

The Effect of Probe Thinking Strategy (Application of Principles) on Acquisition of Some Basic Offensive Skills in Handball

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Abstract—Probe thinking is the structure that emerges from the interaction between the student and what he encounters, rather than what he is taught, and thinking that is focused on posing questions and coming up with solutions, the spark that keeps a learner interested. Therefore, the present study was an attempt to investigate the possible effect of probe thinking strategy on the acquisition of some basic offensive skills in handball. A control group and an experimental group were utilized in a pre-post-test design. Following the pre-test, the experimental group received the treatment whereas the control group did not. For the analysis, 20 learners from Cihan University-Erbil, Iraq, were taken into consideration. Descriptive and inferential statistics were used in the statistical analysis (i.e., Independent samples t-test) in terms of how the two groups performed on the pre- and post-tests. The results revealed that the use of probe questions strategy is effective for the Sports Sciences students to get better results regarding pass-test, dribble-test, and shot-test. The findings of the present study can benefit all the educators and the students as well to have a better performance in practical courses. At the same time, these results can be double-checked for the other sports so that they can be generalized to all the branches of Sports Science.

Keywords—Handball, Offensive skills, Probe questions strategy, Probe thinking, Sport sciences.

I. INTRODUCTION

The human mind has emerged as the first and most reliable investment, and the most advanced countries are those that enhance the investment of their youth's mental energies, cognitive skills, and probe thinking. The expansion of cognitive and educational science research stems from the importance of knowing individual differences, and studying them, which helps to explain the difference between individuals in physical and mental traits; this fact has been known to mankind for a long time, that is, "There are individual differences between individuals in all aspects of behavior, including the mental aspects. It is the reason for the diversity of human life from the decades to the present day" (Gardner, 2004, p.340).

The field of teaching methods has witnessed enormous developments in the recent years and aimed at using an active and effective teaching strategy based on the positive interaction between the teacher and the learner instead of the stagnation that prevails in the educational process, and the passivity of the learner in the teaching strategy used, in which the learner has no role in it other than merely receiving and

memorizing information. Without any positive interaction or participation in the learning process, with this tremendous scientific development and progress, it became necessary to have a new type of learning in which the learner is active and integrated into the learning process. It helps to develop his personality and understand himself.

One of the mindsets known as probe thinking is the cognitive trend (Cazden, 2001), which is based on the ideas of cognitive structure and cognitive representations (MacPhail et al., 2008). Probe thinking is the formation that emerges from the interplay between the student and what they encounter, rather than what they are taught, and thinking that is focused on posing questions and proposing ideas to solve them, the catalyst that maintains a learner interested (Light, 2014).

This type of thinking helps to form the cognitive structure of the student and the teacher, and to develop his higher-order thinking skills (Fairclough, 2013; Prain and Tytler, 2013). Learning based on deep, probing thinking is a dynamic basis for lifelong learning (Ford et al., 2010). Learning and active knowledge are not just ready-made answers, but a dynamic

system that is constantly growing when asking questions. Preparing competencies that lead society in the new millennium requires “keen care to develop thinking, deep, accurate, continuous, and probe thinking, by developing the knowledge system of curricula and focusing on the various skills of students” according to the principle of individual differences, and revealing the strengths of students and working on its development (Abdel Majeed, 2011, p.8).

At the same time, there is an undeniable shortcoming in the methods used in teaching handball, which made handball a difficult subject that does not achieve its main goal. The ability to think and criticize must be developed. Due to its rapid and constant rhythm between attack and defense, handball is the sport that attracts the highest number of participants and spectators, competing in football in this regard. The philosophy behind choosing this very investigation is that the researcher of the present study had the same problem at Cihan University when he was teaching handball to the stage two students, and now he thinks that this strategy can be used as a remedial for this problem.

