Programmed Practice Sheet (PPS) and Technology-enhanced Drills: Inputs to Instructional Material Development in Badminton

Leomar B. de los Santos
Iloilo Science and Technology University, Iloilo City, Philippines
leomarsaints@gmail.com

Abstract. This study aimed at determining the effectiveness of a modified programmed practice sheet (PPS) and technology-enhanced drills as instructional methods in students’ basic badminton skills. Utilized as participants in the study were the 60 first year Bachelor of Science in Information Technology (BSIT) 1-A and 1-B P.E. 2 (Individual/Dual Sports) at Iloilo Science and Technology University, La Paz, Iloilo City, Philippines chose through matched-paired sampling. The badminton skill level data were obtained using the instrument on the Modified Badminton Performance Assessment Rubric [1]. This instrument consists of 6 basic badminton skills to determine the students’ skill level. The pre-treatment badminton skill level of the students in both modified programmed practice sheet (PPS) and technology-enhanced drills was the beginner; it shifted to excellent after the treatment. The students did not differ significantly in their pre-treatment badminton skill level when taken as an entire group and when grouped according to modified programmed practice sheet (PPS) and technology-enhanced drills. The students did not differ significantly in their post-treatment badminton skill level when taken as an entire group and grouped according to modified programmed practice sheet (PPS) and technology-enhanced drills.

1. Introduction

The rapid development of technology over the past two decades has provided many new and creative ways for educators to present instructional materials effectively. Technology has accounted for many changes in
education. These changes range from the method instruction is delivered to the attitudes on how learning occurs to the amount of collaboration and knowledge sharing among teachers. Teaching and learning with technology have had a significant positive effect on student outcomes when compared with traditional instruction [5]. Quality physical education is both developmentally and instructional relevant for all students. Students’ past motor skills, sport, cognitive, and social experiences are also considered in the lesson and program design and delivery. Appropriate instruction in physical education incorporates the best-known practices, derived from both research and teaching experiences, into a pattern of instruction that maximizes opportunities for learning and success for all students. The Programmed Practice Sheet (PPS) was developed by Dr. Keven Prusak to address the issues of skill practice and learning in physical education [4]. This program represents a different approach to assessing sports skills in physical education. It is less concerned with how far/how much a student can do and is more concerned with the learning process in which each student is engaged. The name, PPS, signifies its purpose-to serve as a "program of practice" for each student. The PPS contains an inventory of skills for students to practice, sometimes alone and sometimes with a partner. When using a PPS, the skill grade will come from completing the tasks listed. A teacher does not have to be a gifted athlete to get full points by completing the PPS. And the best part is that by completing the work as outlined, the skills will improve. After all, this is a program of practice, and practice leads to improve skills.

A programmed practice sheet allows each student to document the work he/she has done while in a badminton unit. When the entire PPS is completed, it is handed in. The skill grade will then be equated to how much of the work one has completed. By completing the work, a student becomes more skilled. As one becomes more skilled, his/her ability to perform increases also. All this is accomplished without the stress and anxiety of having to perform for the grade compared to the traditional skills test. Mayer’s Cognitive Theory of Multimedia Learning [3] claims the principle known as the “multimedia principle” and states that “people learn more deeply from words and pictures than from words alone.” However, simply adding words to pictures is not an effective way to achieve multimedia learning. The goal is to instructional media in the light of how the human mind works. This theory relates with the technology-enhanced drill in basic badminton skills as viewed by the students as their basis of executing the skills. According to Thorndike’s law of exercise, learning more frequently to stimulus and response associated with each other, the more likely the particular response will follow the stimulus. The law implies that one learns by doing; therefore, one cannot learn a skill just by watching others. It is necessary to practice the skill because by doing so the bond between stimulus and response is strengthened. In applying this to motor learning, the more often a given movement is repeated, the more firmly established it becomes. The performance of drills, specifically skill drills, attempts to utilize this law.

2. Methodology

2.1 The Participants

The participants utilized in the study were 60 students consisting of 30 Bachelor of Science in Information Technology 1-A (BSIF 1-A), and 30 Bachelor of Science in Information Technology 1-B (BSIF 1-B) college freshmen. These students were enrolled in P.E. 2 (Individual/Dual Sports) at the Iloilo Science and Technology University during the second semester of the school year 2015-2016. Match-paired sampling was employed in the selection of the subjects. Two separate groups were considered: 30 students (50%) were exposed to technology-enhanced drill (TED), and the other 30 students (50%) to the programmed practice sheet (PPS) method of teaching. The participants were grouped according to their respective section. The BSIF 1-A students were exposed to the technology-enhanced drill, while the BSIF 1-B students were under the modified programmed practice sheet (PPS) [6].

