

PEDAGOGY

PETE Teacher Candidates' Preferred Teaching Styles

Carol Wilkinson, David Barney, William F. Christensen

Abstract

This study examined the chosen teaching styles of teacher candidates in a university PE high school teaching methods course (a) to see if teaching styles were chosen with equal probability and (b) to see if there was a difference of the distribution of styles used by males compared to females. A chi-square goodness of fit test determined if one or more teaching styles was more popular than at least one other, and a post hoc test compared all pairs of proportions. A two-sided normal-based test tested whether reproductive and productive styles were equally popular. A test for independence of gender and preferred teaching style was conducted, followed by post hoc tests. The following pairs of teaching style proportions were significantly different: practice with all the other styles except reciprocal. Overall, reproductive styles were more popular. Female candidates preferred reproductive styles at a significantly higher rate than male candidates did, and male candidates preferred productive styles at a significantly higher rate than female candidates did. Reasons for style preference are explored and recommendations made for environmental enhancements that help teachers to develop productive styles.

Helping students to learn in physical education (PE) is a challenge, as classes comprise students with varying abilities and interests.

Carol Wilkinson is an associate professor, Department of Teacher Education, Brigham Young University. David Barney is an associate professor, Department of Teacher Education, Brigham Young University. William F. Christensen is a professor, Department of Statistics, Brigham Young University. Please send author correspondence to carol_wilkinson@byu.edu

In addition, learning in this environment must be linked to motor, cognitive, and affective educational dimensions (SHAPE America, 2013). One aspect teachers must decide upon when planning lessons is what instructional methods to use to help their students learn. Within PE, a well-known formal system of instructional frameworks is the Spectrum of Teaching Styles (Mosston & Ashworth, 2008), which consists of 11 styles designed to create different environments that aid all students' learning. The 11 teaching styles fall into reproductive and productive styles. The goal of the reproductive styles (command, practice, reciprocal, self-check, and inclusion) is to reproduce known knowledge and skills. The goal of the productive styles (guided discovery, convergent discovery, divergent discovery, individual program, learner initiated, and self-teaching) is to engage the students in higher order thinking skills such as problem solving, creating, and synthesizing that help students produce new knowledge (Mosston & Ashworth, 2008).

Since the Spectrum's development, research has been conducted on its teaching styles and over the past two decades researchers have explored PE teachers' views of these styles and use of these in their teaching. In the United Kingdom, the practice style was used more frequently than the other Spectrum styles by PE teachers (Curtner-Smith & Hasty, 1997; Curtner-Smith, Todorovich, McCaughtry, & Lacon, 2001), reproductive styles were used more often (Macfadyen & Campbell, 2005), and PE teachers felt the reproductive styles were the most appropriate to cover the standards in the National Curriculum in Physical Education.

In an international study of British, South Korean, Australian, French, Portuguese, Canadian, and American PE teachers, Cothran et al. (2005) also found that teachers value and use more the reproductive styles than the productive styles. This finding was confirmed in a study in Finland (Jaakkola & Watt, 2011).

A study in the U.S. investigated PE teachers' self-reporting of their use and perceptions of the teaching styles (Kulinna & Cothran, 2003). In the study, teachers completed the Physical Education Teachers' Perceptions of Teaching Styles instrument (Cothran, Kulinna, & Ward, 2000) and reported using many of the styles in their lessons; however, they used the productive styles was less than

the reproductive styles. Cothran et al. (2000) felt that many of the PE teachers lacked experience with the productive teaching styles.

Based on the instructional diversity that the teaching styles provide, preservice teacher candidates would benefit from learning to use different styles if they are to be successful in aiding student learning. Little research has been conducted regarding usage of teaching styles by teacher candidates. In one study, Greek PE student teachers self-reported usage of the teaching styles in their lessons (Syrmpas & Digelidis, 2014). They most frequently reported using the command and practice styles but also quite often used the guided discovery style (a productive style). The researchers felt the reason for the high incidence of the guided discovery style was because this style resembles Socrates's method of investigation. The Greek education system presents Socrates as one of the greatest teachers, and identifying with such a powerful model seemed logical. The researchers found no gender differences in this study (Syrmpas & Digelidis, 2014).

Zeng (2016) explored student teachers' self-report of their use and perception of teaching styles. The student teachers used reproductive styles more often but believed that both reproductive and productive styles were beneficial for students. Zeng found no gender differences regarding their use and perception of the styles.