A. Rosenshine's Principles of Instruction

Rosenshine's (1997, cited in Lloyd, Kameanui and Chard [Eds.]) Principles combine three distinct research areas (cognitive science, classroom practices, cognitive support) and how they complement each other by addressing how:

People learn and acquire new information

Master teachers implement effective classroom strategies

Teachers can support students whilst learning complex material (p.203)

One of the ten principles of instruction outlined by Rosenshine (1997) is to ask several questions and carefully consider each student's answer. Following those concepts, the primary body of this article is organized around the objective of questioning (in this case, Handball) to highlight how practitioners need to employ open-ended questions that encourage discussion and thought rather than just basic yes/no questions that restrict learner thought.

B. Learning through Questioning

Over the past two decades, game-based approaches such as Teaching Games for Understanding and Game Sense have relied on social constructivism to explain and improve learning (Butler and MaCahan, 2005; Kirk and MacPhail, 2002; Rovegno and Dolly, 2006).

C. The Zone of Proximal Development (ZPD)

Vygotsky's (1978) ZPD stresses language and verbal interaction in learning, making it a suitable theoretical framework for inquiry. The ZPD is the difference between the learner's “actual developmental level as judged by autonomous problem solving” and their “potential development as determined via problem solving under adult instruction or in cooperation with more competent peers” (Vygotsky, 1978, p. 86). When learners connect with competent peers and adults, their ZPD abilities and understandings improve. Particularly, teachers/coaches may utilize group scaffolds

(Cazden, 2001) to expand knowledge and facilitate student/player learning within the ZPD by asking teams questions to promote constructive and focused discourse (Wood *et al.*, 1976). In general, such talks are driven by the coach questions and triggered by suitably timed and expressed inquiries that fit the zone of capability of learners and give explanations of comprehension difficulties (Cazden, 2001).

D. The Theory of Complex Learning (CLT)

One of the other coaching philosophies of sports that helps answer questions is CLT. Davis and Sumara (2003) developed CLT to resolve the conflicts that exist in constructivist theories, which have been driven based on Piaget's intra-personal theories through Vygotsky's social theories (Cushion, 2011; Windschitl, 2002). CLT views learning as a complicated social and interpretive process of adaptation (appropriation). Moreover, Light and Fawns (2003) proposed that the act of learning via games might evolve as a discourse between bodily acts in games and the discussion language and argument (Light, 2014a; Light and Kentel, 2013). In physical education and sports, interpersonal or “social” learning, in which people spontaneously and unconsciously acquire their environment's habits and culture, is important (Light, 2005; Light, 2014a; Light and Kentel, 2013).

E. Questioning

General education literature emphasizes inquiry for learning to fulfill various curricular objectives (Cazden, 2001). It improves critical thinking and problem-solving (Sullivan and Clarke, 1991; Yang *et al.*, 2005). Questioning encourages alternative discursive and social practices in and out of the teaching and learning settings (Fairclough, 2013; Prain and Tytler, 2013). Questioning connects cognitive and social learning (Cazden, 2001). Techniques and tactics interact to teach students how to use the right technique in a specific (social) game situation (Light *et al.*, 2014). Skillful asking helps students take charge of their learning and learn how to learn (Evans, 2012, 2014; Light, 2014b). It may also spark interest and tenacity (Cazden, 2001), which can motivate students to solve the teacher/challenges. Coach's good questions broaden replies to assist learners build critical thinking abilities (Wright and Forrest, 2007) and take into consideration the knowledge and ideas of their own (Cazden, 2001).

F. Probing Questions

It is a style of instruction that encourages students to express their thoughts openly and boosts classroom group discussions. By asking perceptive questions, it is simple to develop critical thinking. With its positive output of new information, the strategy of asking probing questions might consist of inquiries and replies that challenge presumptions and disclose several discrepancies (Kagan, 2005).

Types of Probing Questions are as follow (Sahin and Kulm, 2008):

Repetition: The same inquiry may be repeated or rephrased to get additional information about the subject. You might

utilize echo questions to stress the subject where you want additional information.

Extension: If you did not get sufficient information from the student or the instructor.

