



THE INFLUENCE OF FEEDBACK ON PERFORMANCE OF SERVING AND RECEPTION SKILLS IN VOLLEYBALL

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ABSTRACT

The purpose of this study was to determine the effect of different types of feedback on serving and reception skills. The researchers used an experimental design and data were gathered using valid and reliable tests that were developed internationally. The study sample consisted of 60 male students that were divided into three groups. The first group was comprised of 20 students utilizing knowledge of results type of feedback, the second group was comprised of 20 students utilizing knowledge of performance type of feedback, and the third group was comprised of 20 students utilizing both types of feedback combined. The results indicated that there were statistically significant differences in the serving and reception skills between the experimental groups. The experimental group that utilized both types of feedback showed significantly better performance than either of the other two groups.

Keywords: Assessment, Feedback, Knowledge of Result, Knowledge of Performance, volleyball.



INTRODUCTION

In the past few decades, physical education instructors and sport coaches have been heavily influenced by the opinion that feedback provided to learners is necessary for learning and for the acquisition of motor skills (Bilodeau, 1966; Newell, 1974; Schmidt, 1991). Feedback is considered an essential factor that may influence motor learning because it helps the learner in evaluating his/her performance and in identifying his/her development in achieving the ultimate goal. As indicated by Mustafa (1999), feedback has two types: formative feedback and reinforcement feedback. Informative feedback gives the learner the needed formation to focus his/her efforts toward some intended goals, while reinforcement feedback strengthens motor responses to let the learner develop his/her performance. Therefore, feedback must be given for each learner's performance (Mahjoub, 2002).

The amount of feedback must suit the learner's abilities (e.g., age and level of learning). For example, learners may not understand large amount of information, so it is better to give them small amount of feedback and it should be as a continuous process. Thus, the bigger the amount of feedback the lesser its effect (Schmidt & Wrisberg, 2000). The importance of feedback lies in correcting wrong responses and promoting correct responses by increasing repetition and by making the learning process more exciting (Aweis, 2001). Lack of feedback may leave no room for modifications to be made (error-correction) while the action (performance) is in progress and that any error cannot be detected and modified until the performance is completed.



Feedback is characterized as sensory information that provides the performer with information about the actual state of his performance. The sources of this information is either intrinsic or extrinsic as follows:

Intrinsic feedback is defined as sensory information that arises as natural outcome of performing a motor task. Thus, intrinsic feedback is sometimes called inherent feedback. However, intrinsic feedback may come from sources outside the body (exteroceptors) or/and from within the body (interoceptors). Examples of exteroceptors include vision, audition, and olfaction while interoceptors include things related to skin, tendon, and muscles.

Extrinsic feedback is called sometimes enhanced feedback or augmented feedback and refers to information provided to a learner from a source outside the exterior – interoceptors. The main categories of extrinsic feedback include:

- a) Knowledge of results: which refers to extrinsic sources of information usually verbal that tells learners something about the success of their actions with respect to the intended goal. In this situation, feedback may be redundant where the performer is told something he/she already knows about his/her action with regard to success or failure. On the other hand, non-redundant feedback is one in which the performer does not know the quality of his/her performance until certain evaluation criteria are given to their performance (e.g., the decision of a panel of judges or distance measurement electronic device reveals their evaluation in points or distance). In such circumstances, intrinsic proprioceptors are of little value to indicate success or failure in performance.



- b) Knowledge of performance: also referred to as augmented feedback which provides the performer with information regarding the pattern of their movements. For example, a coach may tell his/her athletes that his/her angle of takeoff in the execution of the long jump was too much vertical on the expense of the horizontal component of the take off.

It is noticed that, knowledge of results is associated with external sources of information that the performer can use in this next attempt at a novel task. It is the belief of researchers that knowledge of result takes precedence over knowledge of performance. Research on the topic of knowledge of results and feedback contribution to motor learning and performance is too vast. Early research was often conducted using very simple tasks that prevented subjects from detecting their errors by themselves. As was expected the results of these experiments generally showed that without knowledge of result, there was minimal learning (Schmidt & Wrisberg, 2000).

