

## **THE EFFECT OF AUGMENTED FEEDBACK ON THE ACQUISITION OF THE TENNIS SERVE IN VOLLEYBALL**

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### **ABSTRACT**

*The importance of augmented feedback a critical teaching function in skill acquisition has become an issue most Physical Education teachers especially need to understand. Providing augmented feedback to learners is a common instructional tool in teaching and coaching. However, it is unknown the best type and best ways of providing augmented feedback for optimum results. The purpose of this study was to investigate the effect of teacher augmented feedback (knowledge of performance and knowledge of results) in the acquisition of the tennis serve in volleyball. A one-group pre-test and post-test research design was used with a sample size of thirty (30) participants, comprising twelve (12) girls and eighteen boys of the first year accounting class of Bolgatanga Technical Institute. The researcher used purposive and random sampling technique respectively to select participants for the study. To gather data, a questionnaire was used to collect information on the role of augmented feedback to participants' and a design volleyball tennis serve assessment tool was also used to test participants' before and after the intervention on the tennis serve. The data collected were analyzed using Statistical Package for the Social Sciences window 16.0 to generate dependent t-test, mean and standard deviation for the results obtained with an alpha level of 0.05. The generated results indicated that there was significant difference between the pre-test and post-test results.*

**Keywords:** Volleyball, tennis serve, augmented feedback, knowledge of performance, knowledge of results.

### **1. INTRODUCTION**

Typically, children who are learning to read are taught first to recognize letters, then parts of words, and then complete words, and finally sentences. In physical education, however, all too often children are taught games, dances, or complex gymnastic stunts before they're able to adequately perform fundamental motor skills. Too often, children know the rules for a game or the formation of a dance but don't have the motor skills needed for successful and enjoyable participation. Our way of teaching children how to participate effectively in various activities is to focus on the development of the necessary motor skills. Our primary goal as teachers is to provide children with a degree of competence leading to the confidence that encourages them to become, and remain, physically active for a lifetime. By focusing on learning and practicing skills rather than on the rules or structure of a game or sport, we can dramatically increase the amount of practice the children actually receive, thereby heightening their opportunities to learn the fundamental motor skills that form the foundation for becoming a lifetime mover. Motor learning has been a subject of debate in most research for a decade and yet no deep understanding of the mechanisms and methods that could facilitate its acquisition. Motor learning is defined as a permanent change in behaviour in a specific task, resulting from practice (Schmidt, 1988). This

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definition emphasizes the importance of retention tests for assessing learning, a change in behaviour should be proven to present certain stability over time, for being considered a valid indication of learning.

Motor learning denotes changes of inner processes which define the capabilities of an individual to perform a specific motor skill task (Schmidt, & Wrisberg, 2000). According to Eliote and Madalena (1974) motor learning or the formation of a motor skill is the capability of reaching defined goals with efficiency above the one possessed by an inexperienced person. When learning a new motor skill, early developments are primarily through cognitive processes. Strategies directed at enhancing the cognitive process at this stage will facilitate skill development. Skill acquisition can be measured by motor performance. For the skill to then pass to a more automatic level of performance, performed and adapted under various conditions and contexts indicative of motor learning, physical practice is essential. Aside from physical practice a number of other factors are also known to influence motor learning and have been extensively researched.

One point that is agreed in most studies of motor skill acquisition is the fact that feedback is very vital to levels of performance. It is mentioned that no other independent variable can affect the way humans repeat or change their response as feedback. Physical educators commonly demonstrate and give verbal instructions as a way of teaching motor skills. The instructional cues given during the beginning of the acquisition stage strongly impacts both performance and learning (Zentgraf, & Munzert, 2009). Educators believe that for an individual to acquire and execute complex motor skills, a performer must know what they are doing, a knowledge base must be acquired about the skill during the initial stage of learning.

Movement skills are developed and refined to a point that children are capable of operating with considerable ease and efficiency within their environment. As children mature, the fundamental movement skills developed when they were younger is applied as specialized skills to a wide variety of games, sports and activities. Effective physical education teachers use various teaching variables where necessary to improve on teaching instruction for students. Accordingly, we have witnessed skilful and extraordinary performances of distinguished athletes in sport fields; a display of power and delicacy, creativity and art that will undoubtedly raise many questions in our minds. How such a degree of progress can be achieved in performing the skills? How are these skills developed? How can one approach such a level of skilfulness?