Evaluation: To assess the pupils' ability to appraise and evaluate the material.

Emotional: It may take the form of an inquiry such as, "How do you feel about this topic?"

Clarification: questions and responses might be ambiguous. Therefore, perceptive inquiries may be utilized to clarify.

Purpose: Occasionally, the intent behind what individuals say is unclear. Inquisitive inquiries such as "Why did you mention this fact?" might disclose more about the discussion's objective.

Relevance: Usually, the audience is bewildered by what the speakers are saying and questions their relevance to the matter at hand.

Completeness and Accuracy: Such inquiries might be posed to elicit more information and more precision about the subject.

G. The Purpose of Asking Probing Questions

Probing questions are a modern teaching method that promotes positive student interaction and a two-way educational process. To assess students' comprehension, probing questions seek additional information. These questions allow the teacher to gauge his pupils' opinions of his lessons. This strategy enables students to communicate in class and connect their prior knowledge to the current material. Probing questions improve critical thinking and enhance information acquisition by helping students build cognitive experiences. The instructor must ensure that probing questions enable as many pupils as possible to engage in in-depth conversation (Cazden, 2001; Evans, 2012; 2014; Light et al., 2014).

H. Probing Questions Techniques

When conducting probing inquiries, there are seven approaches that should be considered:

Instructors must prepare a discussion subject and determine the conversation's context.

Making predictions about how the pupils will respond.

Preparing a model explanation is part of the process of critical thinking.

Teachers must recognize potential misunderstandings and misconceptions about communication.

Keeping an eye on students as they debate their ideas and assessing them suitably

Selecting students to express their thoughts and splitting them into groups or pairs to foster greater relationships.

Formulate follow-up questions to encourage more answers and thought (Cotton, 2001; Walsh and Sattes, 2005).

The reasons why probing questions are essential:

They make thinking visible and hence open the road for critical thinking;

They aid pupils in acquiring new information.

Several researchers stressed the importance of probing questions in teaching, stating that they lead students gradually

to the correct answer and interpret and critique each answer to help them correct their mistakes and reach the correct generalization (e.g., Johnsen et al., 2020; Lyons, 2010). After a presentation, asking questions might reveal your students' understanding and thought process. Students may also utilize probing questions to verify they comprehend the content. As students collaborate in pairs or groups to answer each other's questions, such questions foster classroom collaboration (Cotton, 2001; Walsh and Sattes, 2005).

In conclusion, instructors should forsake their old methods of instruction and begin to adapt to the problems of the present day. New teaching strategies, such as questioning, may increase class management and student involvement.

I. Moving Beyond Simplistic Questioning

The coach's questions must encourage reasoning and socialization to improve learning (Cazden, 2001). Coaches' impersonal, surface-level inquiries do not foster metacognition (Cazden, 2001; Kracl, 2012). 93% of Daines' (1986) testing of 38 primary and high school social studies professors were realistic and 7% interpretive (open-ended). Clinical nursing educators addressed low-level inquiries, according to Sellappah et al. (1998). Singaporean PE teachers, reported by McNeill et al. (2008), had similar findings discovered that 76% of elementary and secondary school pre-service teachers' questions were low-order, demanding information or recollection, while 6.7% were open-ended or divergent, fostering tactical awareness and critical reasoning. Behavioristic methods of teaching have encouraged the coaches to provide plenty of instructions, comments, and examples (Williams and Hodges, 2005) to increase learning (Dodge and Hastie, 1993). In sports coaching, the learners' problem-solving and decision-making abilities may be limited by instructing them what to do (Ford et al., 2010), and prompting coaches to ask more questions. Systematic observation studies show that 2–7% of coaching activities include inquiry (Cushion et al., 2012). At the same time, studies based on systematic observation demonstrate that trainers ask more closed (convergent) technical questions than open ones (divergent) (Harvey et al., 2013).

