Developing Teaching Adaptability in Pre-service Teachers using Practice-Based Teacher Education

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Developing Teaching Adaptability in Pre-service Teachers using Practice-Based Teacher Education

Kyuil Cho

Dissertation submitted to the College of Applied Human Sciences at West Virginia University

in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Physical Education Teacher Education

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Morgantown, West Virginia
2022

Keywords: physical education teacher education, adaptive competence, lesson plan, enacted teaching

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I could finish my dissertation with support from a number of people. First, Dr. Emi Tsuda, as a colleague and advisor, I have learned a lot from you since when we both were at the Ohio State. And I was very lucky that I could meet you here at West Virginia University. With your detailed feedback and encouragement, I finally could complete my dissertation and the long journey as a graduate student. I very much appreciate your help and understanding.

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Abstract

Developing Teaching Adaptability in Pre-service Teachers using Practice-Based Teacher Education

Kyuil Cho

The purpose of this study was to examine how pre-service teachers (PSTs) develop their teaching adaptive competence through teaching rehearsal and repeated teaching, which is one of the focused teacher education strategies in practice-based teacher education (PBTE). This study was conducted in an introductory teaching methods course of a physical education teacher education (PETE) program. A total of 22 PSTs participated in the study. Fourteen were male, and eight were female. The PSTs had varied coaching experiences ranging from little to no coaching in limited recreational sports settings, and none had teaching or coaching experience in the school setting.

A total of 150 lesson plans (three different lesson plans per PST that were revised across five weeks) and 85 teaching videos (five peer-teaching sessions) were collected and analyzed to examine PSTs’ adaptive competence in the lesson plans and enacted teachings. First, PSTs’ lesson plans were analyzed by the total number of adaptations, the number of adaptations to each Core Practice, and the number of types of adaptations. Second, PSTs’ teaching videos were explored by the number of adaptations (add and miss), and errors. Last, it was examined whether there are relationships between PSTs’ teaching adaptations demonstrated in lesson plans and errors in enacted teaching.

The results showed that PSTs created a wide-ranged number of adaptations to lesson plan one to three (lesson plan one \([\text{Median}=38.50, \text{range} 6-101]\); two \([\text{Median}=49.00, \text{range} 14-184]\); three \([\text{Median}=38.00, \text{range} 18-97]\)). The PSTs made the most adaptations to Core Practice two (providing clear instruction) followed by one (establishing rules and routine) and five (building positive relationships with students); minimum adaptations were made to Core Practices three (breaking down the content into smaller elements) and four (checking students’ understanding). Also, the majority of teaching adaptations made by PSTs were type two (refine) adaptations, and a minimal number of teaching adaptations were made for types one (modify) and three (apply). Relative to teaching, the results showed that PSTs were able to make teaching adaptations (add and miss) in enacted teaching that was not on their lesson plans, and PSTs showed fewer errors in enacted teaching as they progressed from week one to five. Last, Spearman’s rho analysis showed that there were no relationships between PSTs’ adaptations to their lesson plans and errors in enacted teaching.

Preservice teachers developed their teaching adaptive competence in lesson plans and enacted teaching through teaching rehearsals and repeated teaching in authentic settings with the use of teaching scenarios, quality supervisors’ feedback, and structured reflection. In conclusion, PBTE is an effective framework for promoting PSTs’ teaching adaptive competence in lesson planning and enacted teaching.
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CHAPTER 1

The Challenge of Teacher Development

There is widespread agreement that the quality of teaching is the most influential variable in student learning. Developing and improving teaching quality begins with and is an expectation for teacher education programs (Ball & Forzani, 2009; Benedict et al., 2016; Lampert, 2010). Ball and Cohen (1999) have argued that many people outside of the teaching fields consider that teaching occurs with common sense, and thus, professional development at either the pre-service or in-service levels is not necessary. However, teaching has its own professional knowledge, skills, ethics, and code of conduct (Ball & Forzani, 2009; Cohen, 2011; Lampert, 2010). In short, teaching is specialized, professional, and ethical work (Cohen, 2011).

Teachers need to understand their subject matter, pedagogy, and the context of where they are teaching. Also, teachers should know the developmental characteristics of their students not only in general but also at the individual level (Ball & Cohen, 1999; Goodway et al., 2019). Understanding that each student has a different background such as their culture, family, social-economic status (SES), and race/ethnicity, and using this knowledge to apply adjustments and adaptations to make the content accessible for all students within the safe and inclusive learning environment is critical for teachers (Ball & Cohen, 1999; Ball & Forzani, 2009; Forzani, 2014; McDonald et al., 2013; Shulman, 1987). Collectively, this constitutes the specialized, professional, and ethical knowledge of the teacher.

The above narrative described the basic dimensions of teaching, but what is quality teaching? Kennedy (2008) argued that there are three types of perspectives on quality teaching, including (a) a teacher’s cognitive resources, (b) a teacher’s performance, and (c) a teacher’s
effect. A teacher’s cognitive resources perspective includes a range of variables (Kennedy, 2008). The first set of variables is the teacher’s knowledge, beliefs, and attitudes learned from their teacher education program, and their experiences in life (Ball et al., 2008; Pajares, 1992; Shulman, 1987). Second, a teacher’s test scores such as grade point average (GPA) from classes and cumulatively, edTPA, and teacher assessments (e.g., state licensure tests) are linked to quality teaching as a predictor of effective teaching (Darling-Hammond & Youngs, 2002; Labaree, 2008; Wang et al. 2011). The third variable within the teachers’ cognitive resources perspective looks at whether teachers hold an appropriate teaching license for the subject they teach (e.g., a teacher licensed in teaching physical education). There is weak empirical support for the cognitive resource perspective (Wang et al., 2011). For example, Wayne and Youngs (2003) found that there is little association between student learning outcomes and a teacher’s test scores or their teaching certification. This view of teaching might be considered teacher quality as distinct from teaching quality.

Wang et al. (2011) noted that the teacher’s performance perspective is a common rationale for quality teaching. This perspective sees what teachers do in a class (e.g., process variables) impact students so that Pre-Service Teachers (PSTs) or in-service teachers can be evaluated in terms of the quality of their teaching performances (Ball & Cohen, 1999; Ball & Forzani, 2009; Forzani, 2014, McDonald et al., 2013). In quality teaching, process variables such as content knowledge, pedagogy, or management skills must be adapted to students and contexts (Ball & Forzani, 2009). There is strong longstanding evidence in support of process-product measures of teaching and learning (Evertson et al., 1980; Kirschner et al., 2006; Tannehill et al., 2013). This view of teaching might be considered teaching quality as distinct from teacher quality. The teacher’s effect perspective defines quality teaching in terms of the learning gains
and achievements that teachers are able to produce in their students. Much of the argument against this definition lies in the wide variance at the beginning of the year scores of students, the number of students in the class, and the variance in the experience of teachers (Fenstermacher & Richardson, 2005).

Ball and Forzani (2009) have argued that teacher education programs should put the practice of teaching at the center of their training. In other words, PSTs should not only learn the knowledge of teaching but also have opportunities to practice applying those knowledge bases to be able to produce and improve student learning. In their work, Ball and Forzani (2009) advocated for the term training over the commonly used term, education, which is often considered negatively in the work of teaching. The notion of training in their work is referred to as “discipline and instruction directed to the development of powers or formation of character; education, rearing, bringing up; systematic instruction and exercise in some art, profession, or occupation, with a view to proficiency in it” (Ball & Forzani, 2009, p. 498). A reliable systematic teacher education program needs to provide effective training for PSTs.

Ball and Cohen (1999) observed that teachers cannot do their work if they do not know how teaching and learning occur in complex and unpredictable contexts, arguing the importance of PSTs’ learning in and from practice. The teacher education program should help PSTs to apply knowledge and enact teaching skills effectively with the specific goal of improving their teaching ability (Ball & Forzani, 2009). To address these outcomes, Ball and Bass (2003) introduced the practice-based theory of knowledge for teacher education to respond to the demands of the practice. Practice-based teacher education (PBTE) focuses first on determining what teachers really need to learn in order to teach, and then unpacking it and training PSTs.
The Role of Practice-Based Teacher Education in Improving Quality Teaching

Practice-based teacher education focuses on training PSTs and having them examine their contexts and the effects of their teaching (Ball & Cohen, 1999; Forzani, 2014). The notion of PBTE considers the connection between theory and practice as one of the most important features of teaching, and emphasizes the importance of opportunities to practice teaching using the theory that they learn among PSTs. Ball et al. (2008) argued that PBTE does not simply focus on how many hours PSTs spend teaching at the lab or field, rather, it emphasizes whether they learn enough about the work of teaching to be prepared as teachers, such as what to teach, how to teach, and how to assess. To improve teaching quality, teacher education programs using a PBTE framework (a) teach specific and necessary knowledge, skills, and performance for teaching which can be defined with Core Practices, (b) provide detailed developmental teaching practice which progresses from observing good examples of teaching to practicing teaching in authentic settings with a supervisor and assessing individual teaching performance (Ball et al., 2008).

Grossman et al. (2009) introduced three pedagogical approaches for the use of PBTE in teacher education: (a) representations of teaching (e.g., observing the example of good teaching), (b) decomposition of practice (e.g., determining Core Practices), and (c) approximation of practice (e.g., teaching rehearsal, repeated teaching). Grossman et al. (2009) also argued that these approaches of PBTE provide PSTs opportunities to practice teaching and reflect on their teaching strategies which consequently help PSTs develop their vision for the work of teaching (Anthony et al., 2015).

Criticisms of PBTE have focused on that Core Practices are discrete teaching skills and they are a one size fits all teaching approach for students who vary in their abilities, histories,
language, social norms, and cultures (Daniels & Varghese, 2020). However, researchers advocating for PBTE counterargue that adaptability and decision-making are the critical skills to be learned and practiced in PBTE every student is different. Thus, teachers should know how to adapt and change their planned lessons based on their understanding of their students.

There are two rationales for focusing on the adaptability of teachers. First, Shulman (1987) described pedagogical content knowledge as “an understanding of how particular topics, problems, or issues are organized, presented, and adapted to the diverse interests and abilities of learners, and presented for instruction” (p. 8). Central to this definition is a teacher’s ability to adapt pedagogy and content based on their knowledge of the students and the context in which they are teaching. Second, teaching is characterized by (a) multidimensionality, which means many events and tasks occur in the classroom; (b) simultaneity, which means many things occur at the same time in the classroom; (c) immediacy, which means that classroom events occur at a rapid pace; (d) unpredictability, which means classroom events occur unexpectedly; (e) publicness, which means a classroom is a public space, therefore, the teacher and students are involved in classroom events altogether, and everyone can witness them; and (f) history, which means that the class meets during the weekdays for several months continuously, and it accumulates common events and activities in the classroom. This nature of the classroom requires teachers to be adaptable (Doyle, 1986).

**Problem Statement and Purpose**

To develop teachers’ adaptability, teacher education programs need to provide deliberate practice in the form of opportunities to practice adaptability and require PSTs to reflect and receive feedback on those practices. The two contexts where this deliberate practice happens are
in instructional planning using lesson plans and teachings such as peer teaching and teaching in schools.

At present, we know little about how PSTs adapt their lesson plans and teaching. This study investigated: (a) how PSTs’ lesson plans are repeatedly modified from an initial outline, following lectures, viewing an example video of the teaching, reflection, supervisor’s feedback, and reflection after their own teaching experience of the teaching rehearsal and repeated teaching; and (b) how PSTs adapt their teaching while they teach peers. The results of this study could show how teacher education programs can be more effective in developing lesson adaptability by integrating coursework with clinical experiences, and reflective thinking which ultimately influences professional growth.

**Research Questions**

This is one of the first studies examining PSTs’ adaptability in the physical education field. I propose to use a descriptive research design consistent with an inductive inquiry strategy to examine adaptation. The research questions for this study are formed in part by both our unfamiliarity with teaching adaptation in physical education which represents a significant gap in the research and by the rationales underlying PBTE. The following research questions will guide the study.

1. How does PSTs’ teaching adaptive competence develop through PBTE reflected in modifications of lesson plans across the five weeks?
   a. PSTs will make adaptations to lesson plans one to three (weeks one to five).
   b. PSTs will make more adaptations on Core Practices two (providing clear instruction), four (checking students’ understanding), and five (building positive relationships with
students) than on Core Practices one (establishing rules and routine) and three
(Breaking down the content into smaller elements).

2. What types of adaptation that PSTs made in lesson plans from week one to five?
   a. PSTs will create various types of adaptations as they develop their adaptive
      competence as they move from week one to five.

3. How PSTs’ teaching adaptive competence was developed in enacted teaching across the
   five weeks?
   a. PSTs will demonstrate teaching adaptations (add and miss) in enacted teaching from
      weeks one to five.
   b. PSTs will show fewer errors while they teach from weeks one to five.

4. What is the relationships between teaching adaptive competence on lesson plans and
   errors in enacted teaching?
   a. PSTs who made more adaptations to the lesson plans will have fewer errors in the
      enacted teaching.