White (1998) studied the perceptions of PE teacher candidates regarding the extent of use and exposure to the Spectrum styles. She found most teacher candidates felt adequately prepared to teach the command and practice styles, while few were ready for the learner-designed individual program and self-teaching styles. She also reported a significant difference in candidate and faculty perceptions of how effectively the candidates were prepared to use the Spectrum styles, with candidates feeling they were better prepared to use the styles than the faculty did. Female candidates perceived greater use of selected reproductive styles and male candidates perceived greater use of selected productive styles.

Based on the paucity of teaching style research with this preservice population and the conflicting gender findings regarding usage, the purpose of this study was (a) to see if teaching styles were chosen with equal probability in a university PE high school teaching methods course and (b) to see if there was a difference of the distribution of styles used by males compared to females. The null hypothesis

was that (a) there would be no difference between the teaching styles and they would be equally popular and (b) there would be no difference of the distribution of styles used by males compared to females. These null hypotheses were chosen for evaluation because we believe that in fact some teaching styles will be significantly more popular than others and that males will employ a different mix of styles than females.

Method

This study was conducted in a PE teacher education (PETE) program at a university located in the Intermountain West of the United States between 2011 and 2017. The participants were 104 PE teacher candidates taking a high school teaching methods course (28 males, 76 females) and were predominantly Caucasian ($n = 89$), followed by Hispanic ($n = 6$), Pacific Islander ($n = 4$), African American ($n = 3$), and Asian ($n = 2$).

At the university, a PE high school teaching methods course is taught each fall semester. During field teaching experiences in the schools, students must provide video evidence of teaching competencies. To determine these teaching competencies in all teaching methods courses, faculty studied the *National Standards for Physical Education Teacher Education* (National Association for Sport and Physical Education, 2009), the *Guidelines for an Introductory Undergraduate Course in Physical Education Teacher Education* (National Association for Sport and Physical Education, 2010), the state standards for higher education programs, the state core standards for PE for K–12 students (Utah Education Network, 2017a, 2017b), and the Teacher Education Accreditation Council (2014) standards (now the Council for the Accreditation of Educator Preparation, 2015) that the university's teacher education programs must adhere to as its accrediting body, and allowed these documents to inform their teaching competency selection.

Students take three teaching methods courses (elementary, junior high, and high school) in succession. In each course, candidates have to show video evidence of the teaching competencies required for that course. Competencies are added to each successive course.

Teaching styles are taught and modeled by the instructor in each methods course. During the latter half of the high school methods course, teacher candidates teach in the schools and are recorded by one of their peers. Once back on the university campus in the computer lab, they upload their teaching video into StudioCode, a digital video editing software. Then using coding buttons for the predetermined teaching competencies, the candidate finds, codes, and saves a video clip of the best example of each competency. One of the competencies that candidates must show evidence of is use of Mosston's command style of teaching. The candidates must also provide a video clip of another teaching style besides the command style. They choose from a list that includes the styles of practice, reciprocal, self-check, inclusion (reproductive styles) and guided discovery, convergent discovery, and divergent discovery (productive styles) and include that style in their lesson plan. Along with the video clip of the other teaching competency, they must complete a written transcription that describes what they did for that competency. The video clip and transcription are assessed by the candidate and the course instructor. During this process, the instructor verified the teaching style selected by the student. If it was incorrectly labeled, the instructor made a correction. The principal investigator was the instructor of this course and compiled all of the candidates' transcriptions between Fall 2011 and Fall 2017.

Results

Each participant's chosen teaching style was recorded. Five candidates incorrectly labeled their chosen teaching styles and appropriate corrections were made by the principal investigator. Data were screened for missing data prior to any analysis. Descriptive statistics were calculated. All statistical procedures were completed using R software (R Core Team, 2017). Table 1 shows the PETE teacher candidate teaching style preference data. Among males, the most popular styles were the practice (25% of males chose this style) and guided discovery (25%) styles. Among females, the most popular style was the practice style (39.5%), with the reciprocal style (19.7%) being the next most popular.

