps students take the main responsibility during learning, it elevates the learners' thinking, it helps them understand the concept of self-learning, it elevates the level of thinking and encourages it. Collaboration is the main property of this teaching model. The role of the teacher is to guide and facilitate the learning process. This model increases the students' individuality, increases the quality of learning, and heightens the learners' confidence in applying what they learn. (11: 169) (9: 22)

Thus, it is a must to search for modern strategies which make students the core of the educational process. One such strategy is the Constructivist theory. The researcher has chosen Wheatley's model in teaching the underarm pass skill in Volleyball to the first year students of the Department of Physical Education. This is because Wheatley's model is an objective response to the current trends in education. It is concerned with thinking and the skills needed to teach using it. It assures the importance of classroom engagement and achieving communication between learners. The findings of previous research concerned with Wheatley's model such as the work of Mohamed Berges (2010) (24), Nasser Mohamed (2011) (29), Melody Mohamed (2015) (23), Ahmed Tarek (2017) (4), Gorski (2008) (33), have all proven the extent of the efficiency of Wheatley's model in teaching and learning. Thus, the researcher conducted this study to identify the efficiency of applying the Wheatley Strategy on an educational program concerning the level of the performance of the underarm pass (reception) in Volleyball.

Objective of Study:

The study aims to identify the efficiency of applying the Wheatley Strategy on an educational program concerning the level of the performance of the underarm pass (reception) in Volleyball. It also aims to identify the different opinions and approaches of using the strategy in teaching the underarm pass skill in Volleyball to the first-year students at the Department of Physical Education, College of Health and Sport Sciences, University of Bahrain.

Hypotheses of Study:

1. There are differences of statistical significance between the standard mean of the pre and post measurement of the trial group in terms of their skill level in the underarm pass (reception) in Volleyball. The results are in favor of the post measurement.
2. There are differences of statistical significance between the standard means of the pre and post measurement of the control group in terms of their skill level in the underarm pass (reception) in Volleyball. The results are in favor of the post measurement.
3. There are differences of statistical significance between the standard means of the experimental and control groups in this research in terms of their skill level in the underarm pass (reception) in Volleyball. The results are in favor of the experimental group.
4. The students of the experimental group had good opinions and impressions of Wheatley's model.

Terminology of Study:

Wheatley's Model: It is one of the teaching models which start with a task including a real problem, followed by the participants' research to solve such a problem in small groups. It concludes with the groups sharing their findings amongst each other. (11: 200)

Previous Research:

- The study conducted by Melody Mohamed (2015) (28) titled "The Effect of Using Whateley's Model of Constructive Learning Supported by an Educational Software for some Hockey skills on the Students of the Faculty of Physical Education, Tanta University" aims to find the effect of using Wheatley's Model of Constructive Learning supported by an educational software on the students of the Faculty of Physical Education for Girls, Tanta University. The researcher utilizes the experimental approach as it fits the nature of the study. The study is conducted on a sample of 50 first-year students at the Faculty of Physical Education, Tanta University. The major findings of the study are that Wheatley's model had a positive effect on the students' performance, and it facilitated the teaching process of some Hockey skills.
- The study conducted by Ahmed Tarek (2017) (4) titled "The Effect of an Educational Program to Improve The Goalkeeper's Skills in Football" aims to research the effect of an educational program using Wheatley's model based on problem-solving in some of the learning aspects of goalkeepers in Football. The researcher uses the experimental approach as it fits the nature of the study. The study was conducted on 24 goalkeepers from a Football school in the local club of Mahallah and the Ghazl El Mahallah Football Club School. The study finds that the suggested program using Wheatley's model had a positive effect on improving the goalkeepers' skills in Football.
- The study conducted by Habib Reda (2019) (8) titled "The Efficiency of an Educational Program Using Wheatley's Model of Constructive Learning on Some of the Main Skills and Cognitive Acquisition in Tennis on Students of The Faculty of Physical Education for Boys, Zagazig University." The study finds that there is an improvement in the technical tennis skills under examination.

Procedures of Study:

- **Approach of Study**

  The study uses the experimental approach as it fits the nature of the study.
- **The Experimental Approach of the Study**

  The researcher uses the experimental research design on two groups: an experimental group onto which the suggested program is applied (using Wheatley's model), and a controlling group onto which explanation and presentation methods were applied. Pre and post measurement is then conducted on both groups.
- **Domains of Study**

  Human Domain: The study is conducted on the first year students of the Department of Physical Education, College of Health and Sport Sciences, University of Bahrain.