**Significance of the Study**

This study is significant in three ways. First, this is one of the first studies to examine
PSTs’ lesson plans and teaching adaptability in physical education teacher education (PETE).
The lesson plan is an essential and helpful tool for learning to teach. Adaptations made to the
lesson plan from the experiences in PBTE provide documentary evidence that PSTs are reacting
to their teaching and planning. Refinements during the act of teaching provide direct evidence of
reflecting in action. In this study, examining adaptations on PSTs’ lesson plans and teaching
provides evidence as to what adaptations novice teachers make insights into how to assist PSTs
in making adaptations. Such understandings can inform teacher education.
Second, this study is grounded in PBTE epistemology. Practice-based teacher education is increasingly used in other subject matters such as mathematics and science to inform teacher education (Ball et al., 2008; Grossman et al., 2009; Windschitl et al., 2012). However, PBTE is a new concept for PETE. This study provides data to support PBTE outcomes in the physical education field which will also provide a baseline for future studies. Third, there are only two recent studies examining PSTs’ lesson plan adaptability in PETE, and these studies had only five and nine participants respectively. Therefore, this study extends the literature by using a larger sample size and providing further evidence of how PSTs develop adaptive competence.

**Limitations**

This study has the following limitations.

1. The measurements of lesson plan adaptability are in their infancy and the findings are limited to the categories used.
2. This is a descriptive study and as such causal statements cannot be made and generality cannot be claimed.
3. I used a convenience sample with all participants taken from the same PETE program so that the findings are not generalizable.
4. Analyzed teaching occurred in peer-teaching settings in labs on campus which is an approximation and not the exactly same as an actual teaching setting.

**Delimitations**

This study is delimited to:

1. The specific observation methods and variables as introduced in Chapter three.
2. The teaching of a specific subject matter (i.e., team handball) taught by the PSTs to their peers and middle school students.

3. The course in which this study was conducted was an introductory teaching methods course consisting of lectures, lab teaching, and field teaching.

4. The PSTs in this study had not taught physical education before and can be considered novices in teaching.

**Definitions**

In this section, I provide definitions of terms used throughout this research.

*Adaptation:* Changing how to deliver the instruction or tasks for students considering individual differences in backgrounds such as “conception, preconceptions, misconceptions, and difficulties, language, culture, and motivations, social class, gender, age, ability, aptitude, interests, self-concepts, and attention” (Shulman, 1987, p. 15).

*Core Practice:* “Teaching practices that are essential for novices to become capable at before they are permitted to assume independent responsibility for a classroom” (Forzani, 2014, p. 357). Core Practices focus on applying theories in specific settings with specific content and context rather than focusing on learning theory as discrete events (Ball et al., 2009; Forzani, 2014; McDonald et al., 2013; Ward, 2020; Ward et al., 2020). Example of Core Practices includes organizing and representing the content, designing and teaching lessons to meet objectives, and developing and establishing rules and routines.

*Deliberate practice:* Practice with the specific intention of improving skills. There should be a well-defined goal, multiple opportunities for practicing, and reflection of the performer with feedback from a supervisor (Ericsson 2002; Ericsson et al., 1993; Kavanagh et al., 2020).
**Instructional task:** Presentation, practice, or participation with the subject matter.

Instructional tasks have a substantive function in relation to class content. In physical education, these tasks are primarily movement activities or the acquisition of knowledge in relation to the activity (i.e., rules and strategy; Rink, 1979).

**Managerial task:** Managerial behaviors which create the conditions for learning. These behaviors are not directly substantive in nature, but create the conditions necessary for substantive learning (Rink, 1979).

**Physical Education Teacher Education (PETE):** A teacher education program that trains an undergraduate student to be a Pre-12 physical education teacher.

**Practice-based teacher education (PBTE):** A movement that responds to criticisms that teacher education programs focus on teaching theories that do not apply to the practice of teaching (Janssen et al., 2014). It is “training focused on learning professional performance, centered around key activities of the profession, and involving an investigation of critical problems in teaching” (Forzani, 2014, p. 358).

**Pre-service teachers (PSTs):** Undergraduate students enrolled in a teacher education program.

**Reflection-in-action:** Reflecting during the lesson (Schon, 1983).

**Reflection-on-action:** Reflecting after the action by looking back on the lesson (Schon, 1983).

**Repeated teaching:** Practice teaching the same lesson multiple times, with different contexts such as students or space (Ward & Cho, 2020).
**Task statement:** A set of instructions describing what a person is expected to do in order to successfully meet the demands of a situation (Doyle, 1979).

**Task structures:** Patterns for organizing and implementing subject matter and non-subject matter activities (i.e., an instructional task system and a managerial task system). Each pattern consists of a goal and operations to achieve that goal (Doyle, 1979; Marks, 1988).

**Task:** What a person must do to successfully meet the demands of the situation.

**Teaching approximation:** A setting similar to actual teaching in terms of using the same content, pedagogies, equipment, space, and lesson duration.

**Teaching rehearsal:** Practicing the cluster of teaching skills in front of peers with authentic teaching contexts (Ward & Cho, 2020).
CHAPTER 2

Shulman (1987) argued that teachers’ adapting instruction for learners to accommodate their diverse backgrounds, interests, and abilities is a key component of pedagogical content knowledge. This is especially true as the classroom is (a) multidimensional (e.g., a teacher needs to control content and manage students because a classroom is crowded, and students have different abilities and preferences), (b) simultaneous (e.g., a teacher needs to provide feedback to students while monitoring other students’ safety), (c) immediate (e.g., a teacher needs to make a decision on the best instructional approach immediately after observing student’s performance), (d) unpredictable (e.g., students struggle to complete a task more than a teacher expected), and (e) public (e.g., every event in the classroom can be witnessed by anyone such as students or other teachers). As such, a classroom is seldom a stable or routine environment (Doyle, 1986). Thus, strengthening the adaptive competence of pre-service teachers (PSTs) is essential in teacher education (Sternberg, 2014; Timperley, 2013; Von Esch & Kavanagh, 2018).

Adaptive teaching is a key focus of the practice-based teacher education (PBTE) framework which is designed to move learning in teacher education programs closer to real-life teaching in schools. In PBTE, PSTs have substantive opportunities to practice their teaching and reflect on their practice. With the opportunities of peer teaching or teaching practices at school, PSTs learn not only how to provide instruction, but also how to adapt their instruction (Forzani, 2014; McDonald et al., 2013; Zeichner, 2012). To accomplish these learning outcomes in instruction among PSTs, lesson planning is another important component of PBTE. By improving the ability to adapt lesson plans, PSTs could enhance their adapting skills in enacted teaching to meet diverse students’ needs.
This review consists of four sections. The section defines PBTE and its application to physical education teacher education (PETE). The following section introduces Core Practice, which is the key concept in PBTE. The third section reviews the literature on adaptive competence in lesson planning and enacted teaching in the field of education. The last section of the review discusses the literature on adaptive competence in lesson planning and enacted teaching in the physical education field. The review is concluded with a summary of the findings and the future direction of the study.

**Practice-Based Teacher Education**

**What is Practice-Based Teacher Education?**

Ball and Cohen (1999) defined PBTE as “training focused on learning professional performance, centered around key activities of the profession, and involving the investigation of critical problems in teaching” (Forzani, 2014, p. 358). Practice-based teacher education is a movement that has evolved in response to the fact that teacher education programs have been focusing on theories that are often not applied to the practice of teaching (Janssen et al., 2014). This raises questions on the purpose and relevancy of such theories being taught in teacher education programs. It is not an argument against the theory but, it is the argument against the theory that is not applied, and which results in a disconnection between theory and practice (Ward, 2011). The goal of learning theories is to use them while teaching, such as teaching the Sport Education curriculum model and having PSTs implement it in their secondary teaching practicum and student teaching (Siedentop, 1994), teaching the theory of dynamic systems in motor development (Goodway et al., 2019) and having PSTs use learned theory to teach children fundamental motor skills, or teaching a motivational theory (Petri & Govern, 2012) or social-ecological model (Bronfenbrenner, 1979) and having PSTs adopt it to inform the design of
lessons and teaching practice. The connection between theory and practice is also a key element of recent teacher assessment models, such as assessment three of edTPA where PSTs are required to connect the links between their pedagogy and student learning (Stanford Center for Assessment, Learning, and Equity [SCALE], 2014).

**The Dimensions of Practice-Based Teacher Education**

Well-designed practice-based opportunities that are repeated and occur in authentic contexts are widely used in many fields including medicine, engineering, aviation, and military. They are demonstrably effective ways to gain and develop the skills being taught and their use in different contexts. Similarly, in teacher education, practice-based opportunities provide context for PSTs to develop and integrate the knowledge and teaching skills that they need for effective teaching (Ball & Forzani, 2009; Benedict et al., 2016; Janssen et al., 2015; Lampert et al., 2013). Benedict et al. (2016) observed that:

“This type of instructional expertise does not come from engaging in observation of teaching or from reading about the philosophy of teaching alone. It is developed through careful practice coupled with constructive feedback. For teacher candidates to learn to be effective, they need high-quality opportunities to practice. These opportunities, although informed by research, are often difficult to integrate due to intensive emphasis on coursework and challenges with finding high-quality placements in the field” (p. 1).

Benedict et al. (2016) suggested six essential features for high-quality practice-based opportunities: (a) modeling, (b) spaced learning, (c) varied learning, (d) coaching and feedback, (e) analyzing and reflecting, and (f) scaffolded practice opportunities. First, PSTs should be provided with good examples of the teaching performance they are expected to demonstrate (*modeling*). Through observation of a good model, PSTs can establish a benchmark for quality.
Second, experiences are essential to developing teaching competence, and those practice opportunities should be scattered for PSTs to improve their teaching competence (*spaced learning*). Learning how to teach requires PSTs to practice teaching and to analyze their own instruction not just in one class session, but should repeatedly occur across the semester. Third, providing PSTs teaching practice opportunities with diverse learners in varied contexts is critical to practice adapting their instruction based on different students’ needs (*varied learning*). Practice opportunities with diverse learners and settings strengthen the PSTs’ ability to adapt their instructions.

Fourth, receiving *coaching and feedback* on their teaching from their supervisors, school teachers, as well as their peers is vital for developing teaching effectiveness among PSTs. The feedback could be given in one-on-one or whole-class settings. The fifth component is to *analyze and reflect* on their actions and student learning. During practicing teaching sessions, PSTs reflect and analyze their instruction based on the feedback from a supervisor and analysis of recorded lessons. Lastly, the metaphor of scaffolding is used to describe how PSTs are guided within and across lessons and courses relative to the sequences of work or projects, with recurring teaching tasks with variations (*scaffolded practice opportunities*). Scaffolding involves the development of progression from simple to more complex and rich contexts. In such a progression, PSTs increasingly rely on their own reflection, with reduced support from supervisors.

**Practice-Based Teacher Education in Physical Education**

Though the concept of PBTE is not new in the general education field, it is only recent that scholars have started studying the framework of PBTE in the physical education field. When the PBTE is discussed in the physical education field, first and foremost, the important
consideration is what PSTs must know to teach PreK-12 physical education (Ward & Cho, 2020). As discussed earlier, the central feature of PBTE is for PSTs to have more opportunities to learn how to represent instruction and tasks using and modifying their lesson plan, tied directly to the practice of teaching. Ward (2011, p. 70) noted that those practice teaching opportunities should be characterized by the following: (a) the rationale underlying teacher education practices, (b) strong alignment between theory and practice, (c) teaching practice in the gym or field, not in the classroom discussion, (d) teaching practice focused on the subject matter, and (e) more time spent on teaching practice rather than disciplinary study. Drawn from the works of scholars in the education field (Ball & Forzani, 2009; Benedict et al., 2016; Janssen et al., 2015; Lampert et al., 2013), Ward and colleagues (2022) explained PBTE elements at the macro and micro-level. The macro-level PBTE focuses on curriculum changes. The micro-level includes pedagogical changes of content and methods class, and how to edit and modify the lesson plan.

**Macro-level Practice-Based Teacher Education**

Reforming the PETE program with the PBTE movement at the macro-level is started from the question - what knowledge is most relevant for physical education teachers to teach PreK-12 physical education. Therefore, the macro-level PBTE includes elements such as changing the curriculum by reducing the content in disciplinary courses, making a stronger connection between disciplinary subject matter and teaching, and increasing the number of field experiences. Because there is limited time in a teacher education program, decisions need to be made that prioritize the professional knowledge that teachers must obtain (Ward & Cho, 2020). For example, a PreK-12 special educator needs to know the pedagogies and how to adapt them to work with children with disabilities. Knowing the characteristics of children who have special
needs, and knowing how to accommodate them in the classroom is a higher priority than knowing brain research related to the disability. Similarly, in physical education, Siedentop (2002) and Ward (2009) have argued, as an example, that exercise physiology and anatomy have low relevance in the forms they are taught in most college classrooms for future physical educators because they do not focus or apply the knowledge to PreK-12 physical education. PreK-12 physical education teachers do not need to know the origin and insertion of a muscle-tendon nor the Krebs cycle to teach physical education, but they do need to possess knowledge that they can apply, such as the FITT principle, energy systems, and the basic anatomical structure of the body (Ward & Cho, 2020).

A practice-based focus would be to create an exercise science course around the content found in *Fitness for Life* programs, which are specifically designed for schools (Corbin et al., 2020). Such a course would serve PSTs better than most anatomy and exercise science courses currently found in most PETE programs in the United States. Existing exercise science coursework teaches too advanced knowledge, which is not typically useful for teachers, but more importantly, it is the knowledge that teachers tend not to retain (Castelli & Williams, 2007; Ince & Hünük, 2013; Miller & Housner, 1998; Santiago et al., 2012; Santiago et al., 2016; Santiago & Morrow, 2020). This critique of exercise science and anatomy can be applied to as many professional courses in PETE programs as it has to do with teacher education in general (Ball & Cohen, 1999; Forzani, 2014; Siedentop, 2002; Ward, 2009; Ward & Cho, 2020).