Table 1
Teaching Style Preferences

Teaching style	Males n (%)	Females n (%)	Total n (%)
Practice	7 (25)	30 (39.5)	37 (35.6)
Reciprocal	1 (3.6)	15 (19.7)	16 (15.4)
Self-Check	1 (3.6)	8 (10.5)	9 (8.7)
Inclusion	5 (17.9)	3 (3.9)	8 (7.7)
Guided Discovery	7 (25)	4 (5.3)	11 (10.5)
Convergent Discovery	3 (10.7)	11 (14.5)	14 (13.4)
Divergent Discovery	4 (14.3)	5 (6.6)	9 (8.7)
Total	28 (100)	76 (100)	104 (100)

A chi-square goodness of fit test was calculated to see if one or more teaching styles was more popular than at least one other. The null hypothesis was that each style would be chosen an equal proportion of the time. In other words, the null hypothesis was

$$H_0: \mathbf{p} = \begin{bmatrix} p_1 \\ p_2 \\ \vdots \\ p_7 \end{bmatrix} = \begin{bmatrix} 1/7 \\ 1/7 \\ \vdots \\ 1/7 \end{bmatrix},$$

where p_i is the proportion of teachers preferring teaching style i ($i = 1, \dots, 7$). Significant deviation from the hypothesized values was found, $\chi^2(6) = 41.92$, $p > .0001$. We conducted a post hoc test comparing all pairs of proportions. Because tests of the form $H_0: p_i = p_j$ ($i \neq j$) represent comparisons of dependent proportions from the same multinomial vector, we use the statistic

$$Z = \frac{\hat{p}_i - \hat{p}_j}{\sqrt{\frac{\hat{p}_i(1-\hat{p}_i)}{N} + \frac{\hat{p}_j(1-\hat{p}_j)}{N} + 2\frac{\hat{p}_i\hat{p}_j}{N}}},$$

which is approximately Gaussian for large N . Because we simultaneously considered all $\binom{7}{2} = 21$ pairwise comparisons, we used a Bonferroni adjustment and considered a p value to be statistically significant only if it was less than $0.05/21 = 0.00238$. The following pairs of teaching style proportions were statistically significant:

$p_{\text{Practice}} > p_{\text{Inclusion}}$ ($p < 0.0001$), $p_{\text{Practice}} > p_{\text{Self-check}}$ ($p < 0.0001$), $p_{\text{Practice}} > p_{\text{Guided}}$ ($p < 0.0001$), $p_{\text{Practice}} > p_{\text{Convergent Discovery}}$ ($p = 0.0007$), and $p_{\text{Practice}} > p_{\text{Divergent Discovery}}$ ($p < 0.0001$); this means the practice style was more popular than the other styles except the reciprocal style.

A test for independence of gender and preferred teaching style was conducted. In other words, the null hypothesis was that the distribution of styles chosen by females would be equal to the distribution of styles chosen by males:

$$H_0: \mathbf{p}_F = \begin{bmatrix} p_{1|F} \\ p_{2|F} \\ \vdots \\ p_{7|F} \end{bmatrix} = \begin{bmatrix} p_{1|M} \\ p_{2|M} \\ \vdots \\ p_{7|M} \end{bmatrix} = \mathbf{p}_M$$

where $p_{i|F}$ and $p_{i|M}$ ($i = 1, \dots, 7$) are the probabilities of preferring teaching style i given that the teacher is female or male, respectively. The standard chi-square test statistic was calculated to be 20.13, but the p value associated with the $\chi^2(6)$ distribution was invalid because of the low expected cell counts for six of the 14 cells in the table. Consequently, the p value for the test of independence was based on an approximate permutation test using 99,999 random permutations of the data (Higgins, 2004). When the data were randomly permuted so that any dependence between gender and preferred teaching style was removed, the standard chi-square test statistic for the permuted data reached the level of 20.13 a total of 238 times. Thus, the permutation-based p value is less than 0.0024. Associated with the chi-square of 20.13 is a Cramér's V 0.440, which is recognized as a medium to large effect size (Cohen, 1988).

A set of seven post hoc tests were run to evaluate whether the proportion of males preferring teaching style i was equal to the proportion of females preferring teaching style i ($i = 1, \dots, 7$). Specifically, we tested the null hypothesis

$$H_0: p_{i|F} = p_{i|M}, i = 1, \dots, 7$$

For each comparison, we calculated a z statistic to compare the proportion of males with the proportion of females choosing each style. Because of the small sample size for some of the teaching styles, we could not assume a Gaussian distribution under the null hypothesis

for some of these z statistics. Consequently, we used Fisher's exact test to evaluate whether there was a statistically significant difference between the proportions (e.g., to evaluate whether gender is independent of preference). The p value for each test was derived from the hypergeometric distribution. To protect against Type I error inflation, we again used a Bonferroni adjustment, which accounts for seven tests. A comparison was considered significant if the p value was less than $0.05/7 = 0.0071$. Although $p_{i|F}$ seemed to differ from $p_{i|M}$ for some of the styles (especially inclusion, reciprocal, and guided discovery), the sample size within each of the styles was too small to claim statistical significance with a Bonferroni adjustment. The style that was closest to statistical significance was the guided discovery style ($p_{\text{Guided|Male}} = 0.250$, $p_{\text{Guided|Female}} = 0.053$, $p = 0.0079$). However, as described, the overall dependence of gender and style preference is still compelling based on the overall test's p value of 0.0024.