II. METHODOLOGY

The theoretical and empirical background to the research variables were reviewed in chapter two. Chapter three depicts the methodology used in the study and elaborates on the research design, participants, data collection, instruments, procedure, and data analysis.

A. Design

In line with the research purpose, which was investigating The Effect of Probe Thinking Strategy (Application of Principles) on the Acquisition of some Basic Offensive Skills in Handball, the current study adopted the experimental and quantitative research design. Two variables were proposed in the current study, i.e., probing questions as the independent variable and the learners' basic offensive skills.

B. Participants

In accordance with the main purposes of the current study, the data was collected from 2nd year students at Physical Education and Sports Sciences Department at Cihan University-Erbil, Iraq. Taking the main argument of the research into account, the target population were 20 male and female students studying in the second grade. Their age range was 19–25. The intact classes were chosen based on the university grading procedures and their year of being accepted to the university. They were assigned to two different groups of control and experimental based on random sampling. Therefore, there were 10 members for the control group and 10 for the experimental group.

The students of the control group studied the course in the same way they were studying, and at the same time, the experimental group students were presented with a probing question strategy. This way, the possible difference between their performance in handball offensive skills could be taken into consideration.

C. Procedures

For the purpose of answering the research questions of the current study, several probing questions were used to elicit the learners' understanding of the course. Some examples based on Rosenshine's (2010, 2012) six question templates, to get the students to think more deeply about their learning as well as gauge their level of understanding, are as follows:

- What is the main idea of overhand pass skill?
- What are the strengths and weaknesses of dribbling?
- How does this tie in with what we have learned before?
- Which one is the best shooting type and why?
- Do you agree or disagree with this statement: Dribbling must be used to a less extent so that the possession can be held?
- What do you still not understand about jump shot technique?

On the other hand, to assess the learners' progress, there were two sets of questions one of which was used as the pre-test and the other was used as the post-test at the end of the treatment procedures. The tests are as follows:

Pass test (Alshamary, 2006, cited in Karim and Joudeh, 2022, p.5):

- Test Name: pass and quick pass in 30 s.
- Test Objectives: Measure the student's repetition speed of passing the ball.
- Performance Method: The students stand four meters away from the wall having the ball in his/her hand and with the signal he/she starts passing to the wall and receiving the ball again, and he/she continues this for 30 s.
- Equipment: Handball court, six legal balls, stopwatch, recording form.
- Recording: Recording the number of passes which the students made with the wall in 30 s, and all students have one attempt only.

Dribbling Test (cited in Karim and Joudeh, 2022, p.5):

- Test Name: 30 m of straight-line dribbling
- Test Objectives: Measure the speed of dribbling

- Performance Method: The students stand after the start-line with the ball, when they hear the sign, they start dribbling with maximum speed till the end-line.
- Equipment: Handball court, six legal balls, stopwatch, recording form, start and end lines.
- Recording: recording the time which the students take to finish 30 m, from the start point to the end point.

Shot Test (cited in Karim and Joudeh, 2022, p.5):

- Test Name: Accuracy of shooting skill from a high jump
- Test Objectives: Measure the accuracy of shooting skill from high jump
- Performance Method: The students perform the high jump shot from 10 meters away from the goal-line area. They must take three steps with high jump shooting, and they have to shoot to the squares inside the goal posts; moreover, they must shoot to both sides alternatively
- Equipment: Handball court, six legal balls, stopwatch, recording form
- Recording: Each student has six attempts, one point will be counted for each successful attempt, and zero for failed attempts, and the maximum point is six points.

The implementation of the experiment took 5 weeks, with two educational units per week for each group, and the time of the educational unit was 90 min that is, the students had 10 sessions for the whole implementation procedure of the probe thinking strategy. At the end of the treatment sessions, the researcher meticulously analyzed the students' scores through independent samples t-test to ensure the significance level of the collected data.