**Micro-level Practice-Based Teacher Education**

The micro-level focus of PBTE in PETE programs is about redesigning existing courses of PETE programs, such as pedagogical changes in content and methods classes, and how to plan a lesson and use a lesson plan. There is a critique of the content course in PETE programs (Ward
et al., 2022). In PETE programs, there are content classes that are designed to teach the content to be taught for PreK-12 students. With these courses, PSTs can learn how to perform the sport or physical activity, and how to teach sport or activity with appropriate task sequence based on the students’ characteristics. However, the content class in PETE programs typically focuses too much on performance rather than on learning how to teach the content (Kim et al., 2015; Ward et al., 2012). Because the focus is biased toward the performance of sports, in general, PSTs are assessed with their performance level rather than the knowledge that they should know to teach the content to PreK-12 students. Although knowing how to perform is important for teaching, knowing the appropriate task sequence to teach performance, and knowing how to apply the task sequence to students with diverse backgrounds is also essential knowledge for teaching PreK-12 students. As such, PSTs need to be able to learn how to represent and sequence tasks, what is the appropriate instructional task considering students’ skill levels, and how to discriminate errors that students make during task practices in content classes.

For the pedagogical changes in a methods class, Ward et al. (2022) argued several points. First, the content to be taught in PETE programs needs to be defined to teach sports/activities in physical education settings (e.g., PreK-12 physical education teachers do not teach Krebs cycle to their PreK-12 students, but they learn when they are in the PETE program). The second is the use of repeated teaching and teaching rehearsals which are underpinned by Core Practices in methods courses (the following section further explains Core Practices). Third, the methods class needs to emphasize adaptive teaching based on reflection. Lastly, PSTs need to know how to create and edit their lesson plan, and repeatedly use it with modifications based on the teaching and feedback. Table 1 summarized the elements of PBTE in physical education (Ward et al., 2022, p.3).
### Table 2.1

*Practice-Based Teacher Education Elements and Definitions (Ward et al., 2022, p. 3)*

<table>
<thead>
<tr>
<th>PBTE element</th>
<th>Description of changes made in the last decade</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Macro - Level</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Curriculum changes</strong></td>
<td>The extent to which..</td>
</tr>
<tr>
<td>Reducing content in disciplinary courses</td>
<td>the PETE program as engaged in redesign based in the relevance of classes</td>
</tr>
<tr>
<td>Increasing content courses</td>
<td>the PETE program as engaged in redesign based in the relative importance of some classes over others in this case content knowledge classes</td>
</tr>
<tr>
<td>Increasing number of methods classes</td>
<td>the PETE program as engaged in redesign based in the relative importance of some classes over others in this case methods classes</td>
</tr>
<tr>
<td>Increasing number of field experiences</td>
<td>the PETE program has engaged in redesign based in the relative importance of some classes over others in this case practicum classes</td>
</tr>
<tr>
<td>Making stronger connections between disciplinary subject matter and teaching</td>
<td>the PETE program asked instructors to make strong connections between disciplinary subject matter and the practice/application of teaching</td>
</tr>
<tr>
<td><strong>Micro - Level</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Content class pedagogical changes</strong></td>
<td></td>
</tr>
<tr>
<td>Moving from performance-based class to SCK focus</td>
<td>the class or classes include the specific teaching of SCK in their syllabus</td>
</tr>
<tr>
<td>Moving from performance-based class to task design</td>
<td>the class or classes include the specific design of SCK tasks by students in their syllabus</td>
</tr>
<tr>
<td><strong>Methods class pedagogical changes</strong></td>
<td></td>
</tr>
<tr>
<td>Defining and teaching content</td>
<td>the PETE program has defined the content to be taught in PETE programs either in terms of CCK and SCK or in terms of scope and sequence (e.g., not teaching too advanced content in PETE classes.</td>
</tr>
<tr>
<td>Using repeated teaching</td>
<td>the methods class or classes uses the repeated teaching of the same lesson.</td>
</tr>
<tr>
<td>Using teaching rehearsals</td>
<td>the methods class or classes uses the rehearsal of a lesson to be taught in a school using approximations peer teaching, small groups of students</td>
</tr>
</tbody>
</table>
Using Core Practices | the class uses Core Practices  
Using scenarios | the class uses teaching scenarios to elicit teaching conversations  
Adaptive teaching | the class asks teachers to engage in adaptive teaching practices based on reflection and analysis of teaching episodes.  
Viewing models of teaching | the class provides models of lessons by the instructor or practicing teachers  
Connections to standards or national curriculums | the class ties content to the national standards (though this may not be a method class).

**Planning**

| Lesson plan scripts leading to adaptation | which the lesson plans begin with a script and students then edit them.  
| Repeated modification of the same plan | the same lesson plan in repeatedly modified based teaching or feedback.  

Notes. CCK = Common content knowledge (knowledge about rules, techniques, tactics, etiquette); SCK = Specialized content knowledge (knowledge about task progression, error detection)
Core Practices

As is mentioned in Chapter one, the use of Core Practices is key in methods classes to develop PSTs instructional effectiveness in PBTE. Core Practices focus on key teaching strategies which are important for developing pedagogical knowledge (Ward et al., 2022). Core Practices (Grossman et al., 2009), also called high-leverage practices (Ball et al., 2009) and ambitious teaching practices (Windschitl et al., 2018), “represent the core task domains of teaching, such as organizing and representing content or designing, and then teaching lessons to meet an outcome” (Ward, 2020, p. 1). Core Practices help define the most impactful knowledge and teaching skills that PSTs need to know to teach effectively (Ball et al., 2009; Grossman et al., 2009; Windschitl et al., 2018). Core Practices focus on applying theories in specific settings with specific content and context rather than focusing on learning theory as discrete events (Ball et al., 2009; Forzani, 2014; McDonald et al., 2013; Ward, 2020; Ward et al., 2020).

Implementing Core Practices is not prescriptive, but teachers should actively judge how to adapt Core Practices to a given context such as students’ background, learning history, space and equipment of the school, and the content of the lesson (Ward et al., 2020). The first, and so far, only research on validating Core Practices in PETE was conducted by Ward (2020). In his study, he created a list of Core Practices and defined them using the evidence from the existing literature (see Table 2; Ward, 2020, p. 5).
### Table 2.2

**Core Teaching Practices for Physical Education and Their Evidence Base (from Ward, 2020, p. 5)**

<table>
<thead>
<tr>
<th>Core Practice</th>
<th>Description</th>
<th>Evidence</th>
<th>Effect Size</th>
</tr>
</thead>
</table>
| Establishes and uses rules and routines. | Teachers use rules and routines to maximize the time available for instruction. Routines are a framework that creates continuity across lessons by making make predictable and thus routinized frequently occurring management tasks (e.g., attendance), transitional tasks (e.g., entering and leaving the gymnasium). Rules identify appropriate and inappropriate behaviors tied to high expectations. | - Cothran & Kulinna (2015).  
- Hastie & Siedentop (2006). | 0.35<sup>4</sup> |
| Holds students accountable using informal and formal accountability systems. | Holding students accountable is a practice of ensuring students are successfully making progress in lessons. Accountability drives managerial and instructional tasks, but only if those tasks are developmentally appropriate, meaningful and presented in a motivating instructional setting | - Cothran & Kulinna (2015).  
- Hastie & Siedentop (2006). | 0.35<sup>4</sup> |
| Establishes and maintains rapport with students. | Knowing who your students are and how to connect with them is a foundational requirement for teaching effectively. Teachers who make time to learn and understand students’ backgrounds, culture, values and prior knowledge become a student of their students. This allows for the development of respectfulness, positive and social interactions, and the design of meaningful and appropriate instruction. | - Hellison & Martinek (2006).  
- Pianta (2016).<sup>2</sup> | .74<sup>4</sup> |

**Notes:**
- <sup>1</sup> Where possible review papers were chosen over research papers.  
- <sup>2</sup> Citations from general education.
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
<th>References</th>
<th>Score</th>
</tr>
</thead>
</table>
| Devotes at least 70% of lesson time to content.                            | Devoting the majority of lesson to teaching the content of the lesson is not just associated with student learning, it might be considered an ethical principle that teachers should be spending time on the content that they are being employed to teach. | • van der Mars (2006).  
• Metzler (1989). | 0.49 |
| Devotes at least 50% of the lesson time to creating MVPA.                  | While individual lessons may not always meet this criterion, most lessons should endeavor to do so as a commitment to public health goals and teachers should be able to demonstrate that they create this outcome.                   | • SHAPE America (2015).³  
• Institute of Medicine (2013).³  
• Hollis, Sutherland et al., (2017).  
• Hollis, Williams et al., (2016)  
• McKenzie, Alcaraz, Sallis, & Faucette (1998) | - |
| Represents developmentally appropriate content to students in small understandable chunks of information. | An essential task of teaching is to organize and present content to students in understandable ways. Organizing the content into developmentally appropriate and sequential chunks is an important teaching practice for teachers to acquire. Teachers need a repertoire of content representations for use when they need to describe their tasks, to respond to students when they ask questions to clarify the task and to provide alternative explanations for students who have misunderstandings. | • Rink (2001).  
• Rink (1994).  
• Hebert, Landin, & Solmon (2000). | 0.75 |
| Uses accurate demonstrations in presenting content to students.           | Demonstrations are not required in every instance of instruction, but when they are used they should accurately present the task to be performed. Similarly, use of accurate pictures and recordings.                  | • Rink (1994)  
• Weiss, Ebbeck & Rose, (1992) | 2.48 |
| Uses a sequence of extending and refining tasks to teach an objective.     | Content development refers to incremental and progressive sequencing of instructional tasks to teach a specific outcome. This is characterized by step-by-step incremental progression of both understandings and performance. Progressions should be goal | • Rovegno (1995).  
• Kim et al. (2018). | - |

³ Policy documents.
<table>
<thead>
<tr>
<th>Practice</th>
<th>Description</th>
<th>References</th>
<th>Effect Size</th>
</tr>
</thead>
</table>
| Designs a developmentally appropriate sequence of lessons to teach content that meets unit objectives. | Carefully-sequenced lessons that help students develop a deeper understanding and competence of content is an important practice. Effectively-sequenced lessons maintain a coherent focus for students linking past lessons with current lessons. | • Byra & Coulon (1994).  
• Housner & Griffey (1985). | 0.76<sup>4</sup> |
| Enacts a developmentally appropriate sequence of lessons to teach content that meets unit objectives. | Teaching carefully planned lessons that meet students’ needs leads to deeper understanding and performance competence is an essential teaching practice. | • Housner & Griffey (1985).  
• Byra & Coulon (1994). | 2.32<sup>5</sup> |
| Selects and uses instructional methods and curricula to teach content. | There are a variety of instructional and curriculum models and their use should be consistently faithful to their frameworks so that they produce specific outcomes. | • Casey (2014).  
• Casey & McPhail (2018) | 0.57<sup>4</sup> |
| Selects and uses methods to assess students' learning of content. | Effective formative assessments provide both students and teachers with ongoing feedback that allows teachers to evaluate and design further instruction. Effective summative assessments provide teachers with information about what students have learned and where they are struggling in relation to specific learning outcomes at the end of a unit of instruction. | • Hall, Hicklin, & French (2005; 2017).  
• Lund (1992). | 0.57<sup>4</sup> |

<sup>4</sup> Hattie (2017) Meta-analyses effect sizes for Core Practices and learning in general education  
<sup>5</sup> Kim et al. (2018). Meta-analysis effect sizes for Core Practices and learning in physical education  
<sup>6</sup> Scheerens et al. (2013). Meta-analyses effect sizes for Core Practices and learning in general education
<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Source(s)</th>
<th>Evidence Score</th>
</tr>
</thead>
</table>
| Differentially modifies tasks to accommodate student learning for all students. | A hallmark of effective teaching is the teacher’s adjustment of their instruction to meet the needs of the students in their class. | • Kim et al. (2018).  
• Ward & Ayyazo, (2016). | 0.45  
2.11 |
| Uses feedback, cues and prompts to correct and shape student learning. | Feedback, cues and prompts serve several functions in instruction and including informing, correcting, motivating and reinforcing student learning. | • Rikard (1992).  
• Pellett & Harrison (1995).  
• Byra & Coulon (1994). | 0.70 |
| Analyzes and improves specific elements of their own teaching. | Learning to teach is an ongoing process that requires regular analysis of instruction and its effectiveness and different effects on students. The critical skills are reflection and effecting change in future teaching is a lifelong teaching practice. Analyzing instruction may take place individually or collectively and involves identifying salient features of the instruction and making reasoned hypotheses for how to improve. | • Korthagen & Vasalos (2005).  
• Standal, & Moe (2013)  
• Tsangaridou, & Siedentop (1995). | 0.75 |
| Write appropriate, comprehensible, and professional messages to colleagues, parents, and others. | Competence in communication in the form of messages to colleagues, parents, and others is an essential teaching task. | • Penuel, Riel, Krause, & Frank (2009).  
• Richards, Gaudreault, Starck, & Woods (2018). | - |
Instructional Adaptation in Teaching and Learning Environment

Adaptive teaching is one of the key focuses of the PBTE framework, which is designed to help PSTs move closer to the actual work of teaching that they will do in schools. Teachers need to know how to adapt their instruction to present a task, design and progress a task, and provide feedback in accordance to the students. As noted earlier, the classroom environment is complex and unpredictable (Doyle, 1986). Also, there are no single students who have the same backgrounds, interests, motivation, skills, and knowledge, and thus, it is essential for teachers to adapt their instruction to meet diverse students’ needs (Vogt & Rogalla, 2009). These conditions require teachers to make numerous decisions, including when to start and stop instructional and managerial tasks, when to move forward to the next task, how detailed instruction to provide, how to answer students’ unexpected questions, and what type (e.g., corrective, evaluative) and context (e.g., whole group, small group, or individual) of feedback to provide to students during task practices. To effectively teach students in these dynamic and ever-changing environments, teachers need to constantly adapt their instruction. Accordingly, teaching PSTs how to adapt their teaching is critical in teacher education programs.