The practice, reciprocal, self-check, and inclusion styles are reproductive styles and the guided discovery, convergent discovery, and divergent discovery are productive styles. When testing whether the reproductive and productive teaching styles were equally popular, we used a two-sided normal-based test that the proportion selecting each class was equal to 0.5. This test rejects the null hypothesis with a p value of 0.0006, $\chi^2(1) = 11.78$, $p > .0006$, and we concluded that reproduction styles were significantly more popular than production styles overall.

Males were equally split between reproductive ($n = 14$) and productive ($n = 14$) styles, whereas 73.6% of the females chose reproductive ($n = 56$) styles over productive styles ($n = 20$). Using Fisher's exact test for assessing the independence of gender and teaching style preference (reproductive vs. productive), we obtained a p value of 0.0332. That is, there was only a 3.3% chance that we would see this degree of gender differences in style preferences if gender were in fact independent of style preference. Thus, female candidates preferred reproductive styles at a significantly higher rate than male candidates did and male candidates preferred productive styles at a significantly higher rate than female candidates did.

Qualitative Analysis of Transcriptions

We wanted to see if candidates' transcription comments might inform the quantitative data regarding candidates' style selec-

tion. We used an inductive content analysis to analyze candidates' comments in the transcription data and the constant comparative method (Lincoln & Guba, 1985) to compare, contrast, and categorize each unit of information. We proximally placed, examined, and reexamined similar chunks of text to identify commonalities.

A researcher may assume diverse membership roles while involved in qualitative research. There are three principal roles that may be assumed: (a) the complete member, (b) the active member researcher, and (c) the peripheral member researcher (Adler & Adler, 1994). The researchers assumed the role of active member researcher while they taught PETE classes where teaching competencies were used.

We used member checking when students' interview comments needed further explanation. We asked students for clarification via e-mail or in person. We used investigator triangulation (the use of several different researchers). One of the researchers had the role of peer debriefer in clarifying the primary researcher's interpretation of the data (Lincoln & Guba, 1985). A university PETE professor not involved in organizing the student interviews or analyzing the data assumed the role of auditor (Lincoln & Guba, 1985) and examined the data and the process of data analysis.

Qualitative Results

The results of the inductive content analysis of candidates' transcription comments revealed several reasons why candidates chose a specific teaching style. For each teaching style, several categories emerged from candidates' comments. Raw data consisted of a short phrase to an extended paragraph. For each teaching style, we will address each category.

Practice Style

Increased teacher–student interaction. Several teacher candidates felt that the practice style allowed them more time to observe, give feedback to, and develop rapport with the students. One female stated,

I had the students each at a station with a partner. They would rotate at a certain time interval. This was a great time to build rapport with the students. I could rotate amongst the students and give them feedback.

Efficient coverage of content. Using stations allowed candidates to effectively cover lesson content. One male elaborated,

I had the students doing different stations. This was my second time teaching this same content to the class, so we had a good system down that they were familiar with. They were able to get through the different stations very quickly so that we could move on.

Student autonomy. The practice style allowed students to have choice of work pace. A female stated, “The students are working in stations at their own pace. They were in charge of their work and their effort. It was a really great activity actually.”

Students engaged and motivated. The variety of activities in the different stations helped to motivate the students. One female created a cardio circuit and enthused, “I had the girls working on cardio equipment in different stations and then rotating through in a team competition. The girls were very engaged and I think it was a creative and effective activity.”

Reciprocal Style

Student feedback. Using the reciprocal style enabled the students to receive peer feedback. One candidate stated,

I used this style by having students work with partners during volleyball drills to provide feedback to each other. I thought that this was very good for the students to not only practice the cues on their own, but make sure that their partner was doing the cues while they were watching them and throwing the ball to them. This was a great way to make sure that the students knew the cues and had the opportunity to work with other students.