Adams, Goetz, & Marshel (1992) investigated the effect of response-produced feedback on motor performance. Subjects of their study were asked to perform a self-based positioning task under minimal feedback conditions. Visual, auditory, and proprioceptive feedback were examined in various contexts. The conclusions of the study were that the acquisition of skills was directly related to the amount of feedback provided. Augmented feedback led to more effective performance than minimal feedback and response-produced feedback had a great impact on both learning and performance. Hattie (1999) found that not all forms of feedback are effective as extrinsic rewards and punishment. He concluded that if more feedback is directed at the task and not of the person then, feedback is more powerful.



Lee, White, and Canahan (1990) found that the frequency of presentation of augmented feedback can create detrimental results. Subjects who received augmented feedback on every trial performed less than subjects who received augmented feedback with a systematic reduction of frequency. The researchers justified the results in that subjects who received augmented feedback on every trial developed an expectation that with every trial. That they will receive an augmented feedback. Therefore, they attended less frequently and persistently to internal feedback and standards of performance from within. Magill (1994) indicated that when subjects receive knowledge of performance as a form of augmented feedback, performance was enhanced.

Special technical practice is required for volleyball skills during their learning, especially serving and reception skills which need "muscle-nerve consistency", so informing the learner with different feedback information promotes performance, thus modern techniques and methods of teaching must be used, especially feedback which saves time, money, and effort in preparing the needed equipments. The connection between performing both serving and reception skills, and the learners conscious of time, makes the learner in continuous need for feedback to connect wrong motor responses to reach the best response (Al dlaimi, 2005).

Feedback in volleyball is one of the factors which help athletes acquire the needed information for skill which goes through different phases. These phases include verbal explanation, practical example, using pictures, films and discussions between teacher and learners, which all help in constructing a visual picture that leads to quicker skill acquisition and develops performance (Hikmat, 2005). Anderson (1992) added that feedback plays a vital role in the



learning process because it helps to develop learner's motor abilities and develop a well-organized picture of the skill to increase its performance.

Husean (2002) studied the effect of augmented feedback (knowledge of results and knowledge of performance) in the learning of a stand-on-hand. The study concluded that feedback had an important effect on motor learning of skills. The group which used both types of feedback (knowledge of results and knowledge of performance) significantly improved. In addition, Shalash (2007) studied the effect of feedback in the accuracy of kick-ball upon junior soccer players. The study showed that the group which used (knowledge of result and knowledge of performance) was better than other groups. Nong (2000) studied the effect of (knowledge of result and knowledge of performance) feedback on the acquisition and retention of intrinsic-rich and intrinsic-poor motor skill. The results showed that prescriptive knowledge of performance feedback was effective for developing movement patterns of both intrinsically-rich and intrinsically-poor motor skills, while knowledge of result was more beneficial for learning the intrinsically-poor skill.

This study's importance lies in its concern with learning the basic volleyball skills, specifically serving and reception skills using different types of feedback to improve learners' performance. Thus, the researchers conducted this study in an effort to identify the effect of using feedback on learning serving and reception skills.



STATEMENT OF THE PROBLEM

Feedback information about the quality of performance is generally believed to be one of the most important factors that guide the process of learning motor skills (Biloduea, Biloduea, & Schumsky, 1959; Salmoni, Schmidt, & Walter 1984). Feedback may come into play within the individual in the form of a sensory system or may be provided by some external sources such as the teacher, the coach, a videotape, and graphics. Volleyball game witnessed essential improvements, which has been reflected on performing the basic skills in volleyball especially serving and reception skills. This sport needs both quickness and agility, so players must respond directly, quickly and precisely in performing the skills. In the past few years, researchers have noticed that there is a weakness in using the aid factors in learning volleyball skills and in performing serving and reception skills (Biloduea, Biloduea, & Schumsky, 1959; Salmoni, Schmidt, & Walter 1984). This weakness was believed to be due to teaching methods used by teachers and coaches. However, modern techniques such as feedback information were not utilized. Thus, the purpose of this study was to investigate the effect of different types of feedback on serving and reception skills.

