

Learning Outcomes Taught by Three Teaching Styles in College Fundamental Volleyball Classes

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ABSTRACT

The current study examined learning outcomes of three teaching styles in collegiate fundamental volleyball skill classes. Participants were 72 non-physical education major college students who were enrolled in fundamental volleyball skill classes. After an informal skill test the participants were randomly assigned to three groups taught by practice, reciprocal, and inclusion styles. Each group followed the teaching-learning transition patterns of the three teaching strategies as designed by Mosston and Ashworth (19). After eight classes, a validated volleyball skill test battery (1) was utilized to assess skill acquisitions. Scores on passing, setting, and serving constituted a composite score that represented students' learning outcomes. Results revealed that the mean composite score of the practice group was significantly ($p < .01$) higher than that of the reciprocal and inclusion groups. No significant difference in the mean composite score was found between the reciprocal and inclusion groups. Furthermore, males scored significantly ($p < .01$) higher than females in the practice group while females scored significantly ($p < .01$) higher than males in the inclusion and reciprocal groups. In conclusion, when teaching collegiate fundamental volleyball skills, the three teaching styles toward teaching effectiveness are ranked in descending order as follow: (a) practice, reciprocal, and inclusion styles for males; and (b) inclusion, reciprocal, and practice styles for females.

Key words: Practice Interval, Composite Score, Skill Acquisitions

INTRODUCTION

Since the spectrum of teaching styles was introduced to the field of teaching physical education by Muska Mosston in 1966 (17), it has been recognized by educators in many countries and widely applied in the domain of teaching physical education. Conceptually, the spectrum of teaching styles has been refined starting from early 1970s until early 2000s (3, 5, 6, 13, 18, 19). Validating selected theoretical frameworks associated with the spectrum of teaching styles continue to be critical to the search of knowledge in regard to various instructional styles (11-13, 15, 18, 19, 20). As researchers have pointed out, there is no single, perfect style of teaching that could be utilized within the framework of teaching physical education. Verifying the effect of the spectrum of teaching styles is always an interesting topic in the research of pedagogical inquiry (13, 19). As a result, teachers and scholars in the field of teaching physical education apply the spectrum of teaching styles as a framework for delivering instruction and conducting research at different school levels (4, 7, 10, 14, 16). The findings of those pedagogical studies provided valuable information that enabled teachers to purposefully prepare and implement their teaching to match up various teaching objectives and the characteristics of diverse learners (4, 10, 16, 20).

The spectrum of teaching styles is composed of eleven interconnected styles, and each style possesses a unique structure determined by the decision-making

of the teacher and the learner. Specific styles are developed from a gradual shift in decision-making from complete teacher control (Styles A – Command) to complete learner control (Style K – Learner Self-Teaching). Mosston and Ashworth (19) indicated that different teaching styles are suitable for achieving different learning outcomes, and they further categorized the outcomes into four developmental channels: physical, social, emotional, and cognitive. In order to select a style of teaching, Mosston and Ashworth (19) suggested that physical educators should first look at the subject matter they want to teach, and then determine what to be accomplished. If the primary task requires imitating of a model and specific feedback from the teacher, a style from the reproduction cluster of styles A-E should be selected; because these styles elicit reproduction of knowledge and skills. Moreover, the educators also need to consider the type of learners in the class to ensure the teaching style selected is congruent with the developmental level of the learners (19).

The decisions that each teacher and learner make in the eleven different styles are identified and organized into three interconnected sets: (a) pre-impact, those decisions made prior to the teaching-learning transaction that determine the intent; (b) impact, those decisions made during the actual teaching-learning transaction that determine the behaviors; and (c) post-impact, those decisions that are related to the assessment of the teaching-learning transaction (19). Among the eleven interrelated

teaching styles, the practice, reciprocal, and inclusion styles are considered as the primary styles in teaching psychomotor skills. A key component of these three styles is the “criteria of task sheet”, which provides the learner with information about “what to do”, “how to do it”, and provides the teacher with a record of learner progress (19).

Goldberger and Gerney (8) indicated that the practice style is more appropriate for motor skill acquisition for students with average ability while the inclusion style is designed for students with below or above average ability. Beckett (2) found that either the practice or inclusion style is appropriate for motor skill acquisition and improvement; however, learners who receive instructions in the inclusion teaching style improve their soccer juggling skill and have higher scores in the knowledge test than those who practice within the settings of the practice teaching style. Many pedagogical inquiry studies have been conducted since early 1970s to examine the effects of different teaching styles on learners’ motor skills and cognitive learning outcomes (2, 3, 8, 13, 20), on motor learning for different abilities of learners (2, 4, 6, 13), on learners’ social interaction patterns (5, 6, 9, 20), and on learners’ decision-making (4, 5, 13, 16).