2.2 Instruments

To gather data on the participants’ pre-experiment and post-experiment basic badminton skill, the researcher utilized the Modified Badminton Performance Assessment Rubric [1]. The Modified Badminton
Performance Assessment Rubric instrument was pilot-tested in the second semester of the Academic year 2015-2016 to 40 BSCS 1-A students who were enrolled in P.E. 2 (Individual/Dual Sports) of the Iloilo Science and Technology University. **Modified Badminton Performance Assessment Rubric** [1]. This instrument consists of 6 basic badminton skills to determine the students’ skill level. The 6 basic badminton skills are: forehand serve, backhand serve, forehand drop shot, forehand overhead clear, smash, and drive. Each skill has corresponding number marks ---1,2,3,4, and 5 to determine the skill level of the students during the execution of the skills in the pre-test and post-test.

2.3 The Pilot Test

The pilot test is a method used to test the design and/or methods and/or instrument before to carrying out the research. It can be administered to a small number of participants since the purpose is not to collect data but to refine the process and/or instrument. Before the conduct of the pilot testing, permission was secured from the teacher concerned for the researcher to conduct the said test. The Bachelor of Science in Computer Science 1-A students were the participants of the study conducted in two-weeks (two meetings per week of 2 hours per meeting) from January 9, 2016 to January 19, 2016. The participants were divided into two groups--Group A and Group B. Group A were exposed to Technology-enhanced Drill, while group B underwent Modified Programmed Practice Sheet (PPS). Both groups underwent two-week treatment based on the instructional method assigned to them. The first intervention was on January 12, 2016 and the second intervention was on January 16, 2016. Post-test was done on January 19, 2016. Results of the pilot-test were analyzed using SPSS to determine the reliability of the Modified Badminton Assessment Rubric [1] instrument. The obtained reliability coefficient (alpha) was .82. An acceptable range of reliability coefficients for most instruments is .70 or higher [2]. Hence, the reliability coefficient of Basic Badminton skills during pilot testing was within the acceptable range.

2.4 The Treatment/Intervention

Using match-paired sampling method, only 60 students—30 BSIF 1-A and 30 BSIF 1-B were finally chosen as participants of the study. An orientation meeting was conducted before the start of the experimentation. The pre-experimentation test required all the participants to execute the six basic badminton skills five times each. The pretest was completed in two sessions -- one session per section. The skill level of each participant was evaluated and recorded by the researcher using numbers 1,2,3,4, and 5 based on the Modified Badminton Performance Assessment Rubric. One is the lowest and five is the highest. The participants were exposed to two instructional methods or experimental groups--technology-enhanced drill and modified programmed practice sheet (PPS). The BSIF 1-A students were exposed to Technology-Enhanced Drill which was scheduled every Tuesday 3:00-5:00 P.M., while the BSIF 1-B students were assigned to the Modified Programmed Practice Sheet (PPS) following their schedule every Wednesday 2:30-4:30 P.M. Before every start of the intervention, the participants executed/performed the warm-up exercises as part of instructions. While students execute the 6 basic badminton skills, the researcher identifies and observed the errors common among students in the execution of the skill. The researcher facilitated the rating with the use of Modified Performance Assessment Rubrics. **The Technology-Enhanced Drill.** This drill refers to the six basic badminton drills that were viewed by the students through the LCD. Students were directed to properly observe and follow how to execute the skills as their basis for their drill exercises to improve their badminton skills. The six basic badminton drills viewed by the students were: forehand serve, backhand serve, forehand drop shot, forehand/overhead clear, smash and drive. **The Modified Programmed Practice Sheet (PPS).** The modified version [6] Programmed Practice Sheet (PPS) refers to the six basic badminton skill drills performed by the students through the tasks specified in the eight-week drills. The six basic badminton skill drills that the students performed were: forehand serve, backhand serve, forehand drop shot, forehand/overhead clear, smash and drive. The results of the data were gathered, tabulated, computer processed, analyzed and interpreted using the Statistical Package for the Social Sciences (SPSS) software.
3. Results

Pre- and Post-treatment Badminton Skill Level of the Students Exposed to Technology-enhanced Drill and Modified Programmed Practice Sheet (PPS)