Adaptive teaching as a goal of teacher education and professional development has become increasingly important (Anthony et al., 2015; Baard et al., 2014; Lampert, 2010, Ward et al., 2018; Xie et al., 2021). There are several definitions of adaptive teaching. Pulakos et al. (2000) define performance adaptation as “altering behavior to meet the demands of the environment, an event or a new situation” (p. 615). Allworth and Hesketh (1999) note that adaptation requires “behaviors demonstrating the ability to cope with change and to transfer learning from one task to another as job demands vary” (p. 98). Baard et al. (2013) describe performance adaptation as a “behavioral modification” based on the “demands of a new or
changing environment, or situational demands” (p. 50). Von Esch & Kavanagh (2018) explained that “Adaptive expert teachers can recognize when their common repertoire of methods or approaches are not working or may not apply”, and added “In response to these problems of practice, adaptive expert teachers rethink key ideas, practices, and values; pursue the knowledge of why and under which conditions certain approaches have to be used or devised, and employ flexible, innovate, and creative competencies” (p. 241). Common to these definitions and conceptions is that teachers are seen to change their behaviors, often called adaptations and modifications, to meet the needs of individual learners.

**Routine versus Adaptive Teachers**

Bransford and Schwartz (1999) explained the difference between a routine expert teacher and an adaptive expert teacher. Routine experts are good at providing precise instruction and task presentation in a lesson. However, because they do not have developed adaptability, they are more likely to stick with the lesson plan, and perform in the same way regardless of the context (Kavanagh et al., 2020; Von Esch & Kavanagh, 2018). For example, even if the success rate of students for a task is low in the lesson, routine experts do not adapt their plan to provide easier tasks to the students. In physical education, Stroot and Morton (1989) called these types of teachers plan-dependent. Plan-dependent teachers have a lesson plan and review the plan before teaching, carry the plan with them, and refer to the plan during the teaching. Stroot and Morton (1989) found that some plan-dependent teachers feel uncomfortable if they do not have their lesson plans available as they teach.

Adaptive teachers, on the other hand, recognize situations where their plan does not fully apply, try to determine why their planned instruction is not working, and find alternative approaches for these situations by employing adaptive, flexible, and creative competencies (Von
Esch & Kavanagh, 2018). Adaptive teachers can modify their method of instructing and presenting tasks to meet learners’ needs and demands. Stroot and Morton (1989) called these types of teachers plan-independent because they adapt beyond their plan to the situation that they confront in each lesson. Stroot and Morton (1989) noted that plan-independent teachers plan outlines of lessons and block plans for their teaching, but they adapt their teaching based on what they see in students.

Kavanagh et al. (2020) observed that “routine expertise involves the efficient and precise execution of predetermined behaviors, while adaptive expertise involves the thoughtful and innovative exercising of judgment in practice” (p. 96). These two concepts are important for teacher education. If the teacher education program prepares PSTs to be routine orientated, this conception of teaching requires PSTs to master teaching skills and follow their plans regardless of student performance during the lesson. While no teacher education program would typically support this view in practice, the high reliance on following lessons plans creates a “routine” outcome. However, if teacher education focuses on making PSTs adaptive, then the focus would be developing PSTs’ adaptive competence in applying teaching skills dependent upon the situation of the lesson or classroom (Von Esch & Kavanagh, 2018). This does not mean creating lessons in the spur of the moment or abandoning lesson plans. Rather, it means not being limited by their plans and adapting to what is encountered during the lesson. In summary, although mastering teaching techniques and skills are important, having adaptability is also crucial because the classroom and gymnasium is not static and stable, but is multidimensional, simultaneous, immediate, unpredictable, and public (Doyle, 1986).
Content Knowledge in Adaptive Teaching

Fundamental to adaptive teaching is for teachers to obtain content knowledge because teachers need to know different ways to execute instructions to adapt their instruction. Unless teachers know the content, their options for adapting lessons would be sparse. The importance of content knowledge is highlighted in the 2017 National Standards for Initial Physical Education Teacher Education. The standards indicate that teachers should be able to describe and apply common content knowledge and specialized content knowledge for teaching PreK-12 physical education (SHAPE America, 2017). Consequently, the content knowledge contributes to equipping pedagogical content knowledge (PCK) among PSTs (Chang et al, 2020; Kim et al., 2018; Stefanou et al., 2020; Ward et al., 2020). The review of the multiple interventions studies that examined the impact of improving content knowledge found that after the intervention workshop, teachers used more appropriate tasks, better representation, and showed inter-/intra- adaptations for the lesson (Kim et al., 2018). As such, knowing the content is central to developing the adaptability of instruction among PSTs.

Deliberate Practice and Reflection

To develop adaptive competence among teachers, the use of deliberate practice is critical (Kavanagh et al., 2020). Deliberate practice is practice or training which is specifically designed with the intention of improving particular tasks or skills (Ericsson, 2002; Ericsson et al., 1993). With experiential learning and reflection, deliberate practice improves learning outcomes in a specific domain (Ericsson et al., 1993). Different from having only experience or repetitions, deliberate practice requires a well-defined goal, repeated opportunities to practice an activity, reflection by the performer, and the provision of feedback (Ericsson, 2002; Ericsson et al., 1993; Kavanagh et al., 2020). For example, the teaching practice opportunity needs to have specific
goals such as PSTs would learn how to deliver the instruction in a clear and concise manner or how to manage students effectively across a lesson. To achieve those goals, teaching practice needs to be repeated, not just once. A supervisor also needs to provide feedback based on the goal, and time needs to be given to PSTs to reflect on their instruction and see whether they meet the goal. Ericsson et al. (1993) argued that deliberate practice requires a PST to “attend to the critical aspects of the situation and incrementally improve her or his performance in response to knowledge of results, feedback, or both” (p. 368). Kavanagh et al. (2020) also suggested using approximations of the setting is needed which is providing a similar setting to the real teaching place. For example, the teacher education program can make similar settings by providing the same equipment or space, which is used for middle school physical education. These approximations of the setting can provide good opportunities to focus on the goals, to practice repeatedly, to enable reflection, and to receive feedback.

Since deliberate practice is a necessary, but not sufficient for teaching improvement, reflection is vital for a deeper understanding and application of adaptive teaching by PSTs (Anthony et al., 2015; Ericsson et al., 1993; Xie et al., 2021). Schon (1983) introduced two concepts, reflection-in-action and reflection-on-action. Reflection-in-action indicates reflecting on a task while it is ongoing. Schon (1983) argued that because practitioners often encounter situations of uncertainty, instability, and uniqueness, they must often act immediately to the situations. Practitioners make decisions based on noticing, thinking, and observing with tacit knowledge in the middle of acting (Schon, 1983). In the case of teaching, teachers should reflect on what they observe and modify their teaching based on the students’ performance to improve student learning. One can see a teacher’s reflection-in-action while they are teaching a lesson. A teacher adapting a planned lesson to meet students’ needs based on their performance is an
indication of reflection-in-action. Specifically, if a teacher observed that a planned task is too difficult for students, the teacher can change the equipment, modify the rules of a game, or modify the pace of the lesson to make a task easier for students.

Reflection-on-action occurs after the action has ended. Reflection-on-action is a systematic examination looking back on the action to improve future actions. Therefore, it requires time for teachers to reflect and often use various materials to prompt reflection such as video recordings, guided questions, and discussions with peers. Hall and Smith (2006) observed that reflection is a good evaluation process for guiding teachers’ thinking before, during, and after the class. Reflection-in-action is aligned with decision-making during the class, and reflection-on-action is aligned with future instruction (Hall & Smith, 2006). Reflection-on-action can be observed in the way how PSTs edit their lesson plans. For example, after PSTs have conducted a teaching rehearsal which is one of the pedagogy of PBTE, they might receive feedback from their instructor or supervisor, analyze their teaching by reviewing their own instruction video or a peer’s teaching video, or discuss these videos with peers or supervisors. They would then use the reflection to edit their future lesson plans, such as changing the sequence of tasks, changing the method of providing instruction and demonstration, or adding questions or comments to review a lesson during the lesson’s closure. Hall and Smith (2006) have argued that teacher education programs need to encourage PSTs to reflect on their instruction during teaching practices, and after the lesson to plan for their future lessons to improve their instructional effectiveness. Reflection allows PSTs to make connections between previous lessons and future lessons (Hall & Smith, 2006).
Two pedagogical approaches have increasingly been used in PBTE to promote deliberate practice and reflection: teaching rehearsal and repeated teaching (Lampert, 2010; Ward & Cho, 2020). Teaching rehearsal is a pedagogy that the PSTs can practice their teaching in front of their peers. It differs from the traditional method of peer teaching, which practices a discrete skill of teaching such as introduction, demonstration, or closure. The approximation is the key to this pedagogy. Pre-service teachers prepare and practice their teaching for and in authentically similar teaching contexts using the same lesson plans, equipment (e.g., balls, goal nets, or cones), and space (e.g., a size of a court) as real teaching settings. The PSTs do not practice each teaching skill discretely, but they practice teaching with a cluster of the skills such as starting with an introduction, warm-up, instruction, demonstration, transition, and ending with closure. They can practice a whole lesson, but may also execute only a segment of the lesson (Ward & Cho, 2020). They can do so with peers in a lab setting or small groups in a school setting, leading to increasingly larger groups and finally to an intact class.

Repeated teaching is the other pedagogy that is often adopted in PBTE. Repeated teaching occurs when PSTs practice teaching the same lesson multiple times but with different students, and it helps PSTs understand the nuances of a lesson and improve the quality of a lesson based on student differences (Lampert, 2010; Ward & Cho, 2020). Repeated teaching can occur in on-campus settings and during field experiences at school sites. With repeated teaching, PSTs are able to discover and understand how their teaching progresses and improves as they teach the same lesson repeatedly. Deliberate practice and reflection are promoted using the
pedagogies of teaching rehearsal and repeated teaching. By using these pedagogies, PSTs can improve and refine their instructions (Ward & Cho, 2020). These pedagogies increase the opportunities for PSTs to practice making decisions and improve their adaptive competence.

**Review of Teaching Adaptation Studies in Education**

This section provides the review of adaptation studies in education including the studies examining the developmental process of lesson planning, intervention to develop and improve lesson planning, adapting and modifying enacted instructions.

**Studies on the Developmental Process of Lesson Planning**

John (1991) conducted a one-year longitudinal case study to examine PSTs’ growth and development on their lesson planning. Five PSTs from mathematics and two from geography were selected as participants. Each PST had a mentor teacher at a school and a curriculum tutor at the university. The researchers used interviews as the main data source and collected the PSTs’ written lesson plans. Data collection occurred three times, at the beginning, middle, and end of a course. The results showed that PSTs were able to consider their students more when they planned their lessons. The results also suggested that a curriculum tutor was helpful; however, each PST felt differently about how helpful their tutors were in developing lesson planning ideas. Then the study concluded that PSTs develop lesson plans differently depending on their instructional tasks of the lesson and the practical condition of each classroom.

Ozogul et al. (2008) examined the effect of three types of evaluations (teacher evaluation, self-evaluation, and peer evaluation) on teaching performance, knowledge, and attitudes of PSTs on writing lesson plans. A total of 101 PSTs from an undergraduate teacher education program were assigned to each type of evaluation group. All participants submitted initial lesson plans, and after the evaluation and feedback from the instructor, self, or peers, they
submitted a revised lesson plan. The lesson plans were scored using a 15-item lesson plan rubric consisting of the categories of lesson objectives, material, procedure, and assessment. Each of these rubrics was rated in a range of 0 to 2. The researchers found that in all three groups, the revised lesson plan scores were significantly higher than the initial lesson plan scores. Though there was no statistically significant difference in the initial lesson plan score among the three groups and there were statistically significant differences among the groups on the revised lesson plan score; the teacher evaluation group illustrated the highest score, and the self-evaluation group showed the lowest score and the teacher evaluation group score was significantly higher than the other two groups. Ozogul et al.’s (2008) finding showed that although all three groups had improvements, the teacher evaluation group had more positive changes in lesson planning. The researchers noted that the teacher evaluation group had better improvement because the instructors had more knowledge and experience in planning and evaluating. For future studies, the researchers suggested that PSTs could be trained on how to evaluate lesson plans and provide feedback to determine whether this would demonstrate improvements similar to the teacher evaluation group.