Researchers pointed out that the spectrum of teaching styles provides physical educators and scholars with a set of alternative instructional styles, a widely accepted and understood language, a model for decision-making, and a potential resource for conducting research studies in physical education teaching settings (2, 4, 6, 13, 15, 16). Even though the spectrum of teaching styles provides a wide range of instructional options and an excellent theoretical framework for research and its application, the majority of claims and implications set forth in the spectrum theory remain unanswered. For instance, whether a particular style would be more appropriate than another style for a particular group of students? What would be the effects of the practice, reciprocal, and inclusion teaching styles in collegiate volleyball skill learning? Would there be any sex differences in the effects of different teaching styles on college students’ volleyball skill learning? Therefore, the purpose of this study was to examine if there were differences in learning outcomes taught by the practice, reciprocal, and inclusion styles in collegiate fundamental volleyball skill classes.

METHODS

Participants

Learners. A total of 586 students, who enrolled in a general physical education skill program in a college located in the east coast of the United States, were contacted by letters asking for their voluntary participation in the present study. Finally, 72 non-

physical education major students (27 females and 45 males) aged 20-24 years ($M = 22.15 \pm 1.98$ yr) were selected from fundamental volleyball skill classes as participants, and they provided informed consent to participate in this study. Prior to the start of the formal class, an informal skill test consisting of forearm pass and set skills was conducted by the three instructors. Each student was given two minutes to play by her or himself, and they were instructed to use forearm pass and set skills. The results of the informal volleyball skill test showed that these non-physical education major students had little or no experience in playing volleyball before attending the volleyball skill classes. The reason for conducting the informal volleyball skill test was to control for the initial skill level; hence, the present study assumed that the participants’ initial volleyball skill levels were similar. The informal skill test was the best effort that we attempted to control for the initial skill level because no skill tests were allowed to be conducted set forth by the department and the college prior to certain instructions that had to be provided. The participants were randomly assigned to three learning groups taught by the following three teaching styles: practice ($n = 24$), reciprocal ($n = 24$), and inclusion ($n = 24$).

Teachers. Three instructors, who conducted the classes during this study, were the physical education skill class teaching staff members of the same college. Prior to the start of this study, the three instructors were contacted orally to ask for their voluntary participation in a pedagogical study. After provided informed consent, they attended a workshop that focused on how to apply the practice, reciprocal, and inclusion instructional styles to teach the collegiate fundamental volleyball skill classes. This workshop provided necessary knowledge and teaching skill training for the instructors, and enabled them to carry out the criteria of each specific instructional style when they conducted classes in the current study. The three instructors had three to five years of teaching experiences, and were randomly assigned to a learning group. Lastly, the Institutional Review Board of the college approved the current study.

Treatment --The Three Teaching Styles

The treatment for this study was eight 75-minute lessons on the basic volleyball skills of passing, setting, and serving taught by the following three teaching styles: (a) the practice style involves the students in the decision-making process. According to Mosston and Ashworth (19), in addition to motor skill practice, the students have to make nine decisions, including posture, location, order of tasks, starting time per task, pace and rhythm, stopping time

per task, rest interval, attire and appearance, and initiation of questions for clarification, that occur during the class; (b) the inclusion style provides multiple levels of performance difficulties for skill tasks. Students taught in this style have more responsibilities than in the practice style. Students not only have to make the nine decisions as in the practice style but also need to decide at which level of performance to start and which level of performance to attempt next (19); and (c) the reciprocal style requires the organization of a class in pairs, and each member of the pair has a role as the doer and observer, the role of the doer is to perform the task while the role of the observer is to offer concurrent feedback to the doer based on the criteria prepared by the teacher, this partnership continues until the doer completed the task and then the partners switch roles (19).

It was important to note that, at the beginning of each lesson, the instructors spent about ten minutes clarifying what had to learn and practice, demonstrating what each student had to do within a specific teaching-learning transaction pattern in order to create a pedagogical environment. Afterwards, the teachers and learners began working on their volleyball skill tasks following the practice pattern within a particular teaching style as defined by Mosston and Ashworth (19).