OBJECTIVE

The following objective was formulated to achieve the purpose of the study:

To determine the effect of various types of feedback (KR, KP, KR & KP) on serving and reception skills.



DEFINITION OF TERMS

Feedback

Is a sensory information that indicates something about the actual state of a persons movement.

Intrinsic Feedback

Sensory information that arises as a natural consequence of producing a movement. another name for intrinsic feedback is inherent feedback

Extrinsic Feedback

Sensory information provided by an outside source and in addition to that which individuals produce movement, another name for extrinsic feedback augmented feedback.

Knowledge of Results (KR)

Information that tells learners something about the success of their actions with respect to the intended environmental goal.

Knowledge of Performance (KP)

Feedback that provides performance with information about the pattern of their movements.

METHODOLOGY

Population and Sample

The sample for this study comprised all undergraduate students majoring in physical education who registered for volleyball courses for beginners in the Physical Education department from the Faculty of Physical Education at Yarmouk University offered by the Department of physical education during the second semester of the 2007/2008 academic year. The study sample consisted of (60)



male students. There were three volleyball courses for beginners with 60 students divided as follows: 20 students in the first group were exposed to knowledge of results type of feedback, 20 students in the second group were exposed to knowledge of performance type of feedback, and 20 students in the third group were exposed to both types of feedback. The students were mostly 20 and 22 years of age.

INSTRUMENTATION

Data for the study were gathered using the serving and reception skill tests (see Appendix 1). These tests were adopted from (Shok, 1996; Hikmat, 2005). The two skill tests are reported to have a strong reliability and validity. Based on their studies, a test-retest of the scale provided a strong reliability of an alpha of 0.82 for serving and 0.80 for reception. The standards for testing reliability for Cronbach's Alpha by Robinson, Shavor, and Wrightsman (1991) were used to judge the quality of the tests scale: .80-1.00 – exemplary reliability, .70-.79 – extensive reliability, .60-.69 – moderate reliability, and < .60 – minimal reliability. The validity of the serving test was 0.86 and 0.81 for the reception test.

DATA COLLECTION

In an effort to review the impact of different types of feedback (knowledge of results, knowledge of performance, and both types combined) on serving and reception skills of students, this study compared three sections of students enrolled in a second-semester volleyball course for beginner at Yarmouk University for the academic year 2007/2008. There were three sections of the same course with approximately equal number of students. One section was randomly assigned to the first experimental group utilizing knowledge of results type of feedback, the second section was also randomly



assigned to the second experimental group utilizing knowledge of performance type of feedback, and the last was assigned to the third experimental group utilizing both types of feedback (knowledge of results and knowledge of performance). The same instructor taught all the groups' courses.

The process of data collection was as follows: first, the tests of serving and reception skills were given by the instructor during the first week of February 2007/2008 as the pretest for all students in the three experimental groups before the implementation of the intervention. The instructor collected students' surveys and stored them in SPSS database. The survey length was approximately 20 minutes. After the intervention, feedback with the three types for the experimental groups was provided. The same tests were administered during the first week of May 2007/2008 for all groups. Usable data were collected from 60 students in the three experimental groups, 20 from each group. Finally, since all the experimental groups took the same pre-and posttest, and the experiment occupies the same time period for all subjects, and the same instructor teaches all classes, testing, instrumentation, maturation, mortality, history, selection, and sensitization are not internal validity threats.