Lim et al. (2018) examined how three approaches to lesson planning—synthesizing, creating, and modifying—affected PSTs’ lesson planning. The study included 126 PSTs from mathematics methods classes of two teacher education programs in the United States. They were asked to create a lesson plan for a 90-minute class using different approaches: modification, focusing on revising a prescribed lesson plan; synthesis, focusing on combining short lesson plans with appropriate synthesizing and sequence of activities; and creation, emphasizing PSTs’ creativity in lesson planning. A total of 45 PSTs modified prescribed lesson plans, 42 PSTs synthesized three lesson plans, and 39 PSTs created an initial lesson plan. These lesson plans
were rated using a four-point scale on seven domains of lesson planning which were aligned with standards, set appropriate learning goals, had opening and warm-up, learning activities, closure, methods to measure student understanding, and instructional support for a range of learners. The findings showed that PSTs were good at modifying a lesson plan, but they had lower scores on synthesizing followed by creating lesson plans. Based on the results, the authors concluded that PSTs could create the most effective lesson plan when they revised a prescribed lesson plan. The limitation of this study was that PSTs were not randomly assigned to groups and could choose which approach they would use for lesson planning. This represents a selection bias, which indicates that the findings should be interpreted with caution.

**Summary**

These three studies demonstrated how PSTs develop their lesson plans. John (1991) found that practicum experiences were helpful for PSTs to develop lesson plans. Ozogul et al. (2008) reported that when teachers evaluated their PSTs’ lesson plans, PSTs showed higher improvement on lesson planning than other evaluators (self or peer). Lim et al. (2018) found that when PSTs modify existing prescribed lesson plans, they had better quality lesson plans than synthesizing lesson plans or creating new lesson plans. The studies revealed that there is no fixed way to develop a lesson plan, but PSTs preferred their own style of developing their lesson plans.

**Intervention Studies on Developing and Improving Lesson Planning**

Three studies investigated the efficacy of an intervention on developing and improving PSTs’ lesson planning. Zhou and Xu (2017) examined PSTs’ learning from microteaching lesson study and their perceptions of microteaching lesson study. The lesson study was a professional learning process in that teachers could work together to improve their practice of instruction. The microteaching lesson study provides PSTs the opportunity to practice teaching, and incorporates
a cycle of planning, teaching, reflecting, and revising a lesson. Participants were 73 PSTs from a physics and chemistry methods class at a mid-sized university in Canada. PSTs’ reflective journals, lesson plans, and instructors’ observation notes of PSTs’ teaching were used as data sources. The researchers found that they used lesson plans and instructors’ observation notes to better interpret their comments in reflective journals. PSTs reported that microteaching lesson study helped them understand a new teaching approach to science teaching, called inquiry-based teaching, and to learn inquiry techniques. PSTs also reported that the microteaching lesson study helped them to learn more about instruction skills, and to have better performance in teaching practicum.

Kang (2017) examined how the teaching cycle affects the effective planning of eight PSTs in science secondary education in the United States. The participants engaged in a teaching cycle of planning, enacting, analyzing teaching (recorded), and reflecting. The PSTs submitted their lesson plan and received feedback from an instructor, classmates, and mentor teachers. Teaching episodes included lesson plans, the videos of the teaching episode, and the documents of materials, such as student worksheets and presentation slides were the primary data sources. Lessons were analyzed by “what students are asked to produce” in the lesson, and then “how PSTs selected, designed instructional tasks” (p. 59) was examined in the planning process. The researcher found that PSTs engaged in a planning process which has links among “framing instructional goals, constructing a lesson scenario, and addressing problems of practice” (p. 61). Two types of planning processes were identified from the analyses. The first type was demonstrated by three PSTs who were sorted in the ‘disciplinary practice group’ focused on framing a broad goal, making students engaged in disciplinary practices. The second type was shown by five PSTs who were in the ‘content group’ focused on framing the lesson goal to teach
specific content of the lesson. Other differences between the two groups were found, such as how PSTs construct lesson scenarios, how they react to student participation problems, and how they use curriculum resources and communicate with other teachers. Kang’s (2017) study revealed the way of how PSTs in science education learned planning through the teaching cycle including clinical experience in a teacher education program.

Bismack (2019) conducted a longitudinal case study to investigate teachers’ knowledge development based on two years of a PBTE program and two years of their own teaching. Three novice elementary science teachers participated in this study. Qualitative methods were used to analyze the teachers’ knowledge development over time. The researcher collected video records, lesson plans, reflections, and interview data. Lesson plan data was collected to see how teachers’ knowledge was demonstrated in their plans. Lesson plans were collected for two years when they were in the teacher education program, and for two years as in-service teachers. The collected lesson plans were coded by idea units such as the core content knowledge of science, the knowledge of content and students, the knowledge of content and curriculum, and the knowledge of the application of science. Bismack’s (2019) study found that the teachers had opportunities to develop their teaching knowledge in their teacher education program. The researchers of this study assessed how teachers progress based on PBTE and their own teaching experiences. The scholars noted that the PBTE approach helped PSTs learn about teaching. The PBTE decomposed features of teaching to make them more manageable and enabled PSTs to become more engaged in learning features of teaching. Teaching rehearsal provided opportunities for PSTs to put features of teaching together. The researchers argued that PBTE provided a good opportunity for teaching practice.
Summary

The three studies reviewed in this section used interventions to develop and improve PSTs’ lesson planning. The interventions were a microteaching lesson study, a teaching cycle, and PBTE. All the interventions demonstrated positive improvement in lesson planning. Common strategies in these approaches were providing multiple opportunities for PSTs to practice developing lesson plans and implementing the lesson plans. In particular, the teaching rehearsal which is the pedagogy of PBTE was effective by providing PSTs enough opportunities to use their lesson plan and combine the features of teaching together that they learned.

Studies Examining Adapting and Modifying Enacted Lessons

Two studies examined the adaptation and modification in the enacted lesson. Vaughn (2019) examined teacher adaptability during reading instruction. She used a multi-case study design, and teacher adaptability was analyzed for six different educators. These six teachers had various teaching backgrounds such as years of teaching and grade levels. The year-long study took place in kindergarten classrooms at three different public elementary schools in rural areas of the Pacific Northwest. The researchers conducted pre-and post-study interviews, collected lesson plans, conducted pre-and post-lesson interviews (before and after teaching a lesson), and had classroom observations. Pre-and post-study interviews asked about the teachers’ lesson goals and their perceptions of the planning and their overall plan for instruction. The researchers observed classes and took field notes to see the evidence of adaptations. The lesson plans were obtained at the pre-lesson interview, and questions about the reasons for any adaptation were asked during the post-lesson interviews. Two assistants who were familiar with adaptive teaching coded the collected data. The researcher revealed that the six teachers made 184 adaptations, such as inserting a mini-lesson, providing examples, and having new activities from
72 observations. Through the interviews, researchers found the common rationale for making adaptations such as to reflect on the knowledge of students, to teach skills better, and to challenge the understanding of students. Although the frequency of lesson adaptations was different among the teachers, they made more adaptations of “modeling a skill or inserting a mini-lesson” (p. 23) than other adaptations based on using their knowledge of students such as students’ interests and backgrounds. Vaughn’s (2019) study revealed the rationales of why teachers make adaptations during a lesson. Although it is a year-long study in different contexts, the small sample size was a weakness of this study.

Scharon (2013) used a qualitative collective case study to explore how teachers in chemistry adapt or maintain their lesson plans, and which contextual factors affected adaptations. Five high school chemistry teachers in the Midwest participated in the study. The researchers collected lesson plans, had classroom observations, and conducted interviews. In addition, a survey was conducted to explore which factors influenced making adaptations. The researchers focused on adaptations in one single class rather than observing many classes for each participant. Field notes were used to code adaptations or to report no change in the lesson plan. Video recordings of the lessons were also used and transcribed to identify the evidence of adaptations. During the interview, teachers were asked to think about how they implemented a lesson plan, such as why they made changes or kept it the same. Constant comparative methods were used to compare and contrast multiple data sources to find similarities and discriminate categories. The researchers found that there were 15 types of adaptations such as modifying instructions, adding additional support for students to complete a task, changing equipment, and modifying task sequence. The researchers also identified factors that affect whether teachers make adaptations such as the teacher’s confidence in students’ ability, student confusion, student
previous knowledge, and activity efficiency. These factors showed that adaptations were occasioned by factors, not by random decisions. Scharon’s (2013) study provided insights about which adaptations were made, and which classroom factors affected them.

**Summary**

Two studies examined the adaptation and modification of the lesson. Both studies showed that there were specific rationales and factors for teachers to make adaptations to their lesson plans, and they did not make those adaptations randomly. There were three factors revealed. It included the knowledge of students (e.g., background and interests), challenging students’ understanding, and activity efficiency.

**Teaching Adaptation Studies in Physical Education**

This section discusses four studies examining teachers’ adaptations for lesson plans and enacted teaching in physical education that were conducted in different countries including England, the United States, and Belgium. The first study examined PSTs’ perceptions about lesson planning and teachers’ use of lesson plans for their instruction. The second and third studies looked at how PSTs develop adaptive competence, in an in-person and virtual methods course, respectively, using repeated teaching and teaching rehearsals, which are both critical components of PBTE. The last study investigated the impact of content knowledge development on in-service teachers’ instructional adaptations.

Capel et al. (2019) conducted a study in England to examine how 289 PETE PSTs use their lesson plans. PSTs completed a questionnaire about using lesson planning after the school-based practicum. The results showed that 46.5% of participants answered that they deviated from the lesson plan during the lesson. They said they were flexible to adapt the lesson to address
unpredicted situations during the lesson. 45.5% of participants answered that they used lesson plans depending on the lesson. They mentioned that it depended on their content knowledge level of the activity or task of the lesson. And 8% of participants said they just followed their lesson plans as written regardless of the situation. Capel et al.’s (2019) study highlighted that PSTs understand that it is appropriate to adapt their lesson plans depending on the needs of students and class contexts instead of relying on what they have planned (i.e., plan-dependent teachers).

Xie et al. (2021a) explored (a) how teaching rehearsal and repeated teaching contributed to developing five PETE PSTs’ adaptive competence in lesson planning for middle school physical education, and (b) how PSTs perceived teaching rehearsal and repeated teaching for developing their adaptive competence in an introductory methods class in the United States. The PSTs received three pre-developed lesson plans from an instructor and edited them a total of five times across the course. Lesson plan data were coded using six categories of Core Practices (i.e., rules and routines, clear and precise instruction, checking for understanding, adjusting instruction based on students’ needs, breaking down content into smaller elements, and building respectful relationships with students). The five PSTs made a total of 620 adaptations on six Core Practices, with making adaptations on some of the six Core Practices earlier in the semester and more frequently than others. For example, the PSTs edited ‘making rules and routine’ and ‘providing precise instruction’ earlier and more often than ‘building a respectful relationship.’ The frequent adaptations of certain Core Practices were understandable with the purpose (i.e., developing basic pedagogical competence) and the context of the course (PSTs were only peer teaching at the beginning and actually taught students later in the semester). The interview data illustrated that teaching rehearsal and repeated teaching helped the PSTs understand and use six Core
Practices, which also improved their confidence in teaching. The study concluded that teaching rehearsal and repeated teaching helped PSTs develop their adaptive competence in the lesson plan and actual instruction.

The consistent results of developing adaptive competence using repeated teaching and teaching rehearsals were reported in a virtual setting. Xie et al. (2021b) examined how nine PETE PSTs developed adaptive competence in lesson planning through repeated teaching and teaching rehearsal in a virtually taught introductory methods class in the United States. Similar to the first study (Xie et al., 2021a), the PSTs learned instructional and managerial Core Practices (e.g., providing precise instruction, establishing rules and routines) in a lecture setting and had 20-minute peer teaching opportunities to practice the Core Practices through Zoom (each group had four to five PSTs). The PSTs taught two different lessons repeatedly across the six weeks (lesson one from week one to three and lesson two from week four to six). Every week, the PSTs edited their lesson plan three times (before, during and after the lecture, and after peer teaching). Five Core Practices (e.g., rules and routines, precise instruction, checking for understanding, breaking down content into smaller elements, and building respectful relationships with students) were used to analyze the adaptations on the lesson plans. The results showed that each PST made approximately 256 edits on lesson one and 563 edits on lesson two, which illustrated a deeper understanding of teaching adaptation using Core Practices among PSTs on lesson planning. Xie et al.’s (2021b) study provided evidence that repeated teaching and teaching rehearsals are still an effective approach to developing adaptive competence in virtual settings with the feedback of the supervisor and repeated lesson plan editing processes.

The last study looked at how teachers adapt their instruction in enacted teaching. As previously mentioned, a teacher’s content knowledge is the prerequisite for demonstrating
adaptations in teaching. To provide evidence for this premise, Iserbyt et al. (2020) examined how teachers’ task adaptations differ from before and after a content knowledge workshop for a swimming unit. Participants were three elementary school teachers, and they taught seven lessons before the 3.5 hours of content knowledge development workshop of the swimming unit. The workshop consisted of a two-hour session in the swimming pool and a 1.5 hours session in a classroom. After the workshop, teachers taught the same group of students for five to six lessons using the content of the workshop. The researchers observed the lessons to collect the data of adaptations and the appropriateness of the adaptation. When there were developmentally appropriate adaptations and when students performed correctly after the adaptations, the adaptations were coded as appropriate. The result showed more adaptations were made by the teachers after the workshop, except for one teacher, and all the adaptations made by the teachers were developmentally appropriate. Iserbyt et al.’s (2020) study added the evidence that a sufficient level of content knowledge is critical for teachers to adapt their lessons to meet different students’ needs.