Skill Testing

After each group received a total of eight lessons, the volleyball skills of passing, setting, and serving were tested by the three instructors separately. The scores of the students were recorded immediately. The North Carolina State University Volleyball Skill Test Battery developed by Bartlett, Smith, Davis, and Pell (1) was utilized to assess skill acquisitions. Bartlett, Smith, Davis, and Pell (1) stated that this volleyball skill test battery was designed to accurately measure and evaluate the three basic volleyball skills (serve, forearm pass, and set). There was a list of testing procedures when utilizing the North Carolina State University Volleyball Skill Test Battery including purpose, equipment administration, and justification. The volleyball skill tests were administered in the same volleyball courts and by the same instructors conducting the classes. The test scores on passing, setting, and serving constituted a composite score, which represented the students' learning outcomes. Prior to the skill tests, a North Carolina State University Volleyball Skill Test workshop was held by the research team to assure that all students would be tested by the same criterion. The North Carolina State University Volleyball Skill Test Battery was a previously validated and reliable testing package, and has been

widely recognized and used by instructors in higher education as a tool for volleyball skill testing.

Statistical Analysis

Descriptive statistics were calculated for the mean scores and standard deviations of the three treatment groups; and a 2 (gender) × 3 (treatments) independent groups analysis of variance (ANOVA) was utilized to examine whether any significant differences existed among the group and gender. The independent variables were treatment conditions (practice, reciprocal, and inclusion styles) and gender (male and female), whereas the dependent variable was the composite score on the students' learning outcomes.

RESULTS

The descriptive statistics of the students' learning outcomes scores in the three treatment groups are presented in Table 1. The 2 x 3 independent groups ANOVA for comparing the students' learning outcomes taught by the three teaching styles are presented in Table 2.

Table 1. Mean Scores and Standard Deviations of Learning Outcomes for Males and Females in Three Teaching Style Groups ($N = 72$)

Groups	<i>n</i>	<i>M</i>	<i>SD</i>
Male/Reciprocal	15	76.17	2.25
Male/Practice	15	90.58*	0.79
Male/Inclusion	15	73.42	2.19
Female/Reciprocal	9	84.92*	1.56
Female/Practice	9	75.50	0.90
Female/Inclusion	9	88.17*	1.58

NOTE: *M* = mean, *SD* = standard deviation. * $p \leq 0.01$

Table 2. Independent Groups ANOVA for Determining Learning Outcome Differences Taught by Three Different Teaching Styles ($N = 72$)

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	η^2
Gender	141.68	1	141.68	52.21*	0.442
Styles	91.00	2	45.50	16.77*	0.337
Sex/Style	2988.11	2	1494.05	550.62*	0.943
Residual	228.37	66	3.46		
Total	3399.87	71			

NOTE: * $p \leq 0.01$

The findings revealed that significant differences were found on the following factors: (a) sex (male and female), $F_{1, 69} = 52.21$, $p < .01$; (b) styles (practice, reciprocal, and inclusion), $F_{2, 66} = 16.77$, $p < .01$; and (c) sex - styles interaction, $F_{2, 66} = 550.62$, $p < .01$. Furthermore, the 2 x 3 independent groups ANOVA yielded the following results. First, the practice style group obtained a significantly higher ($p < .01$) mean score on students' learning outcomes

than that of the reciprocal and inclusion groups among the males, whereas the inclusion style group acquired a significantly higher ($p < .01$) mean score on students' learning outcomes than that of the practice and reciprocal groups among the females. Second, the males ($M = 90.58 \pm .79$) demonstrated a significantly higher ($p < .01$) mean score on students' learning outcomes than that of the females ($M = 75.50 \pm .90$) in the practice style group. Third, the females acquired a significantly higher ($p < .01$) mean score on students' learning outcomes than that of the males in the inclusion style group (females = 88.17 ± 1.58 vs. males = 73.74 ± 2.19) and in the reciprocal style group (females = 84.92 ± 1.56 vs. males = 76.17 ± 2.25).

DISCUSSION

The purposes of this study were to examine the students' learning outcomes taught by the practice, reciprocal, and inclusion styles on selected volleyball skills, and to determine whether gender differences existed in the students' learning outcomes taught by the three teaching styles. The findings of this study revealed that differences in the students' learning outcomes taught by the three teaching styles existed, wherein the students' learning outcomes of the practice style for the males was higher than that of the reciprocal and inclusion styles. However, the students' learning outcomes of the inclusion style for the females was higher than that of the practice and reciprocal styles. The students' learning outcomes of the reciprocal style for the males was higher than that of the inclusion style; and the students' learning outcomes of the reciprocal style for the females was higher than that of the practice style.