DATA ANALYSIS

A quasi-experimental, pretest-posttest experimental group design using a sample of intact groups was used in this study (Campbell & Stanley, 1963). Quasi-experimental design is used when intact classrooms are used as the experimental and control groups. This design is most appropriate when the researcher is not able to randomly assign subjects to groups but able to randomly assign groups to the levels of the treatment. Researchers use them to compare groups "that are defined by a naturally occurring, non-manipulated variable that is usually a subject variable or



a time variable" (Gravetter & Wallace, 2000). Moreover, this design is used to control or reduce threats to internal validity (Fraenkel & Wallen, 2003).

The main purpose of this study was to determine the effect of each type of feedback (KR, KP, KR & KP) on serving and reception skills for students at Yarmouk University. The independent variable is the type of feedback which are (KR, KP, KR & KP), the dependent variable of the study is the posttest scores for each skills, and the pretest is the covariate. Analysis of covariance (ANCOVA) is most suitable to be used when dealing with intact groups or subjects. ANCOVA on the post-semester scores with pre-semester scores as a covariate was used to determine whether there are differences in serving and reception skills between the three experimental groups before and after the intervention. Data analysis was handled by using Statistical Package for Social Science (SPSS 11.5) and a significance level of .05 was adopted.

RESULTS

The data collected from all participants were coded and analyzed using software package SPSS version 11.5. Descriptive statistics for all variables were examined using SPSS frequencies. The minimum and maximum values for each variable were examined for the accuracy of data entry by inspecting out of range values. An examination of these values showed that no out of range values were detected. Missing subjects were not detected.

Results Pertaining the Research Objective

The objective for this study was to determine the effect of various types of feedback (KR, KP, KR & KP) on serving and reception skills. Analysis of covariance (ANCOVA) was



utilized to achieve this objective. In this case, the post total score for each skill was used as the dependant variable, the group (experimental) was used as the independent variable, and the resection pre total score for each skill was used as a covariate. The results indicated that there were statistically significant differences in serving and reception skill between the experimental groups in favor of the experimental group which utilized both feedback (KR + KP) for the two skills, serving and reception $F(1, 60) = 18.363, p = .000$ for serving skill. (Tables 1 and 2), $F(1, 60) = 41.230, p = .0001$ for reception skill (Tables 3 and 4). The pretest (covariate) was not found to be a significant predictor of the post-test score ($p = .301$) indicating the equivalence of the treatment groups on the pretest. The effect size and power of the test were also reported to provide more detail.

Table 1
Means and Standard Deviations for the Three Groups on
Serve Skill on the Posttest

Group	Mean	Std. Deviation	N
Knowledge of result	27.65	3.05	20
Knowledge of performance	29.50	3.41	20
Knowledge of result + knowledge of performance	34.05	4.50	20



Table-2
Summary of ANCOVA for the Three Groups on Serve Skill
with Pretest as Covariate

Source	SS	df	MS	F	Sig.	Effect Size	Observed Power
Corrected Model	575.518	3	191.839	16.763	0.000	0.473	.9990
Intercept	1097.934	1	1097.934	95.937	0.000	0.631	.9990
Covariate (Pre)	141.618	1	141.618	12.375	0.001	0.181 0.396	0.933 0.999
Group	420.307	2	210.154	18.363	0.000		
Error	640.882	56	11.444				
Total	56666.000	60					
Corrected Total	1216.400	59					

Note. R Squared = 0.473 (Adjusted R Squared = 0.445).