**Summary**

Four studies relative to teaching adaptation in physical education settings were discussed. One study examined PSTs’ perception of using the lesson plan, the second and third studies conducted how the PETE program helped PSTs to develop their adaptive competence, and the last one investigated how the professional workshop affected making adaptations in enacted teaching. Xie et al.’s studies (2021a, b) found that teaching rehearsal and repeated teaching were effective ways to improve PSTs’ adaptive competence. In these studies, the PETE program provided sufficient opportunities to practice lesson planning and teaching with feedback from the supervisors. Those practice experiences allowed PSTs to have a better understanding, provided
opportunities to improve the use of the Core Practices, and gave chances for PSTs to make more adaptations in their lesson plan. In addition, Xie et al. (2021a) also found that PSTs had more confidence in teaching after having teaching practice experiences. Iserbyt et al.’s study (2020) verified that when the teachers had a better understanding of the content knowledge, they were able to make more adaptations during the lesson, in addition, this study further added evidence for the importance of developing content knowledge among PSTs to develop adaptive competence.

**Conclusion and Future Direction**

Shulman (1987) argued that knowing how to adapt the instruction based on learners’ needs is key to obtaining high levels of pedagogical content knowledge. In addition, as Doyle (1986) mentioned, the classroom is not a stable or routine environment. Thus, PSTs need to develop their adaptive competence before they enter the classroom in the school (Sternberg, 2014; Timperley, 2013; Von Esch & Kavanagh, 2018). In this sense, PBTE could serve as a key framework to develop PSTs’ adaptive competence. The PBTE framework helps teacher educators define the important knowledge and skills to provide effective instruction for teachers. Furthermore, the key PBTE components such as teaching rehearsal and repeated teaching provide critical practice opportunities for PSTs to develop their adaptive competence for their lesson planning and actual instructions. However, it is important to note that simply engaging in teaching rehearsal and repeated teaching is not sufficient for the development of adaptive competence among PSTs. Consistent and repeated feedback from supervisors and reflection are also essential for PSTs to develop adaptive competence.

However, although adaptation is one of the most important skills that PSTs need to learn in the teacher education program, the studies are sparse in this area. In physical education, there
are only two studies that investigated how PSTs develop adaptive competence in the PETE program using the PBTE framework. These two studies examined adaptations that were made in the lesson plan only, but not during the teaching. It is still unclear which types of adaptations, and how many adaptations that PSTs made during teaching the lesson. Adaptations made on lesson plans through the practice opportunities (i.e., repeated teaching and teaching rehearsals) provided research-based evidence that the PBTE is a viable framework to develop adaptive competence among PSTs. Also, adaptations made during the act of teaching provide direct evidence of the reflecting-in-action of PSTs. Therefore, my dissertation study will examine not only PSTs’ adaptation of the lesson plan, but also their enacted teaching.
CHAPTER 3

The preceding chapters showed that practice-based teacher education (PBTE) provides a significant framework to prepare future teachers to be able to apply theory and knowledge into practice. The underlying philosophy for Core Practices is that if teachers can enact impactful teaching practices, their teaching effectiveness increase. Yet little is known about the process of PBTE. Practice-based teacher education should be guided by empirical findings as those findings will enable teacher educators to make informed decisions about teacher preparation and Core Practices. This is a descriptive study that aims to better understand pre-service teachers (PSTs)’ adaptability which is a central component of PBTE. This study examined PSTs’ adaptability when they planned and taught a lesson to their peers in an introductory teaching methods course. The chapter consists of six primary components: (a) the anthropological assumptions underlying this study, (b) the research design, (c) the context of the study, (d) the dependent variables and their coding process, (e) interventions and procedures, and (f) data analysis.

Anthropological Assumptions

Siedentop (1983) proposed that there should be a brief note about what is the view of humanity that the researcher has, and where the study’s methodologies derived from. He noted,

Such a section would not only alert the reader to the basic point of view of the researcher but, more importantly, would require the researcher to consider seriously the implications of the questions asked and the assumptions underlying the implications of the questions asked and the methodologies used to answer those questions (p. 11).
This study was conducted using a behavior analytic theoretical framework to define and examine teacher adaptability. Bransford et al. (2005) found that effective teachers were good at making adaptations with their pedagogical knowledge when they made instructional decisions. Allington and Johnston (2002) also argued that adaptive teaching was effective. They noted that although teachers already had a good lesson plan, they could make “teachable moments” (Allington & Johnston, 2002, p. xiii) by making adaptations to respond to students’ needs while they taught the lesson.

In this study, PSTs’ adaptability was examined in the modifications to a lesson plan and adaptations to the lesson. The adaptations were observable behaviors that can be defined and measured. Because we know little about adaptability, the research strategy in this study was to use a descriptive study that can report the manner in which PSTs adapt their lesson plans and lessons. Behavior analysis requires a systematic observation of all behaviors of interest for the duration of the study (Cooper et al., 2020). Figure 3.1 displays a summary of a behavioral analysis of adaptive teaching.
Figure 3.1

A Behavior Analysis of Adaptation

There are eight philosophical assumptions underlying the behavior analysis: (a) determinism, (b) empiricism, (c) experimentation, (d) replication, (e) parsimony, (f) philosophical doubt, (g) pragmatism, and (h) selectionism (Cooper et al., 2020). Behavior analysis is a deterministic science (determinism). It is based on the idea that behavior is the result of a certain event. As such, it is driven for the search for behavior causes that occur in the environment including the environment within the skin of a person. The search for the causes of behavior should occur in empirical ways (Empiricism). Researchers should rely on the events that they observe and objectively measure, rather than higher inference methods. Empiricism provides opportunities for researchers to define, observe, and measure behavior systematically. Variables of interest are best examined using experimentation by manipulation of the
independent variable to determine the effects on the dependent variable (Experimentation). For scientific inquiry, experimentation is the basic strategy to determine whether there is a causal effect between the two events; experimentation is necessary.

The condition of the experiments can be replicated for the reliability of the effects and increment of the internal validity (Replication). Such replication can establish the generality of findings in different subjects, settings, and behaviors. Behavior analysis uses a parsimonious approach to determining causal effects (Parsimony). Parsimonious models are simple models with strong explanatory power. They explain results using a minimum number of variables. Researchers should continuously question the scientific theory and knowledge for truthfulness and validity of it (Philosophical Doubt). It is important that consider scientific knowledge as tentative, and researchers should be open to replace existed beliefs and findings with newly discovered knowledge. This is the approach that assesses the truth of the meaning of theories or beliefs in terms of the success of their practical application (Pragmatism). Because the parent science of behavior analysis is evolutionary biology, it views ontogenetic selectionism as a mechanism for learning (Selectionism). Specifically, based on individual experiences with contingencies that are driven by reinforcement, punishment, or extinction.

Four primary research questions addressed in this study were:

1. How does PSTs’ teaching adaptive competence develop through PBTE reflected in modifications of lesson plans across the five weeks?
   a. PSTs will make adaptations to lesson plans one to three (weeks one to five).
   b. PSTs will make more adaptations on Core Practices two (providing clear instruction), four (checking students’ understanding), and five (building positive relationships with
students) than on Core Practices one (establishing rules and routine) and three 
(Breaking down the content into smaller elements).

2. What types of adaptation that PSTs made in lesson plans from week one to five?
   a. PSTs will create various types of adaptations as they develop their adaptive 
      competence as they move from week one to five.

3. How PSTs’ teaching adaptive competence was developed in enacted teaching across the 
   five weeks?
   a. PSTs will demonstrate teaching adaptations (add and miss) in enacted teaching from 
      weeks one to five.
   b. PSTs will show fewer errors while they teach from weeks one to five.

4. What is the relationships between teaching adaptive competence on lesson plans and 
   errors in enacted teaching?
   a. PSTs who made more adaptations to the lesson plans will have fewer errors in the 
      enacted teaching.

**Research Design**

This study employed a descriptive research design to examine PSTs’ adaptability in 
lesson planning and teaching. The purpose of this research design was to employ methods to 
observe and describe how PSTs develop their adaptability. In this study, the dependent variables 
were the changing texts in the PSTs’ multiple versions of lesson plans and the changes in their 
teaching. The independent variable was an introductory methods course.
Context of the Study

Permission to conduct this study was obtained from Institutional Review Board (IRB) at The Ohio State University (IRB # 2019E0723). Pre-service teachers signed an informed consent form and researchers collected it at the first class meeting of the course (Appendix A).

Setting

This study was conducted in an introductory teaching methods course of a Physical Education Teacher Education (PETE) program at The Ohio State University. This course was held once a week for four hours throughout the semester (14 weeks in total) and consisted of three components (lecture, laboratory teaching, and field teaching), and the details of this course are explained later part of this chapter.

Participants

A total of 25 PSTs were enrolled in an introductory teaching methods course in Fall 2019. Seventeen PSTs were male, and eight PSTs were female. Participants in this course ranged in age from 18 to 25 years old. The majority of the PSTs were sophomores or juniors. All were pursuing a Bachelor of Science in Education, Sports Coaching, Recreation, and Physical Education degree. Eight participants were pursuing a sports coaching focus and 17 were pursuing a physical education focus. Twenty-five of the PSTs submitted a signed informed consent form, and three PSTs withdrew; therefore, in total 22 PSTs participated in the study. Fourteen were male, and eight were female. Participants reported that they had varied coaching experiences ranging from little to no coaching in limited recreational sports settings. Few had experience coaching middle school-age students. None had teaching or coaching experience in the school setting. This class was the first experience in the degree program with teaching pedagogy.
Dependent Variables

Two dependent variables were examined in this study: adaptations that PSTs made in the lesson plan and adaptations that PSTs made in enacted teaching. The following sections describe the definitions of the coding variables, the procedure of coding for each variable, the training procedures of coders, and the process of establishing an inter-observer agreement for both lesson plans and enacted teaching analyses. A total of 150 lesson plans and 85 teaching videos were collected and analyzed. All 22 PSTs submitted their lesson plan every week; however, there were different numbers of PSTs for teaching data each week because of the technical issues with audio (week one \( n = 19 \), week two \( n = 16 \), week three \( n = 20 \), week four \( n = 17 \), week five \( n = 13 \)).

Lesson Plans

To examine adaptations that PSTs made on their lesson plans, the rubric represented in Table 3.1 was used. Five Core Practices employed by the course instructor were key outcomes examined in the study: (a) establishing rules and routines, (b) providing precise and clear instruction, (c) breaking down content into smaller elements, (d) checking students’ understanding, (e) building respectful and positive relationships with students. There are three types to evaluate the modification of lesson plans: simple modification (Type 1) to refining (Type 2) and more sophisticated application (Type 3) of the Core Practice to the given context of teaching (see Table 3.1). The rubric was developed for this study which is made based on Xie et al., (2021).
Table 3.1

Codes for Lesson Plan Adaptability

<table>
<thead>
<tr>
<th>Core Practice Related Content</th>
<th>Change Maintained</th>
<th>Type 1 (Modify)</th>
<th>Type 2 (Refine)</th>
<th>Type 3 (Apply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establishing rules and routines in the teaching environment.</td>
<td>The change made in the previous lesson plan was maintained. (1.NC-M)</td>
<td>Modify existing words for the rules and/or routines to their own language by adding, deleting, and/or changing content on a lesson plan. (1.1)</td>
<td>Newly add and/or refine the rules and/or routines based on the contexts in a lesson plan. (1.2)</td>
<td>Type 2 and adding further instruction to maintain and promote the rules and routines by reminding and/or praising the expected behavior on a lesson plan. (1.3)</td>
</tr>
<tr>
<td>2. Providing precise or clear instruction. (Instruction refers to information throughout the lesson: introduction warm-up content instruction)</td>
<td>The same as above. (2.NC-M)</td>
<td>Modify existing words to their own language by adding, deleting, and/or changing the instruction on a lesson plan. (2.1)</td>
<td>Newly add and/or refine instruction to increase the preciseness or clarity of the instruction on a lesson plan. However, the revision is made at the class level, not at the individual level. (2.2)</td>
<td>Newly add or revise the instruction to increase preciseness or clarity of the instruction based on the contexts to meet students’ needs on a lesson plan (e.g., using multiple instructional approaches [visual, verbal, kinesthetic]). (2.3)</td>
</tr>
<tr>
<td>3. Breaking down content into smaller elements.</td>
<td>The same as above. (3.NC-M)</td>
<td>Refining the existing task by adding/ deleting and/or changing an element(s) of the task in a lesson plan. (3.1)</td>
<td>Refining existing extension, refinement, and application tasks and/or adding new extension refinement, and application tasks on a lesson plan. (3.2)</td>
<td>Newly add another task and/or replace an existing task(s) to further break down the content into smaller elements to make the task sequence developmentally appropriate and individualized on a lesson plan. (3.3)</td>
</tr>
<tr>
<td>4. Checking student understanding during and at the conclusion of lessons.</td>
<td>The same as above. (4.NC-M)</td>
<td>Modify existing words of questions and/or the follow-up instruction to the questions using their own language to ask students in a lesson plan. (4.1)</td>
<td>Newly add and/or refine the questions and/or the follow-up instruction to the questions in a lesson plan. However, the question(s) cover only part of the instruction. (4.2)</td>
<td>Newly add or revise the questions and/or the follow-up instruction to ensure students’ full understanding of the instruction in a lesson plan (the question[s] covers the majority of the instruction). (4.3)</td>
</tr>
<tr>
<td>5. Building respectful and positive relationships with students.</td>
<td>The same as above. (5.NC-M)</td>
<td>Modify existing words of greetings or respectful words to their own language on a lesson plan. (5.1)</td>
<td>Newly add and/or refine the words to express respect to students on a lesson plan. (5.2)</td>
<td>Newly add or revise words to express respect to students based on their individual characteristics on a lesson plan (e.g., using a student’s first language to greet). (5.3)</td>
</tr>
</tbody>
</table>
Coding Procedure of Lesson Plans. In the introductory teaching methods course, PSTs made multiple edits to their lesson plans using the tracking function of Microsoft Word. The PSTs were provided with an original skeleton of a lesson plan (see Appendix B). Any changes in one written lesson plan were compared to the previous plan and so on. The first step of analyzing a lesson plan was to identify segments representing the Core Practice in each component of the lesson (e.g., introduction, warm-up, task development, application game, and closure). For example, in the introduction, a PST wrote

“Hello everyone, my name is Mr. Smith and I will teach you for the next few weeks. Here is my rule for this class. Please do not talk when I talk. When you hear I say freeze, you have to stop what you do. Do you have a clear understanding of my rule? Okay, let’s start warm-up, we will do tagging game for the warm-up.”