  Temporal Domain: The second term of the academic year 2021/ 2022.
- **Sample of Study**

  The sample comprises 65 students after the elimination of injured students, as well as those affiliated with sports teams. The application is done on the experimental group of 20 students, the control group of 20 students, and 20 students for the survey.

Data Collection Methods:

- **Reference Scanning**

The researcher has examined references and research to find the physical abilities related to the underarm pass as well as the physical examinations connected to it. Such references and research include the works of Zaki Mohamed Hassan (2003) (14), Abd ElAtti Abd ElFattah et. al. (2006) (16), Osama Abd ElKhalek (2005) (5), Seif Saad (2016) (15), Haidar Kazem (2016) (13). The aforementioned abilities are as follows: agility, precision, compatibility, abdominal muscle strength, the distinctive strength of the arms, and the thrust strength of the legs. The physical examination of the motor performance of the underarm pass skill in Volleyball.

- A survey of the students' opinions and impressions of the Wheatley model.
- **Scoping Study:** The researcher has conducted a scoping study in the time period from 9/2/2021 to 11/2/2021 on a sample of 20 students in the same research environment as well as outside the main

sample. This is to calculate the coefficients of the examinations used.

The Main Study: The researcher has taught the two research groups at regular timings. She has provided the same necessary circumstances and resources to teach both groups. However, the control group has been taught with the traditional method, while the experimental group has been taught using Whateley's model.

Procedures of Study

First: The pre measurements have been conducted on both the experimental and research groups in the time period from 14/2/2021 to 16/2/2021 in order to assess the motor performance and the physical abilities required for the skill.

Second: The main study has been conducted in the time period from 18/2/2021 to 7/3/2021. The time period comprises 8 weeks, in each of which two educational units of 45 minutes per unit.

Third: After all units have been applied on both groups, the researcher conducted the telemetry consisting of the examination of skills and the survey to collect the opinions and impressions of the students of the experimental group concerning Whaetley's model. This was done in the time period from 9/3/2021 to 11/3/2021. The data was then collected, tabulated, and statistically processed.

Scientific Factors of Examinations (Validity - Reliability):

- **The Validity and Reliability of The Physical Examinations**

The validity factor equates to between 0.81 : 0.95. This indicates the validity of the examinations. The reliability equates to between 0.83 : 0.99. This indicates the reliability of the examination.

- **The Validity and Reliability of the Examinations of Skill**

The validity factor equates to 0.87. This indicates the validity of the examination as per the table. The reliability factor equates to 0.82. This indicates the reliability of the examination.

The Reliability of Wheatley's Model

The value of internal consistency fluctuates between 0.562 and 0.889. These values are significant at 0.05. This assures that the model measures what the axis measures. Thus, the model is reliable and it measures that which it is required to measure. The value of the correlation coefficient (validity factor) amounts to 0.79. This value is a good indicator of the validity of Wheatley's model if it is reapplied.

The Homogeneity of The Two Samples of the Study (Experimental - Controlling)

The values of the skew modulus of the age, height and weight variables fluctuate between 0.06 and 0.096. As for physical variables, they fluctuate between -0.08 and 0.99. As for the performance of the skill in the motor performance examination, they fluctuate between 0.29 and 0.32. These values are limited between -3, +3. Thus, it falls under the equilibrium curve. This indicates the components of the sample are homogenous.

The Equivalence of the Two Samples of the Study (Experimental - Controlling)

The value of the tabular T is greater than the value of T calculated at the level 0.01 in terms of the age, height and weight variables as well as the physical and skill variables. This indicates there are no significant differences. Thus, the study samples are equivalent.

Discussion of the First Hypothesis

Table (1)
Difference between coefficients - skew - earning ratio in the precision of motor performance of the reception skill test.
N = 20

Statistical Connotations	*Pre-Measurement*		*Post-Measurement*		*Difference Between Coefficients*	*Values of T*	*Difference Ratio*	*Earning Ratio*	
Variables	*s*	*+ _ M*	*S*	*+ _ M*	*s*				*Degree of Potency*
Precision of motor performance of the reception skill test	*9.10*	*1.94*	*10.50*	*2.04*	*1.40*	***4.50*	*0.16*	*0.24*	*non-potent*

****Significant at level 0.01 = 2.86**

Table (1) shows statistically significant differences between the pre and post measurement mean in favor of the post measurement in terms of the skill performance.

The researcher believes this is due to the teacher's role in explaining the skill, as giving a good example of its technical stages, the learners performing the skill repeatedly, and correcting errors as soon as they occur. This positively affects the learners and their performance of the skill.