Table No. 3
Means and Standard Deviations for the Three Groups on
Reception Skill on the Posttest

Group	Mean	Std. Deviation	N
Knowledge of result	27.35	2.48	20
Knowledge of performance	30.15	1.98	20
Knowledge of result + knowledge of performance	34.80	3.19	20

**Table-4****Summary of ANCOVA for the Three Groups on Reception Skill with Pretest as Covariate**

Source	SS	df	MS	F	Sig.	Effect Size	Observed Power
Corrected Model	567.335	3	189.112	27.622	0.000	0.597	0.999
Intercept	999.052	1	999.052	145.924	0.000	0.723	0.999
Covariate (Pre)	0.902	1	0.902	0.132	0.718	0.002	0.065
Group	564.559	2	282.280	41.230	0.000	0.596	0.999
Error	383.398	56	6.846				
Total	57746.000	60					
Corrected Total	950.733	59					

Note. R Squared = 0.579 (Adjusted R Squared = 0.575)

Moreover, to determine the best group from the three type groups of feedback, Post Hoc analysis (LSD) indicated differences between the three experimental groups for the favor of the (KR + KP) group (see Table 5).



Table-5
Post Hoc Comparison Test among the Three Groups

Dependant variable	The groups and the mean of groups		Mean difference	Sig.
Serve skill	Both of KR+KP (34.05)	Knowledge of performance (29.50)	4.70*	0.000
	Both of KR+KP (34.05)	Knowledge of result (27.65)	6.22*	0.001
	Knowledge of performance (29.50)	Knowledge of result (27.65)	1.52	0.163
Receive skill	Both of KR+KP (34.80)	Knowledge of performance (30.15)	4.62*	0.000
	Both of KR+KP (34.80)	Knowledge of result (27.35)	7.45*	0.000
	Knowledge of performance (30.15)	Knowledge of result (27.35)	2.83*	0.000

As can be observed in Table-5, the group which was exposed to both types of feedback (knowledge of performance and knowledge of results) was better than the other two groups separately in learning serving and reception skills.

Discussion and Conclusions

The primary purpose of this study was to investigate the effect of types of feedback on serving and reception skills. Results showed significant differences between the pre and post tests in serving and reception skills among the three groups in favor of the group which utilized both types of feedback.

These results are consistent with the views of Schmidt and Wrisberg (2000) who indicated that knowledge of result is more important for performance and learning and because the available intrinsic feedback is insufficient, extrinsic feedback is also essential when person's intrinsic feedback



sources are diminished or distorted, as in the case of some patient who suffers from neurological impairment. The effect of knowledge of result on motor performance and learning has received considerable attention in the research literature. In most of these studies, the experimenter is the one who determines the type and frequency of intrinsic and extrinsic feedback available to participants. Using this general method, researchers have examined how feedback processes influence learning. Early research was often conducted using very simple tasks that prevented participants from detecting their errors by themselves, such as drawing a 3 in - line while blindfolded. Not surprisingly, the results of these experiments generally showed that, without knowledge of result, there was no improvement or learning. On the other hand, when the knowledge of result was provided following movement attempts, rapid improvement occurred over practice and persisted during retention tests when knowledge of result was withdrawn. These results suggested that, when individual do not have sufficient intrinsic feedback to detect their own performance errors, they are unable to learn unless knowledge of result is provided. (Bilodeau, Bilodeau & Schumsky, 1959; Trowbridge & Cason, 1932)

Furthermore, Schmidt and Wrisberg (2000) also emphasized the importance of knowledge of performance feedback which provides performance with information about the pattern of their movements. Knowledge of performance, sometimes referred to as kinematics feedback, is frequently used by instructor and therapists in real - world setting. Coaches might provide these kinds of knowledge of performance "that punch was little too slow", or "your backswing was too long", "your trunk was not tight enough". Each of these examples of knowledge of performance contains information about the kinematics (pattern or speed) of the



movement. Notice that knowledge of performance information, unlike that provided by knowledge of result, does not necessarily indicate anything about the level of goal achievement. Rather, knowledge of performance informs individuals about the quality of movement they are producing.

These results agreed with many studies as Adams, et.al, 1972; Kluger & Deluisi, 1996; Hattie, 1999; Lee, et.al, 1990; Kemodle & Carlton, 1992 which indicated that knowledge of results has an impact on developing motor learning and performance, and agreed with Magill (1994) which indicated that using feedback (knowledge of performance), students performed better than other groups of students with different types of feedback.