Then, this instruction component would be divided into four segments, the first segment would be “Hello everyone, my name is Mr. Smith and I will teach you next few weeks.” (Core Practice 5: Building respectful and positive relationships with students). The second one would be “Here is my rule for this class. Please do not talk when I talk. When you hear I say freeze, you have to stop what you do.” (Core Practice 1: Establishing rules and routines). The third would be “Do you have a clear understanding of my rule?” (Core Practice 4: Checking student understanding). The last one would be “Okay, let’s start warm-up, we will do tagging game for the warm-up,” (Core Practice 2: Providing precise or clear instruction).

After determining the segments to be analyzed in each component of the lesson, the data were recorded on a spreadsheet template (see Figure 3.2). The leftmost column of the spreadsheet in blue indicates the part of the lesson plan such as the introduction, warm-up, task
development, application game, and closure. The light green row indicates versions of the lesson plan. If it is labeled as LP1. W1. V1., it refers to the first lesson plan (LP1) of the week one (W1), which a PST made edits for the first time (V1). There was a total of three lesson plans that PSTs worked on in the course. The first lesson plan was used for weeks one and two, the second lesson plan for weeks three and four, and the last lesson plan for week five, and PSTs made three versions in general for each week. The data from lesson plans two and three were coded in other tabs of the spreadsheet in a similar manner.

After entering the identified segment, each segment was coded using one of the codes indicated in Table 3.1. For example, as is shown in Figure 3.2, if the PST wrote “Does everyone understand clearly about the crease?”, this refers to the Core Practice of checking students’ understanding during and at the conclusion of lessons; this segment was coded as type one because it added questions for students, which was presented as 4.1 (Core Practice four and type one). If there were not any changes between the lesson plans, it was indicated as ND indicating no difference as it is shown in week two columns of Figure 3.2.

**Figure 3.2**

*Example of Lesson Plan Coding Sheet*

<table>
<thead>
<tr>
<th>LP #</th>
<th>Task development</th>
<th>Does everyone understand clearly about the crease? (4.1)</th>
<th>What is the most important rule about the crease in the team handball? (4.2)</th>
<th>Does everyone understand what the crease is? Anyone can tell me what is the most important rule for crease? (4.2)</th>
<th>ND</th>
<th>ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Once a coder finished coding each segment of the lesson plans, the total number of each Core Practice and its type of each segment of the lesson plan was recorded in a spreadsheet (see
Figure 3.3). In Figure 3.3, the first column on left indicates the category of the Core Practice. As is shown in Table 3.1, if the segment of the lesson plan is about establishing rules and routines in the teaching environment, it is coded as Core Practice (CP) 1. The next column indicates each type of the Core Practice. The following columns are the same as with the coding sheet as Figure 3.2 shows.

**Figure 3.3**

*Example of a Completed Data Summary Sheet*

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<th>F</th>
<th>G</th>
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<th>I</th>
<th>J</th>
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</thead>
<tbody>
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<td></td>
<td></td>
<td>1.1.1</td>
<td>1.1.2</td>
<td>1.1.3</td>
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<td>1.2.3</td>
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<td>No Submission</td>
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<td>2</td>
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<td>CM (ND)</td>
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<td>7</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Coder Training.** Two assisting coders helped the primary coder with coding. All the coders were doctoral students enrolled in the PETE program at The Ohio State University. The primary coder had expertise in using these codes from two other studies. Two assisting coders also had experience coding with these codes from another study. Regardless of experience, all coders were trained in the following steps.
First, two assisting coders learned the codes and definitions. For this process, the assisting coders read the Core Practice codes and its types shown in Table 3.1. Then, the primary and two assisting coders talked through each segment in a lesson plan together and practiced coding verbally. Second, the assisting coders practiced coding two to three lesson plans with feedback from the primary coder. Third, the assisting coders coded two lesson plans which were provided by the primary coder, and they compared to the coding of the primary coder. This process was repeated until the assisting coders reach 90-95% agreement with the primary coder.

**Inter-Observer Agreement (IOA).** The challenge for reliable coding was to identify segments of the lesson plans to be coded. In this procedure, first, two coders analyzed one lesson plan to reach a consensus on the segments of lesson plans. Second, each coder identified segments of the lesson plan by themselves and compared them with the primary and the other assistant peer coders. If they were in disagreement, they determined together which segment was more precise to code as a representation of a specific Core Practice. They did this for an entire lesson plan sequence (i.e., modifications one to three of each week). This procedure has been used in several studies in determining the unit to evaluate (Kavanagh et al., 2020; Schipper, et al., 2017; Xie et al., 2021). Next, the two assistant coders independently coded the lesson plans. There were a total of 150 lesson plans used in this study. The lesson plans were grouped by weeks because a set of modifications occurred each week and comparisons were made relative to the edits. Inter-observer agreement was conducted on 33% (50/150) of the randomly selected lesson plans. The IOA criterion of acceptable reliability was established at 85% or above.

**Teaching Videos**

Teaching was analyzed relative to the followings variables: (a) adaptations made in the enacted teaching, and (b) errors that clearly decreased the quality of the enacted teaching. All
teaching episodes during the peer teaching laboratory were recorded using a video camera and audio was recorded using a cell phone application called REV recorder (https://www.rev.com/voicerecorder). The audio and video were synchronized after each laboratory. Coders compared the PSTs’ teaching videos with their lesson plans. To examine the congruence, adaptation, and errors that PSTs made while they teach to the lesson plans, their teaching performances were compared to their lesson plans and analyzed by using the codes shown in Table 3.2. The leftmost column shows the teaching variables (e.g., adaptation and error), the middle column presents the definition of the variable, and the final column refers to the codes of each variable.

**Table 3.2**

*Codes for Comparing the Lesson Plan and Teaching*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adaptation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add</td>
<td>Segment or part of a segment added that improved the quality or efficiency of practice of teaching.</td>
<td>AA</td>
</tr>
<tr>
<td>Miss</td>
<td>Segment or part of a segment missed that improved the quality or efficiency of practice of teaching.</td>
<td>AM</td>
</tr>
<tr>
<td><strong>Error</strong></td>
<td>Segment missed and caused ineffective teaching.</td>
<td>E</td>
</tr>
</tbody>
</table>

**Adaptations and Errors in the Enacted Teaching.** The first analysis focus was the adaptations. If the PSTs made adaptations while they taught, the types of adaptations were identified using the categories of add and miss (see Table 3.2). The PSTs could add teaching episodes such as extending and refining tasks to accommodate students’ learning pace, add a rule to manage their students in a better way, or add a segment to make students understand the task
better although they did not have it on their lesson plan. For example, PST could add, “Can I have a volunteer?” when this PST thought presenting peer demonstration would be more effective while he/she gave instruction. Another example would be asking a question of “Do we have to follow through after executing the ball or not?” for students’ better understanding which was not on their lesson plan. The PSTs also could intentionally miss planned teaching segments. If the PSTs skipped some segments consistently, it was coded as an adaptation miss. For example, in the lesson plan, it is written as “Freeze and gather” for the transition to the next task; however, if the PST thought that students did not need to be gathered because students were already in the appropriate place for the next task, the PST could skip saying “Freeze and gather” and proceed to the next task for the efficient teaching. As is shown in Figure 3.4, the added segments were coded as adaptation added (AA), and the missed segments were coded as adaptation missed (AM; see Table 3.2). The code of each teaching segment was recorded at the end of the segments first, then recorded on the data summary sheet later.

Third, when the PSTs missed a segment in the written lesson plan which was important to be addressed, it was coded as an error. The examples of an error would be that a PST did only three minutes of static stretching while he/she had 10 minutes of dynamic stretching planned in the lesson plan or forgot to provide corrective feedback on critical elements to his/her students during a task which was planned in a lesson plan. In these cases, the missed segments were coded as an error (E). As shown in Figure 3.4, the codes were marked at the end of each segment. The total number of errors and types of errors were recorded in the data summary sheet as Figure 3.5 shows. Once coders finished the data coding for each week’s lesson plans, the data were recorded in the data summary sheet (see Figure 3.5).
Figure 3.4

Example of Lesson Coding Sheet

1 (huddle) “Good work- lets make this harder (E) Now we are going to play keep away game. I have (name of student) is going to be (AM) Can I have a volunteer for a defender (2.1). Overhand throw only, it cannot go over the defender (2.1), we will move into the shooting zone (2.1), and don’t step on the crease (2.1), you got it? (AA) (4.1) She cannot run she cannot intercept the ball but she can provide a barrier. If you pass then move quickly to get open away from the defender if you are waiting to receive a pass make sure you keep your hands up. If you hold the ball longer than 3 seconds it is a change of possession. Defense needs to count to 3 seconds so they can cause a turnover (AM). I only want to see overhead passes in this game. Ready begin.”

- **Pause** (1.3), keeping the L shape when you throw, (AA) (3.2)
- **Underhand toss only** (2.1) follow through toward the defender (AA) (3.2)
- T “(Pause) lets change the defender and add a new rule – you cannot throw over the defender. You cannot hold the ball for longer than 3 seconds! Begin”
- T “(Pause) lets change the defender and now allow the defender to run but not intercept. Begin”
- T “(Pause) lets change the defender and now allow the defender to intercept. Whoever is the defender count 3 seconds! Begin”
- **Three steps rule, switch the defender** (AA) (2.1)
- **Pause, (1.3) you guys did good job, (5.1) and I will make bring the court little bit to smaller (AA) (3.1)
- **Defender walk, but you can intercept (AA) (2.1)**
- **Pause, (1.3) make sure you follow through when you throw, (3.2) and stay in the boundaries, switch the defender (AA) (2.1)**
- **Pause, (1.3) in about 1 mins, we are going to do 4v4 game so that has 3 sec rule and 3 steps rules, (3.1) I want you play one more round and grab a penny and we are going to do 4v4, ready, go ahead (AA) (2.1)**
- Alright, **pause. (1.3) Good job, you guys did great for the game. (5.1) I ask you guys quickly go over and grab a penny, make sure you put it on fully and correctly and back over here. (AA) (2.1)**
- Alright come on over, and hurdle here
Figure 3.5

*Example of Teaching Data Summary Sheet*

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>26</td>
<td>No data</td>
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</tr>
<tr>
<td>3</td>
<td>AA</td>
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</tr>
<tr>
<td>5</td>
<td>AA</td>
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</tr>
<tr>
<td>6</td>
<td>AA</td>
<td>Task</td>
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<tr>
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<td>4</td>
<td>2</td>
<td>No data</td>
<td>0</td>
</tr>
</tbody>
</table>

**Coder Training for the Teaching Variables.** The same coders from the lesson plan evaluation, the primary coder and two assisting coders, analyzed the teaching variables. In step one, two assisting coders read the definition to learn the codes of each variable shown in Table 3.2. Second, the primary coder provided an example lesson plan similar to that shown in Figure 3.4 after removing the codes from the lesson plan. The assisting coders were asked to fill in the blank by using the definition and the code of Table 3.2 to practice analyzing the segments. In this process, the primary coder told the assisting coders about which segments were added or missed because those coders did not watch recorded videos of teaching. Third, the assisting coders practiced the coding of the lesson plan while watching the teaching video. Then, the primary coder provided feedback on their coding accuracy. Fourth, the assisting coders coded two
teaching videos. Once they finished the coding, their data were compared to the primary coder’s analyses. Coders were trained to meet 90-95% agreement with the primary coder.

**Inter-Observer Agreement.** To identify the congruence of teaching to the lesson plan, first, coders agreed on which component of each segment to be included or excluded from the analysis (e.g., excluding “okay,” or “alright” from the coding/analyses). Second, both coders independently coded each segment to judge the congruence of teaching to a lesson plan and compared it to each other. If they were in disagreement on coding, they had a discussion to determine which coding is more precise for the congruence of teaching to the lesson plan. Third, they analyzed the same video and the lesson plan that they used in the previous step and compared their responses again to see whether they reached above 85% agreement.