III. RESULTS

The collected data were checked through the Kolmogorov–Smirnov Test of Normality and the independent samples t-test. The results of the analyses regarding the pretest scores indicated that there was no statistically significant difference between the control group and the experimental group participants. Therefore, the researcher of the present study made sure that at the beginning of the study, the students were at the same level of understanding based on offensive skills in Handball. Therefore, to investigate whether there was a significant difference between the participants' scores regarding the three aforementioned tests within the post-test scores, the researcher ran three independent samples t-tests, the results of which have been provided in the following tables.

Table I took into consideration the post-test scores regarding the Pass-test. As it is clear from the table, the significance level is <0.05 , and therefore it can be concluded with 95% confidence level that the participants of the experimental group had a better performance in the Pass-test.

Table II manifests the illustration the effect of probing questions on the participants' Dribbling-test in the post-test. As it is shown in the table, the significance level is 0.005,

which is <0.05 , and thus it can be concluded with 95% confidence level that the implementation of probing questions had a positive impact on the students' Dribbling skills.

The last independent samples t-test was related to the difference between the scores collected from the experimental and the control group members regarding their Shot-test. Table III shows that the significance level is 0.009, which is <0.05 , and therefore, the researcher can be sure that the difference between the two aforementioned groups is statistically significant in favor of the experimental group.

IV. DISCUSSION

The present study was an attempt to take into account the possibility of making use of the probing questions strategy and finding a statistically significant effect of the strategy on the participants' pass-test, dribbling test, and shot test. The results manifested that the students took a lot of advantage from the probing questions strategy and by means of these questions, the teachers can make the learners aware of the whole procedure so that they can implement the theory into practice. However, there are some controversial issues regarding these kinds of questions. For example, Cazden (2001) argues that asking questions on its own cannot make a huge difference in the learners' performance. On the other hand, some researchers questioned the way the questions are asked. That is, they found that the questions are not open-ended and the students' thinking is not activated during the process of probing questions (e.g., Daines, 1986; McNeill et al., 2008; Harvey et al., 2013; Sellappah et al., 1998).

Moreover, there are other studies regarding sports sciences the results of which are not in line with the results of the

present study. The researchers came to the conclusion that asking many questions hinders the process of creativity, and the decision-making procedure will be delayed for the students to be implemented at the exact time (e.g., Cushion et al., 2012; Ford et al., 2010).

V. CONCLUSION

As mentioned in the previous sections, the present study investigated the effect of probing questions strategy on the students' pass test, dribbling test, and shot test. The results manifested that the strategy does have a statistically significant effect on the three above-mentioned skills. At the same time, in this study, the researcher compensated for the defects found in the probing questions and tried to make use of both convergent and divergent questions so that the participants' minds could be fully activated. The results of the present study shed light on the efficacy of implementing the probing strategy in sports sciences classes. These results can be useful for both teachers and coaches regarding the teaching procedures and techniques so that they can get better results. It is worth mentioning that the present study suffered from some limitations and delimitations as well. It is suggested that further research can be conducted with a greater number of students and within a longer period. At the same time, the participants' gender can also be taken into account.

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TABLE I

INDEPENDENT SAMPLES T-TEST FOR THE POST-TEST SCORES OF THE PASS TEST

Independent samples test				
PASS post-test	df	Sig. (2-tailed)	Mean difference	Std error difference
	18	.04	-1.50	1.74
	17.72	.04	-1.50	1.74

SE: Standard error

TABLE II

INDEPENDENT SAMPLES T-TEST FOR THE POST-TEST SCORES OF THE DRIBBLE TEST

Independent Samples Test				
Dribbling post-test	df	Significant (two-tailed)	Mean difference	Std error difference
	18	.005	15.80	4.90
	14.06	.006	15.80	4.90

SE: Standard error

TABLE III

INDEPENDENT SAMPLES T-TEST FOR THE POST-TEST SCORES OF THE SHOT TEST

Independent samples test				
Shot post-test	df	Significant (two-tailed)	Mean difference	Std error difference
	18	.009	-1.70	0.57
	17.83	.009	-1.70	0.57

SE: Standard error

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