| Category                      | Pre-test Skill Level | Post-test skill level | Mean | Gain  |
|-------------------------------|----------------------|-----------------------|------|-------|
|                               | N        | M       | Description | SD  | N        | M       | Description | SD  | Gain  |
| A. Entire Group               | 60       | 1.55    | Beginner    | .55 | 60       | 4.56    | Excellent   | .36 | 3.01  |
| B. Technology-enhanced Drill | 30       | 1.55    | Beginner    | .61 | 30       | 4.48    | Excellent   | .43 | 2.93  |
| Forehand serve                | 30       | 1.77    | Beginner    | .30 | 30       | 4.70    | Excellent   | .28 | 3.07  |
| Backhand serve                | 30       | 1.60    | Beginner    | .70 | 30       | 4.70    | Excellent   | .30 | 3.27  |
| Forehand                      | 30       | 1.63    | Beginner    | .63 | 30       | 4.70    | Excellent   | .28 | 3.07  |
| Forehand drop                 | 30       | 1.33    | Beginner    | .33 | 30       | 4.27    | Excellent   | .27 | 2.94  |
| Smash                         | 30       | 1.43    | Beginner    | .43 | 30       | 4.23    | Proficient  | .23 | 2.80  |
| Drive                         | 30       | 1.53    | Beginner    | .53 | 30       | 4.33    | Excellent   | .33 | 2.80  |

Scale:
The findings of the study were:

1. The pre-treatment badminton skill level of the students exposed to technology-enhanced drill and modified programmed practice sheet (PPS) when taken as an entire group was “beginner.”

2. The post-treatment badminton skill level of the students exposed to the two instructional methods was “excellent” when taken as an entire group. But, the students exposed to technology-enhanced drill had “proficient” badminton skill level in their “smash”, while those students under the modified programmed practice sheet (PPS) had “excellent” badminton skill level in all basic badminton skills. Smash in badminton, just like in other sports, like volleyball, needs power and timing in executing the skill, and it takes time to master this skill.

3. The students did not differ significantly in their pre-treatment badminton skill level when classified according to the two instructional methods—technology-enhanced drill and the modified programmed practice sheet (PPS).

4. The students did not differ significantly in their post-treatment badminton skill level when taken as an entire group and classified according to the two instructional methods—technology-enhanced drill and in the modified programmed practice sheet (PPS).

5. Significant differences existed between the students’ pre- and post- treatment badminton skill level in the technology-enhanced drill and those in the modified programmed practice sheet (PPS) -- in favor of the post-treatment badminton skill level.

6. Based on the results of the study, an instructional material in badminton was developed. The modified programmed practice sheet is the focus of this instructional material for the effective development of skills in badminton.

4. Conclusions

Based on the preceding findings, the following conclusions were drawn:

1. The shift from “beginner” to “excellent” badminton skill level of the students exposed to both the technology-enhanced learning and the programmed practice sheet only proves that the two instructional methods are both effective skills development activities towards improving one’s skill in badminton.

2. Based on the results of the study, both the technology-enhanced drill and programmed practice sheet are an effective instructional method in students’ basic badminton skill. But the programmed practice sheet seems to be more effective compared to the technology-enhanced drill because of the programmed tasks that the students should follow and execute.

3. Smash, as an offensive skill in playing badminton, is quite a difficult skill to learn. The skills in badminton require power, timing, accuracy, and strength. The skills like “forehand drop shot” and “drive” as pre-requisite skills require fine muscle groups to execute or to perform them and need more repetitions or practice in order to master the skill. However, the “forehand serve”, “backhand
serve”, and forehand overhead clear” are skills that are quite easy to learn because these are very basic skills in playing badminton game.

4.1 Implications for Theory and Practice

The results of the present study revealed the fact that, with some effort, instructional materials and development programs for physical education instruction can easily be designed for immediate utilization for effective teaching and learning. With the advent of advanced technology, teachers must be innovative enough to connect between technology skills and the application of those skills in teaching and learning. The Programmed Practice Sheet (PPS) was developed by Dr. Keven Prusak to address the issues of skill practice and learning in physical education [4]; [6]. The PPS has been modified to include an enhanced focus on skill performance via cueing and an assessment of student learning in both the psychomotor and cognitive domains. If utilized properly, this modified version of the PPS can be used as both a skill practice and an assessment tool at the same time. The results of the present study also emphasized the need for curriculum evaluators for the improvement of newly designed instructional material. Also of vital importance in determining the utilitarian quality of the material through its actual utilization. Not to be ignored is the importance of noting the criteria to be followed when making materials for instructional needs.

5. Recommendations

1. Both the technology-enhanced drill and modified programmed practice sheet (PPS) instructional methods are an effective method in teaching basic badminton skills to students. But, the modified programmed practice sheet (PPS) is much-preferred method because based on the findings of the study, the students exposed to the said instructional method had better mean gain compared to the students exposed to the technology-enhanced drill.

2. The proposed instructional material in badminton must be further refined and presented to physical education teachers in the secondary and tertiary levels for further validation or administration to find out if results similar to those obtained from the present study would come up.

3. To further validate the proposed instructional material in badminton, copies must be submitted to the Western Visayas offices of the Commission on Higher Education and the Department of Education, for possible adoption of the program.

4. Other Physical Education-related instructional materials similar to the one proposed in this study must be designed by other P.E. researchers in order that the shortage of such instructional materials in the region may be alleviated.

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