Azer assures that teaching is the core of traditional learning. In this case, education relies on realistic information, and the learner is only a consumer. This is because the teacher asks questions and answers them himself/ herself and the learner memorizes the information as it is. Learners only learn to enter examinations, and they listen to lectures with all other students. (34: 87)

The results of the studies by Faiza Ahmed (2005) (19), and Heba Said (2009) (30) show that the traditional method has a limited positive effect in terms of the level of technical performance of skills. The studies also suggest that the presence of the teacher is essential and of utmost importance for teaching as the teacher is responsible for planning, execution, and assessing the learning. **Thus, the first hypothesis is valid.**

Discussion of the Second Hypothesis

Table (2)

coefficient - skew - degree of efficiency - earning ratio in the precision of motor performance of the reception skill test. N = 20

Statistical Connotations / *Variables*	*Pre-Measurement*		*Post-Measurement*		*Difference Between Coefficients*	*Values of T*	*Degree of Efficiency*	*Earning Ratio*	*Degree of Potency*
	s	*+ _ M*	*S*	*+ _ M*	*s*				
Precision of motor performance of the reception skill test	***9.35***	***2.08***	***15.00***	***1.12***	***5.65***	******9.16***	***1.06***	***1.57***	***non-potent***

*****Significant att level 0.01 = 2.86*** ******Significant at level 0.05 = 2.09***

Table (2) shows statistically significant differences between the pre and post measurement mean of the experimental and control groups in favor of the level of the performance of the skill. The researcher credits this progress in performance to the usage of the educational program with Wheatley's Model. The program includes sequentially presenting educational tasks related to the technical performance of the underarm pass skill (reception) in Volleyball. This sequencing leads to discussions among the students of each group. This encourages the students of each group as well as of all the groups together at the stage at which a discussion is held to find the proper method of performing the skill. Faiza Hamada (2005) (19) and Mohamed Al Kasabani (2008) (23) state that the stages of this model stimulate learners to think and grow their communication skills. This is done through discussions among the members of the groups regarding the suggested solutions. In addition, learners and teachers sharing togethers alters the learners expertise and helps them understand the skill.

Azer (2008) agrees with this. He states that using Wheatley's Model in teaching helps learners acquire information from real-life situations. Thus, the learner becomes a producer of information and a researcher in different resources. It also helps learners learn through competition between groups using Wheatley's Model. This is because the learner depends on miscellaneous resources to learn (24: 34)

Thus, the second hypothesis is valid.

Discussion of the Third Hypothesis

Table (3)

The significance of the differences between the coefficients of the post measurement of the motor performance of the reception skill in volleyball for the experimental and control groups

Variables Parameters	Experimental Group N=20		Control Group N=20		Difference between Coefficients	Value of T	Difference Ratio
	S	M	S	M			
Precision of motor performance of the reception skill	15.00	1.12	10.50	2.04	4.50	8.04	42.86

*****Significant att level 0.01 = 2.75** *****Significant at level 0.05 = 2.04**

There are differences between the means of the post measurement of the experimental and control groups in the fitness test in favor of the post measurement of the experimental group.

The researcher credits this to the learning environment in light of Wheatley's Model. This is because the learning environment is an open, free, democratic environment as it encourages dialogue and the presentation of ideas. In addition, it leads to challenge, and encourages the students to construct special methods of learning. It stimulates thinking and helps learners become more independent instead of relying on the teacher. It also increases the learners' ability to make decision making, and stimulates them to learn better without feeling bored during the learning stages of Whetley's Model the learners go through.

In this regard, Atem Mohamed Sayed & Ragaa Ahmed Eid (2008) (16) state that learning according to this model makes learners sense the presence of a problem. Afterwards, they search for solutions through being divided into small groups. The learning is concluded with the groups sharing their findings with each other.

This is in line with the results of the studies conducted by Melody Mohamed (2015) (28), and Ahmed Tarek (2017) (4). The results of both studies show the positive effect of Wheatley's Model in learning physical skills.