The current findings contain several points of interest. First, although the practice, reciprocal, and inclusion teaching styles contain three impact sets as described by Mosston and Ashworth (19), the time for a learner to practice on a particular skill within a specific style is quite different. For example, a learner practices under the practice style condition can utilize the whole period of time on a particular motor skill. However, in the reciprocal style, because of the practice partnership (i.e. a doer and an observer), the time for the learner to practice is cut in half. In the inclusion style, the learner is allowed to choose a skill level that is appropriate for the learner's current level of practice; therefore, the learner needs to work on multiple levels of skills in order to reach the target skill level. Moreover, the learner in the inclusion style needs feedbacks from the teacher when moving to the next step in the skill sequence (4, 18, 19). Obviously, the time for the learner to practice a target skill level in the inclusion style is less than that in the practice style.

Second, when examining sex differences in physical fitness levels, Stewart (21) found that for ordinary students, boys demonstrated higher physical fitness levels than girls. In order to learn the fundamental skills in a volleyball skill course and perform well in the volleyball skill testing (passing, spiking, and serving), an individual's fitness level plays a role to influence one's learning outcomes. In addition, according to the observation notes of the investigators, male students showed higher passion on what they were doing and used class time more efficiently than female students in the practice style. As a result, the male students scored higher than that of the females in the practice style. Although the female students showed lower passion on what they were doing, they seemed to be more socially oriented and preferred working with their partner or within a small group during the practice. Thus, the female students may feel more comfortable with the reciprocal and inclusion styles, which involve social interaction, feedback from the partner, and practice at a suitable level. This might explain why the female students performed better in the reciprocal and inclusion styles.

Third, practicing under the practice style required students to practice independently with their own decisions on pace, frequency, repetition, and rest interval. Based on our observation, the male students demonstrated that they were more independent and more task-oriented than those of the female students. In contrast, the female students demonstrated that they lacked clear ideas on their practice pace, frequency, repetition, and rest interval. These factors might have resulted in lower practice time on the learning tasks and might be the reason that explained the 15.08-point difference in the students' learning outcomes scores between males (90.58) and females (75.50) in the practice style.

As for the inclusion style, the teacher designs and provides multiple difficulty levels for students to choose. The female students can get the task levels that fit their conditions, thus resulting in better motivation and learning outcomes. Our findings revealed that the female students acquired better learning outcomes than the male students in the inclusion and reciprocal styles, and demonstrated the highest students' learning outcomes score in the inclusion style. For the male students, however, they tended to choose a higher skill level to start with and did not like to start from the beginner level. As a result, they might not be able to build up a good foundation for further improvement.

The results of this study partially support the findings of Goldberger and Gerney (8), in which they indicated that significant differences on motor skill learning outcome could be attributed to learning

ability of the students. The practice style is more appropriate for motor skill acquisition with above average students, while the inclusion style is designed for students who are below or average learning ability. The findings of this study are consistent with the findings of Beckett (2), stating that for motor task improvement both practice and inclusion styles are appropriate styles of teaching to college students. Therefore, the findings of this study imply that for the sake of an effective lesson a teacher must diagnosis his/her students' learning ability. Unfortunately, no literature appears to be available to examine the use of the reciprocal style for motor skill acquisition or improvement at the collegiate level.

In conclusion, when teaching collegiate fundamental volleyball skills, the three teaching styles toward teaching effectiveness in the current study are ranked in descending order as follow: (a) practice, reciprocal, and inclusion styles in males; and (b) inclusion, reciprocal, and practice styles in females. When comparing the students' learning outcomes taught by the practice, reciprocal, and inclusion styles in the fundamental volleyball skills, the males appear to score higher on students' learning outcomes than that of the females in the practice teaching style. The females appear to score higher on students' learning outcomes than that of the males in the inclusion teaching style. The females also appear to score higher on students' learning outcomes than that of the males in the reciprocal teaching style. For the males, the practice teaching style appears to yield the highest students' learning outcomes among the three teaching styles. For the females, the inclusion teaching style appears to yield the highest students' learning outcomes among the three teaching styles.

Implications

The findings of the present study are important for collegiate physical education skill instructors to improve their teaching effectiveness. Different teaching styles would lead to different learning outcomes. A particular teaching style might be more appropriate for a specific gender; however, future studies are needed to examine the gender factor in using the three teaching styles at the collegiate level so that instructors can better utilize and understand these three teaching styles. Finally, it is suggested that the eleven spectrum teaching styles should be included in the curriculum of physical education teacher education program, because possessing a variety of teaching styles will enable pre-service teachers to better implement their teaching to fit different and diverse learning abilities of students.

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