Student collaboration. One female teacher candidate said,

I did circuit training for one lesson to demonstrate the task/station teaching style. The girls were in partnerships as they rotated through different stations in the circuit. At each

station I expected them to do the designated exercise and decide with their partner if that exercise was isometric or isotonic. We had just talked about the difference between those exercises in class, along with different types of weight training activities like circuit training. Allowing them to apply both of these concepts in the gym at each task was a great teaching opportunity. Students not only got to learn about it in the classroom, but they got to apply what they learned so it made more sense to them. Each station was different and the girls were required to both think and workout at each station.

Student teaching. Another female stated, “After going through the cues of the lifts with them, I asked them to teach and demo cues to their partner . . . This gave me time to walk around and make individualized corrections to girls who were needing more help.”

Self-Check Style

Written record. One male stated,

I gave them a paper with five different styles of hits. I demonstrated each hit. They went with their partner and practiced each hit at least 10 times on their own, checking hits off on the paper. I circulated to evaluate. The worksheet worked well, but in the future instead of five new hits I will use three instead. After [they practiced on their own], I brought them back to review the hits to test knowledge.

Good participation. One female said,

I used stations to help teach different skills testing and each station also included practice time, written instructions, as well as score sheets to measure their achievement level. This worked out so well and was very beneficial for the students because it was on a personal level. They were able to participate at their own level and grade themselves accordingly. I had max participation from the students as a result.

Inclusion Style

Students work at own level. A male explained,

For our fitness circuit we created five posters that each had a different required task. Each poster had three levels of difficulty that the students could choose from. The circuit was based on individual need and desire so the students were free to choose the level of intensity and nature of their workout.

Good participation. One male stated,

On the rock wall we told the students to choose from the easy green color or yellow, blue, and red. This allowed the students to go at their own pace and level and find out how to make it through the rock wall using their own experience. As they accomplished each color they felt successful . . . I felt like it was a success because everyone was participating.

All of the productive styles in this study (guided discovery, convergent discovery, and divergent discovery) had the same categories: individual discovery and collaborative discovery.

Guided Discovery

Individual discovery. In a 10th-grade Fitness for Life class, one female stated

I posed questions on a topic and then posted the answer on the classroom wall. I did this with several topics all over the walls and allowed students to walk around and find the answers for themselves as opposed to reading it out of a book. This helped them learn the information firsthand by searching for and finding the correct answer to each question.

Collaborative discovery. Another female explained the importance of having students work together: “I had the class split into three teams. Each team was given questions to lead them to an answer. As a team, the girls collaborated to find the answer then all the teams shared their answer with the class.”

Convergent Discovery Style

Individual discovery. One female stated, “We were talking about flexibility in the PowerPoint presentation. As the students worked on their individual packets, I asked the students which joints need to be flexible to rock climb.”

Collaborative discovery. A male explained,

I let the class tell me what they thought the cues for shooting were to see what they already knew. Then after a student demoed the skill, I had them go in their groups and see if they could figure out what elbow position felt most comfortable for a good shot.

Divergent Discovery Style

Individual discovery. One creative female stated,

I instructed the girls to spread out with their partner on two different lines 8 to 10 feet apart and pass the ball back and forth. I asked them to explore the different ways to pass and pay attention to how they chose to pass. Then each of them were to come up with cues they would use to teach passing.

Collaborative discovery. A female said,

I split the class into two groups and asked them to discuss why they thought breakfast would be important. This gave them the opportunity to come up with some of their own answers to share with the class before I taught them the material.

A few candidates who used the divergent discovery style expressed concern about the control of the class. One female stated, “I thought they might be out of control. It is a bit scary to let go of total control over the students and let them explore.”

Discussion

The purpose of this study was (a) to see if teaching styles were chosen with equal probability in a university PE high school teaching

methods course and (b) to see if there was a difference of the distribution of styles used by males compared to females. Based on the descriptive results of this study, the practice style was the most popular style for women (39.5% of women chose this style), with the reciprocal style being the next most preferred style for women (19.7%). Among the men, the most preferred styles were the practice style (25%) and the guided discovery style (25%). The result of post hoc tests following the chi-square goodness of fit test to see which style was statistically the most popular, revealed that for all candidates the practice style was more popular than the other styles except the reciprocal style. This finding regarding the popularity of the practice style concurs with findings in previous research (Kulinna & Cothran, 2003; Syrmpas & Digelidis, 2014; White, 1998). Reasons that emerged from the qualitative analysis of candidates' transcription entries as to why they chose the practice style were student–teacher interaction increased, it was an efficient way to cover the content, it gave students autonomy, and students were engaged and motivated.