This is also in line with the findings of the studies conducted by Hossam Hamed (2004) (9), and Mohamed Kamal (2007) (26). They state that the teaching method reliant on verbal explanation and practical example has positive effects on learning the physical skills needed for different sports activities. **Thus, the third hypothesis is valid.**

Discussion of the Fourth Hypothesis

Table (4)

Repetition and percentage and statistical significance of the survey (experimental sample) for Wheatley's Model. N = 20

Statement Number	*Agree*		*Somewhat Agree*		*Disagree*		*Chi Square*	*SMA*	*Percentage of Agreement %*
	Repetition	*Percentage*	*Repetition*	*Percentage*	*Repetition*	*Percentage*			
1	*12*	*60.0*	*6*	*30.0*	*2*	*10.0*	**7.60*	*2.50*	*75.00*
2	*12*	*60.0*	*7*	*35.0*	*1*	*5.0*	**9.10*	*2.55*	*77.50*
3	*18*	*90.0*	*1*	*5.0*	*1*	*5.0*	**28.90*	*2.85*	*92.50*
4	*18*	*90.0*	*1*	*5.0*	*1*	*5.0*	**28.90*	*2.85*	*92.50*
5	*14*	*70.0*	*5*	*25.0*	*1*	*5.0*	**13.30*	*2.65*	*82.50*
6	*13*	*65.0*	*5*	*25.0*	*2*	*10.0*	**9.70*	*2.55*	*77.50*
7	*14*	*70.0*	*5*	*25.0*	*1*	*5.0*	**13.30*	*2.65*	*82.50*
8	*16*	*80.0*	*4*	*20.0*	*0*	*-*	**7.20*	*2.80*	*90.00*
9	*12*	*60.0*	*5*	*25.0*	*3*	*15.0*	**6.70*	*2.45*	*72.50*
10	*16*	*80.0*	*1*	*5.0*	*3*	*15.0*	**19.90*	*2.65*	*82.50*
11	*14*	*70.0*	*2*	*10.0*	*4*	*20.0*	**12.40*	*2.50*	*75.0*
12	*10*	*50.0*	*8*	*40.0*	*2*	*10.0*	*5.20*	*2.40*	*70.0*
13	*18*	*90.0*	*2*	*10.0*	*0*	*-*	**12.80*	*2.90*	*95.0*
14	*13*	*65.0*	*6*	*30.0*	*1*	*5.0*	**10.90*	*2.60*	*85.0*
15	*13*	*65.0*	*3*	*15.0*	*4*	*20.0*	**9.10*	*2.45*	*72.50*
16	*13*	*65.0*	*5*	*25.0*	*2*	*10.0*	**9.70*	*2.55*	*77.50*
17	*17*	*85.0*	*3*	*15.0*	*0*	*-*	**9.80*	*2.85*	*92.50*
18	*15*	*75.0*	*5*	*25.0*	*0*	*-*	*5.0*	*2.75*	*87.50*

******Chai Square signficant at 0.05 = 5.99***

Table (4) shows that the responses of the experimental research sample to the statements in the survey of opinions and impressions are mostly positive. Accordingly, the educational program using Wheatley's Model is efficient to influence the students' affective aspect.

The researcher credits this to the success and efficiency of the educational program used to teach the skill in question. The model helps the students not to feel bored, to depend on themselves, to depend less on the teacher, to participate in the learning process,and to do research to find information. It also shows the students' ability to take responsibility. In addition, it increases their confidence, and teaches them to respect all abilities and differences. Working in homogenous groups contributed to improve the collaboration and positive effect of dialogue. All the previous is the goal the research seeks to achieve.

In this regard, Ibrahim ElHarthy (2003) states that Wheatley's Model decreases the psychological effort learners exert when facing problems they need to solve. It also boosts their confidence while working in groups, and boosts their sense of responsibility towards achieving the desired goal. (1: 156)

This is in line with the studies conducted by Ehab Fahim (2006) (7), and Melody Mohamed (2015) (28). They state that learning through modern methods has a positive effect on the learning process.

Conclusion:

The Researcher Has Reached The Following Conclusions:

- The educational program using Wheatley's Model yields positive and efficient effects in improving the level of performance of skill in Volleyball in favor of the post measurement of the experimental group.
- The educational program using Wheatley's model yields positive and efficient effects in terms of the opinions and impressions of the students of the experimental group.
- The educational program using Wheatley's Model is more effective than the explanation and presentation method of the control groups in terms of the level of performance of the underarm pass skill in Volleyball.

Recommendations: After illustrating the previous results, the researcher recommends the following:

- Using Wheatley's Model to teach Volleyball skills to the students of the Department of Physical Education, College of Health and Sport Sciences, University of Bahrain as it has proven effective.
- Inserting modern teaching strategies into the academic curricula in order to prepare the teachers of physical education at the faculties of physical education.
- COnducting similar studies using other models of the constructivist theory such as The Constructivist Model, The Authentic Learning Model and The Generative Learning Model.

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