The knowledge obtained in this regard reveals that an effective factor for skilful performance is to provide the required information to improve the function. One of such important information to improve performance which has received a great deal of attention over the years is teacher feedback. The provision of feedback helps to promote efficient learning, ensures correct development of the skill and the way it influence learners' motivation to persist with practice. In a way, feedback can be almost drugged-like in that your athletes can become dependent upon it which makes it addictive. The problem comes when the feedback that has been so heavily relied upon becomes unavailable.

Research has also shown that when athletes seek and can control the content and delivery of feedback, performance improves. However, in the real world, this result is affected strongly by the experience, maturity, and skill level of the athlete as well as by the complexity of the skill being performed. What we can tell is that novice performers will likely need and will take better advantage of feedback when delivered (appropriately) by the coach. More experienced performers should be encouraged to think about and understand their own performances and the information that can be derived from them so that they eventually need less and less coach-controlled feedback (information). A variety of feedback characteristics have been examined, such as the relative frequency of feedback, the timing of feedback, and the content of the feedback (Magill, 1993). This is to say that, when these characteristics are well adhered to, the acquisition of motor skill will be achieved within a shorter time frame.

The performance of a skill is influenced and determined by the information provided as feedback from both internal and external source. One of such information is the augmented feedback, that is, movement-related information about the task, which supplements a performer's intrinsic feedback. There is little disagreement that augmented feedback (knowledge of results, knowledge of performance) is one of the most important variables for motor learning.

When one performs a task, there are two general types of performance-related information, or feedback, available. One type of feedback is called task-intrinsic (or inherent) feedback, which is the sensory-perceptual information, which is a natural part of performing and accessed by the performers themselves. This information is generally used by the individual to adjust performance of the task based on experience with the task and self-observation of performing the task. The second type of feedback is called augmented feedback. Although various terms have been used to identify it, the term that will be used in this review is augmented feedback.

Augmented feedback refers to information that a learner does not normally receive directly from the senses, that is provision of information from an external source which saves the learner's time and energy in learning a motor skill. In this way, the information is "fed back" to the learner (Magill, 1993). Some evidence exists to support the postulate that augmented feedback plays a crucial role in the acquisition of a motor skill, suggesting that providing augmented feedback during skill acquisition improves performance, whereas its removal during a subsequent test or retention condition may result in performance deterioration. This has come to be known as the "guidance hypothesis of information augmented feedback", (Salmoni, Ross, Dill, & Zoeller, 1983; Schmidt, Young, Swinnen, & Shapiro, 1989; Winstein, & Schmidt 1990; Swinnen 1996).

In this study, the researcher focuses on augmented feedback and motor skill acquisition based on two types of augmented feedback, knowledge of performance (KP) and knowledge of results (KR). Knowledge of results is feedback given by an external source which describes the outcome of the action in relation to its desired goal set out to accomplished and deals with the entire task. Knowledge of performance deals with information directly related to the action that led to the outcome concerned. This information may come from many sources, and in order for feedback to be utilized effectively, it is important to understand what those sources are and what kinds of information they may provide.

## **2. METHODS AND MATERIALS**

### **2.1 Participants**

To find out the effect of augmented feedback on the acquisition of the tennis serve in volleyball. The population of the study were 520 first year students of Bolgatanga Technical School with a random sampling technique 30 students (12 girls and 18 boys) of the accounting class were selected as the sample of the study.

### **2.2 Tools used in the Study**

A volleyball tennis serve assessment tool which was an adaptation of Huesser (2007) was used to assess students' correct form for the skills that they learned in class for the tennis serve in volleyball, and a questionnaire were specifically used to gather information based on the research questions. This instrument was used in this study to enable the researcher identify the role of augmented feedback to students during skill acquisition, which contained three (3) closed-ended items.

The designed volleyball tennis serve assessment instrument was used to analyse the various components that are involved in the execution of the correct tennis serve in volleyball, that is, the body position before serve, toss of the ball, contact of the ball, weight transfer and finally, the success of the serve over the net. Each component (5) in the instrument carried a maximum of four (4) points for excellent execution and one (1) point for poor performance.

### 2.3 Procedure

In this experiment, the group was pre-tested and exposed to the treatment and then post-tested. The two tests were administered to the same group. The first test was administered at the beginning, before the treatment and the second one at the end of the treatment.