Reproductive and Productive Teaching Styles

Reproduction styles were significantly more popular than production styles overall. This result is in line with results from other research on PE teachers (Cothran et al., 2005; Jaakkola & Watt, 2011; Macfadyen & Campbell, 2005), with student teachers (Syrmpas & Digelidis, 2014; Zeng, 2016), and college students' reports of their K–12 PE teachers (Cothran et al., 2000).

This poses the question as to why teachers use the reproductive styles more often than the productive styles. Frequent use of the reproductive styles differs to the constructivist approach, which would imply that productive styles encourage more effective learning and should be implemented often (Morgan, Kingston, & Sproule, 2005). In a study of student teachers' perceptions, Zeng (2016) found they believed that using reproductive styles (command, practice, reciprocal, inclusion) and productive styles (guided discovery, convergent discovery, and divergent discovery) in their teaching aided student learning, yet they used reproductive styles more frequently.

One reason for the use of reproductive styles is that PE teachers perceive that the reproductive styles are more beneficial (Cothran

et al., 2005; Jaakkola & Watt, 2011; Kulinna & Cothran, 2003). Candidates' comments from the qualitative analysis in this study revealed the following positive outcomes from the use of reproductive styles (in addition to the comments made about the benefits of the practice style): more time for teacher feedback, maximum student participation, and student success.

Another reason for the use of reproductive styles may concern the amount of teacher control within a style. Thornburn and Collins (2003) stated that the reproductive styles have been considered to be a powerful way for PE teachers to control the learning environment. From the qualitative results of this study, some students mentioned they were concerned about a lack of control with the divergent discovery style (a productive style). Many teachers value class control over class learning (Cothran & Ennis, 1997), and this might especially be the case for preservice teachers.

Although the overall test for independence of gender and preferred teaching style was significant with a medium to large effect size, post hoc tests did not reveal significance, due to the small sample size within each style. The style that was closest to statistical significance was the guided discovery style (25% of males chose this style compared to 5.3% of women), one of the productive styles (Mosston & Ashworth, 2008). This is an interesting finding in light of our results, which showed that male candidates preferred productive styles at a significantly higher rate than female candidates did and female candidates preferred reproductive styles at a significantly higher rate than male candidates did, in line with the findings of White (1998). However, this is in contrast to the work of Zeng (2016), who found no gender differences in student teachers' use of the styles. It is possible that the males in this study were more confident in the use of productive styles because they had feelings of greater class control than females did.

Another reason for reproductive style preference could be the proven effectiveness of those styles in motor skills acquisition (Byra, 2000) and the view of PE teachers that these styles are efficient and promote skills acquisition and knowledge attainment (Cothran & Kulinna, 2008). Calderhead (1996) suggested that student teachers' prior experience as school students greatly influences their conceptions about their students' learning process. If PE teacher candidates

do not receive the same exposure to the productive styles as to the reproductive styles, this could prevent them from reconstructing their existing beliefs and teaching practices to try the productive styles (Zeng, 2016). Making sure that sufficient time is dedicated to this process is crucial, as Postareff, Lindblom-Ylänne, and Nevgi (2007, 2008) stressed that a short educational period is not enough to influence educators to adopt productive teaching styles. One final reason for the use of reproductive styles is that many school students in the United States prefer those styles over the productive styles (Cothran et al., 2000).

It is important to mention that the candidates in this study possibly used other styles during their teaching. This study focused on their best video example of a style.

Conclusion

The purpose of this study was (a) to see if teaching styles were chosen with equal probability in a university PE high school teaching methods course and (b) to see if there was a difference of the distribution of styles used by males compared to females. The key findings of this study are that (a) the practice style is the most frequently used teaching style, (b) reproductive styles were more popular, and (c) females used the reproductive styles more than males did and males used the productive styles more than females did.

From the results of this study and other studies, it appears that the experiences that are occurring in teacher preparation are not enough to encourage candidates to implement productive styles. Guskey (1986) stated that for change to occur, teachers must first see positive results from their new efforts if attitudinal change toward those efforts is to be positive and thus promote further use. Based on this view, it seems necessary for PETE programs to allow candidates more time (Kulinna & Cothran, 2003) and more enriching experiences with the productive styles, making sure candidates progressively construct lessons using the styles in various class settings (Cothran et al., 2005; White, 1998), to help all students become confident in using all styles.

Further research needs to examine why teacher candidates and in-service teachers use the styles they do and why they do not implement the productive styles more often. One limitation of this study

was that it took place at one university in the Intermountain West of the United States.

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