Moreover, student learning was more effective when using two types of feedback knowledge of performance and knowledge of results concurrently than using either one of them. This means that the two types of feedback concurrently is more effective than the use of either separately. These results agreed with that of Husean (2002), Shalash (2007), and Nong (2000). Feedback had an important effect in motor skill acquisition, but the use of both types of feedback (knowledge of result + knowledge of performance) is more effective.

Therefore, the following are suggested:

1. There is a need for contract studies using other types of feedback.
2. Determine similar studies for all essential skills in volleyball.
3. Determine similar studies using elite players as to determine the effects of feedback.
4. Orient instructors and coaches teaching volleyball skills in universities to use the results from this investigation.



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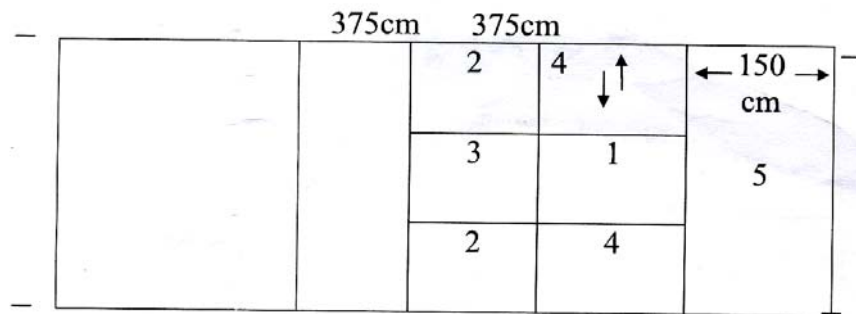
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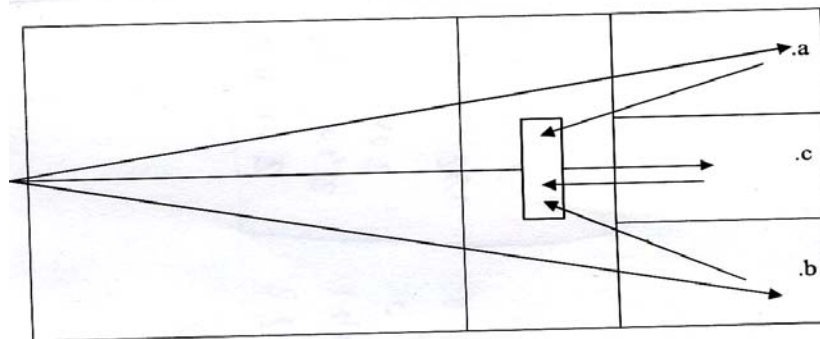
Appendix 1

The skill tests

Serving test figure



Reception test figure





Serving accuracy Test:

Purpose: Measuring the accuracy of serving test.

Tools: Legal volleyball court, ten volleyballs, measuring tap, cohesive tap.

Procedures: The player performed ten continuous serving trials, trying to direct the ball toward higher grade zone.

Instructions:

1. The grade of each trial recorded by the score zone grade.
2. Zero grade record for the ball outside the court.
3. The high zone grade record for the ball drop in the line.

Record: The score of each ten trials recorded for the players, and the final score was form 50.

Reception accuracy test:

Purpose: Measuring the accuracy of receiving skill.

Tools: Volleyball court, volleyballs, wood box.

Procedures: The box pointed at the zone of libero player site, then the player performed 5 trials from the three backward zone 1, 6, 5 and execution the reception skill after the coach serving from the other side of the court (see the figure).

Instruction: The trial didn't record whether the player standout from specific zone.

Record:

1. 4 score of each trial recorded while the ballfall on the box.
2. 3 score of each trial recorded while the ballfall on the border of the box.
3. 1 score of each trial recorded while the ballfall on the zone of 3 m.