The pre-test was used to measure the degree of the dependent variable before the treatment, the treatment was then being employed to influence the dependent variables and finally, the dependent variable was then tested again after the treatment to measure the degree of change before and after the treatment.

Before pre-test, participants went through warmup after which five (5) trials was given to each. A video camera was positioned at an angle, preferably at the side of the server to record all participants during the execution of the serve. A ten (10) days interventional procedure with the aid of the tennis serve verbal cues and demonstrations was used and then a post-test was conducted to collect data on their performance after the introduction of the intervention to participants.

### 2.4 Data Analysis

Pre- and post-test data which was collected through the designed volleyball tennis serve assessment tool and the questionnaire was feed in the SPSS for statistical analysis. The descriptive and independent sample *t*-test was used via using software. Further, the significance (alpha) level was set at .05 for the analysis.

## 3. RESULTS

Questionnaire was administered to thirty (30) participants in the class. All participants completed the questionnaire and submitted them, making a response rate of 100%. Item one (1) sought participants' interest in volleyball, item two (2) sought the role of augmented feedback to participants and item three (3) was based on whether they had ever played volleyball at any level. A summary of the participants' response is shown in Table 1 below.

**Table 1: Role of augmented feedback**

Variable	Category	Frequency	Percentage
Interest in Volleyball	Yes	21	70
	No	9	30
	Total	30	100
Played Volleyball	Yes	24	80
	No	6	20
	Total	30	100
Role of Augmented Feedback	Motivation	6	20
	Reinforcement	15	50
	Information	9	30
	None	0	0
	Total	30	100

Above Table 1 shows statistical computation for the variable, role of augmented feedback. The results show that twenty-one (21) representing 70% were interested in volleyball, while the remaining nine (9) representing 30% were not interested in volleyball. This goes to suggest that majority of students in Senior High School are interested in volleyball. With regards to those who have ever played volleyball, twenty-four (24) representing 80% and six (6) representing 20% responded "Yes" and "No" respectively, indicating that most students play volleyball within or outside the school context. The Above table also revealed that participants knew of the role of augmented feedback in skill acquisition. Thus, six (6) representing 20%, fifteen (15) representing 50% and nine (9) representing 30% making a total of 100% of participants chose motivation, reinforcement and information respectively as key elements of augmented feedback in skill acquisition. Therefore, it can be concluded that the acquisition of skills by students is highly influenced by augmented feedback.

**Table 2: Paired samples statistics**

	Mean	N	Std. Deviation	Std. Error Mean
Pre-test	9.93	30	2.22	0.40
Post-test	15.60	30	1.49	0.27

Table 2, shows a paired sample statistic of the pre-test and post-test results. A pre-test means of 9.93 and a standard deviation of 2.22 were recorded. The pre-test was conducted to find out participants' level of executing the tennis serve in volleyball. After the intervention, a post-test was conducted with a mean of 15.60 and a standard deviation of 1.49. This post-test was done to find out whether augmented feedback helps in the acquisition of tennis serve in volleyball.

A mean difference of 5.66 (15.60-9.93) was realized. The margin in the mean difference showed that there were substantial improvements in the tennis serve of participants after the intervention. But the mean difference did not indicate the effect of augmented feedback in the acquisition of the tennis serve in volleyball. Therefore, a *t*-test was performed to test the hypothesis that when compared to not giving augmented feedback, there will be significant improvement in skill acquisition by learners at 0.05 significance levels.

**Table 3: Paired sample correlation**

Test Type	N	Correlation	Sig.
Pre-test & Post-test	30	0.012	0.948

Table 3, above shows the correlation between pre-test and the post-test scores with a correlation coefficient  $r = 0.012$  and  $\text{sig.} = 0.948$ . It can be seen from the output that there is a very low positive correlation between pre and post test scores due to the fact that the  $r$  value is positive and closer to zero suggesting a low correlation. However, that does not tell whether there is a significant difference between pre-test and post- test scores.

**Table 4: Paired sample test**

Test Type	<i>t</i>	<i>df</i>	Sig. (2-tailed)
Pre-test & Post-test	-11.62	29	0.000

A *t*-test for dependent samples revealed that there was a significant effect of augmented feedback in the acquisition of the tennis serve in volleyball on test scores of ( $t = -11.627$ ,  $df = 29$  and  $\alpha = 0.000$ ). The alpha of 0.000 is far less than 0.05 which indicates that there was a significant change.

These results do not accept the null hypothesis that when compared to not giving augmented feedback, there will be significant improvement in skill acquisition by learners. Participants performed far better after ( $M = 15.6$ ,  $SD = 1.4$ ) compared to before the intervention ( $M = 9.9$ ,  $SD = 2.2$ ). This difference was statistically significant indicating that augmented feedback plays a significant role in skill acquisition

#### **4. DISCUSSION**

A critical look at the research findings indicated that volleyball is one of the popular disciplines in Senior High Schools in the Upper East Region and augmented feedback is vital to the success of its skill acquisition and the skills of other sports. Augmented feedback acts as a regulator and magnet to skill learning and participation because of the satisfaction teachers, coaches and students derive from its usage and service. Teachers as instructors and communicators play many important roles in helping students to learn. They provide content, time, appropriate feedback and monitoring to students in the acquisition of skills. A role supported by Magill (1993), where he stated that relative frequency, timing and content of feedback when well adhered to would result to the acquisition of skills in a shorter time frame.

Augmented feedback as demonstrated in this study has shown to be one of the most significant activities teachers can engage in to improve student performance. It provides students with task related information, makes task more interesting, increase effort and helps them develop an understanding of cause and effect of skill acquisition. A function supported by Schmidt and Lee (1999), where they stated that augmented feedback provide learner with task related information which help learners achieve their goals quickly.

For students to persist with practice to develop correct skills teachers must however not exclude the possibility that the process underlying the learning effect meant differ based on other variables such as experience of learner, maturity, nature of skill to be learnt, time, environment and equipment. These variables may need more or less augmented feedback to accomplish a similar result. To achieve maximum results, knowledge of performance and knowledge of results are said to be crucial variables for determining skill learning. Disregarding these key variables would decrease the understanding of the skill considerably. It is based on this that Newell and Carlton (1987), concluded in their research that the basis for determining the most appropriate augmented feedback for motor skill acquisition is specified by an analysis of the task goal in that, the feedback must match the imposed task constraints. Thus, if the task goal is the production of simple discrete skill, then knowledge of results is sufficient to optimize performance, on the other hand if it is a complex skill is more potent to use knowledge of performance. Stressing on these important variables, Belodeau (1969) also stated when a learner cannot detect their performance error through intrinsic feedback, very little learning occurs unless knowledge of result is evident. Similarly, the acquisition of motor skills can greatly be influenced by the provision of knowledge of performance to participants (Rey, 1971; Schmidt, & Young, 1991).

Though augmented feedback can have powerful and positive effects on athletes, it can become “drug-like”, in that the athlete can become addicted and where it is not made available, can lead to reduced performance. A statement supported by the guidance hypothesis of augmented feedback which states that availability of augmented feedback during skill acquisition guides the learner towards proper performance but its subsequent removal may lead to performance decrement (Winstein, & Schmidt, 1990).

From the above, it is evident to conclude that the acquisition of skills by students in any sports program is highly influenced by the provision of augmented feedback especially knowledge of results and knowledge of performance. Therefore, augmented feedback benefits the learning of the tennis serve in volleyball. It enables the participant to change the attempts on subsequent trials,



thus guiding the participant to a higher level of performance. In other words, the augmented feedback offers the participant a strategy to learn the increasing sequence of the stands, ball toss, the high hit and the follow through sequence in the execution of the tennis serve in volleyball.

## 5. CONCLUSION

The findings of the study based on data collected and analyzed were summarized as follows:

- With regards to participants' interest in volleyball, majority of participants (70%) in Senior High Schools in the Bolgatanga Municipal in the Upper East Region are interested in volleyball, while (30%) are not interested.
- All participants (100%) know about feedback and its importance in the acquisition of the tennis serve in volleyball
- A mean difference of 5.7 between the pre-test and post-test indicated that there was a substantial improvement of performance in the tennis serve after the intervention.
- There was no correlation between the pre-test and post-test results.
- Finally, an alpha of .000 from the paired sample test indicated that augmented feedback is significant in the acquisition of the tennis serve in volleyball. This therefore disapproved the hypothesis that "when compared to not giving augmented feedback there will be significant improvement in skill acquisition by learners".

Further, it is recommended that teachers and coaches should direct augmented feedback more to novice volleyball players than to intermediate and expert players to achieve maximum participation and results. They should be encouraged to use videotaped feedback to display knowledge of performance of the body kinematics and measure task rather than the outcome.

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