To examine adaptation or error, first, coders coded each segment of a lesson plan missed (M) in teaching before they determine if those obviously decreased (error) the effectiveness of practice of teaching. After the completion of coding each segment as M, they discussed and determined each of those coding as either adaptation or error. Once they reach a consensus, they independently coded each segment as AA, AM, and E. After this process, they compared their coding to each other whether they reached 85% or above agreement before they start the IOA for all the teaching variables coding.

Next, the coders randomly selected 33% of lesson plans and teaching (29 out of 88 lesson plans and teaching videos) and independently coded the data for all teaching variables (i.e., adaptation and error); the selected 29 lesson plans were the final version of each week (e.g. LP1.W1.V3, LP1.W2.V3, and LP2.W2.V3). The IOA criterion was established at 85% or above.
**Intervention and Procedure**

The intervention of this study was an introductory teaching methods course in a PETE program. This course consisted of lectures, teaching laboratories, field-based teaching, and the final exam. For the first six weeks, on Friday, PSTs had a lecture in the morning and a teaching laboratory in the afternoon for their teaching practice. For the next five weeks, on Friday, PSTs had field-based teaching experience at a middle school in the morning. For the last three weeks, PSTs came back to the campus and had a morning lecture for two weeks, and took a final exam in the last week. The data collection for this study occurred in the first six weeks. Figure 3.6 shows the organization of this course. The selected content in this course was team handball.

**Figure 3.6**

*Organization of the Introductory Teaching Methods Course*

This course used PBTE pedagogies organized as a recurring cycle each week from week two to six of the semester. Figure 3.7 shows the components and the sequence of the recurring cycle. Collectively the components represent a *package intervention* designed to teach the knowledge and skills of an introductory methods class in physical education (see the syllabus in Appendix C) and to teach and provide opportunities for PSTs to adapt the knowledge and skills.
Figure 3.7
The Practice-Based Pedagogy Cycle in the Introductory Teaching Methods Course

Modifying the Initial Lesson Plan. Each week, the first step for PSTs was to create an initial lesson plan for the week (see Appendix B for a lesson plan example). For weeks 1, 3, and 5, the first lesson plan of a week was the edited lesson plan of an original lesson plan given by the instructor. For other weeks when they were to work on the same lesson plan (weeks 2, and 4), the initial lesson plan of the week was the final version of the previous week. For the initial lesson plan one, the PSTs were asked to refine and revise the entire lesson plan, excluding objectives, equipment, and closure sections. Specifically, they revised the introduction including introducing themselves, their rules and routines for the class, the warm-up, transitions, the instructional tasks, and the use of students’ names. In subsequent edits, focuses included addressing how they created a caring environment, types of feedback, the pacing of the lesson,
incremental stepwise progression of instructional tasks, and teaching within the game as well as new instructional tasks. From week two, the PSTs started applying edits in the closure section of the lesson plan and added the same subsequent edits as the week one lesson plan.

**Lecture.** During the lectures, PSTs were asked to bring their laptop to work on lesson plans. Prior to the lecture, the PSTs took an online quiz of 32 multiple choice items derived from a textbook chapter assigned for the week. The criterion score for passing a quiz was 75%. The PSTs were required to retake the quiz until they met the 75% criterion, which means that before the PST arrived at the lecture with a common understanding of the content in the textbook for that week. This allowed the lecture to be an application of the chapter to their lesson plan and actual instruction. For example, if a chapter for the week was about teaching cues, in the lecture, cues were discussed and PSTs added teaching cues specific to their lesson plans. Similarly, other elements of lesson plans, such as moderate to vigorous physical activity, academic learning time, demonstrations, closure, feedback, praise, lesson introduction, caring behaviors, inclusion and equity, were edited based on the focus of the week. The PSTs were also provided potential teaching scenarios from the instructor, and they had small group discussions about how to address given scenarios such as how they can present the tasks, how they make a transition, how they can provide an inclusive learning environment, and how to solve problems when they encounter unpredicted situations. With the potential teaching scenarios, the PSTs were required to situate discussions with a specific context and Core Practices of a lesson, which helped them understand how to apply knowledge and skills learned in the lectures to actual instruction.

**Second Modification of the Lesson Plan.** Following the lecture, before the laboratory (there was one hour gap between the lecture and the lab session), the PSTs completed the
modifications of their lesson plan they printed their lesson plan for themselves and their supervisors for an afternoon laboratory session.

**Laboratory Teaching.** During the two-hour laboratory, two pedagogies of PBTE, rehearsal and repeated teaching of the same lesson across weeks were employed. To create an authentic teaching context, the PSTs used the same pedagogies, lesson plans, equipment, and space as they would teach for the field-based teaching (i.e., approximation of teaching). PSTs also taught the same lesson repeatedly for two weeks in a row. Through repeated teaching, the PSTs were expected to adapt their lessons to meet the needs of the students and improve the quality of instructions.

During the laboratory, the PSTs were in six groups of four to five. In each group, one PST was a teacher and other PSTs served as students. Each PST taught a lesson approximately for 20 minutes. Depending on the circumstances, PSTs taught either the whole lesson with shortened time for practice or a few sections of the lesson such as from the introduction to the first task, or from the first task to the closure. After the completion of 20 minutes lesson, a supervisor provided one-on-one feedback for five minutes. The foci of the feedback were about what the PST did well and how to improve the lesson plan and teaching. Five supervisors rotated to provide feedback to the different group every week, and one of five supervisors was assigned to two PST groups to observe and provide feedback because there were five supervisors and six PST groups. After the short break for the feedback, the next PST taught, and this occurred again until all PSTs taught a 20-minutes lesson. At the conclusion of a laboratory session, the instructor provided feedback to all PSTs to summarize the week and the overall feedback to the group.
The PSTs were allowed to make adaptations in their lessons when appropriate while they taught. For example, the PSTs could make adaptations on a transition between the tasks and spend less time on a task if they found the task was too each. These adaptations that occurred during the laboratory were expected to be included in future edits to the lesson plan.

**Viewing the Teaching Video and Reflection.** In the laboratory sessions, each PST’s teaching was recorded, and the videos were uploaded on the online cloud storage called Buckeyebox (http://buckeyebox.osu.edu). The PSTs were asked to watch their own teaching video, as well as one peer’s teaching video which was selected by the instructor. By watching their teaching and one good quality of peer’s teaching, the PSTs had an opportunity to reflect on their instruction which also helped them to modify the lesson plan.

**Third Modification of the Lesson Plan.** Based on the feedback from the laboratory sessions, observations of their peers’ teaching, and self-reflection of their own instruction through videos, the PSTs were asked to make modifications to their lesson plans using the tracking function and submit it to their supervisors.

**Data Analysis**

To examine how the adaptive competence of PSTs developed through PBTE that is reflected in modifications of lesson plans in terms of management and instruction (RQ1 and 2), the total number of adaptations made in each management (CP1 and 5) and instruction (CP 2, 3, and 4) were calculated descriptively for each week and across the weeks. In addition, the distribution of adaptations among the three types of each Core Practice was also descriptively analyzed and presented in graphs to demonstrate changes over the five weeks. To explore the PSTs’ adaptive competence demonstrated in the enacted teaching, adaptations and errors of PSTs’ created in then enacted teaching were analyzed (RQ3). The total number of adaptations
(add and miss) and errors per week and across the five weeks were analyzed, again, using descriptive statistics. For examining the relationship between PSTs’ teaching adaptations demonstrated in lesson plans and errors in enacted teaching (RQ4), the total number of adaptations that PSTs made in their lesson plan and errors that they made in the enacted teaching was used for Spearman’s rho analysis. The relationships were analyzed by the number of each week and total number of five weeks. The median score was used to report data because it violates the normality, and the data were analyzed using SPSS version 28.
CHAPTER 4

This chapter reports the results of each research question, and it is organized into three sections: (a) PSTs’ teaching adaptive competence in lesson plans, (b) PSTs’ teaching adaptive competence in enacted teaching, and (c) The relationships between teaching adaptations in lesson plans and errors during enacted teaching. The first section addresses research questions one and two, and the second section discusses the findings of research question three. The final section explains the results of research question four.

PSTs’ Teaching Adaptive Competence in Lesson Plans (Research Questions One and Two)

PSTs’ teaching adaptive competence in lesson plans was examined through two research questions: (a) How does PSTs’ teaching adaptive competence develop through PBTE reflected in modifications of lesson plans across the five weeks? (RQ1), and (b) What types of adaptations that PSTs made in lesson plans from week one to five? (RQ2). Descriptive statistics were employed to examine changes in frequency and type of adaptations in lesson plans across weeks.

Research Question One: How does PSTs’ Teaching Adaptive Competence Develop through PBTE Reflected in Modifications of Lesson Plans across the Five Weeks?

Research question one investigated how PSTs’ teaching adaptive competence developed through PBTE from weeks one to five. A total of two hypotheses were developed for this research question. The following sub-sections illustrate the findings for each hypothesis.

Hypothesis 1a. PSTs will make adaptations to lesson plans one to three (weeks one to five).

Across the five weeks, PSTs worked on three different lesson plans (lesson plans one to three) for the team handball unit. In weeks one and two, PSTs worked on lesson plan one, in weeks
three and four, PSTs made changes to lesson plan two, and in the last week, PSTs worked on lesson plan three only for a week. Figure 4.1 shows the total number of adaptations that PSTs made to lesson plans by week. The bar charts in Appendix E show how many adaptations that individual PST made to the lesson plan each week. Across the lesson one to three, there were wide ranges in the numbers of adaptations that each PST made (lesson plan one [$Median=38.50$, $range 6-101$]; two [$Median=49.00$, $range 14-184$]; three [$Median=38.00$, $range 18-97$]). Overall, these data demonstrated PSTs’ competence to make adaptations across lesson plans one to three. Therefore, hypothesis 1a was accepted.
Figure 4.1

Median of Adaptations Made by PSTs on Lesson Plans (LP) from Week One to Five
**Hypothesis 1b. PSTs will make more adaptations on Core Practices two (providing clear instruction), four (checking students’ understanding), and five (building positive relationships with students), than on Core Practices one (establishing rules and routine) and three (breaking down the content into smaller elements).**

Table 4.1 and Figure 4.2 show the number of adaptations made by PSTs for each Core Practice (median) by week. Across the five weeks, adaptations were most frequently observed in Core Practice two (providing clear instruction; $\text{Median} = 65.50$ [range 25-143]) followed by Core Practice one (establishing rules and routine; $\text{Median} = 38.00$ [range 6-100]) and five (building positive relationships with students; $\text{Median} = 21.50$ [range 7-57]). Minimal adaptations were made for Core Practice three (breaking down the content into smaller elements; $\text{Median} = .00$ [range 0-4]) and four (checking students’ understanding; $\text{Median} = 7.50$ [range 0-20]) across the five weeks. Overall, similar to the results for hypothesis one, the number of adaptations made by PSTs for each Core Practice notably varied among PSTs. As data shows, PSTs made more adaptations to Core Practices two, one, and five, than Core Practices three and four although there was a wide range of total number of adaptations to Core Practices two, one, and five. Collectively, hypothesis 1b was partially accepted.
Table 4.1

Total Number of Teaching Adaptations Made by PSTs in Lesson Plans for Five Core Practices across the Five Weeks

<table>
<thead>
<tr>
<th>Week</th>
<th>CP1</th>
<th>CP2</th>
<th>CP3</th>
<th>CP4</th>
<th>CP5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>Mean</td>
<td>10.09</td>
<td>12.45</td>
<td>.05</td>
<td>1.77</td>
<td>5.64</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(10.66)</td>
<td>(10.01)</td>
<td>(.213)</td>
<td>(1.77)</td>
<td>(4.68)</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>6.5</td>
<td>12.50</td>
<td>0.00</td>
<td>1.50</td>
<td>5.50</td>
</tr>
<tr>
<td></td>
<td>(range)</td>
<td>(0-33)</td>
<td>(0-35)</td>
<td>(0-1)</td>
<td>(0-5)</td>
<td>(0-16)</td>
</tr>
<tr>
<td>W2</td>
<td>Mean</td>
<td>3.82</td>
<td>5.27</td>
<td>.09</td>
<td>.91</td>
<td>2.55</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(4.79)</td>
<td>(6.41)</td>
<td>(.29)</td>
<td>(1.51)</td>
<td>(3.43)</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>.50</td>
<td>2.00</td>
<td>0.00</td>
<td>0.00</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>(range)</td>
<td>(0-14)</td>
<td>(0-20)</td>
<td>(0-1)</td>
<td>(0-6)</td>
<td>(0-11)</td>
</tr>
<tr>
<td>W3</td>
<td>Mean</td>
<td>6.45</td>
<td>11.77</td>
<td>0.00</td>
<td>1.82</td>
<td>3.64</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(7.12)</td>
<td>(9.71)</td>
<td>(.00)</td>
<td>(1.71)</td>
<td>(3.95)</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>4.00</td>
<td>9.00</td>
<td>0.00</td>
<td>1.50</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>(range)</td>
<td>(0-26)</td>
<td>(0-35)</td>
<td>(0)</td>
<td>(0-8)</td>
<td>(0-16)</td>
</tr>
<tr>
<td>W4</td>
<td>Mean</td>
<td>11.27</td>
<td>17.73</td>
<td>.14</td>
<td>2.59</td>
<td>6.36</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(9.39)</td>
<td>(13.49)</td>
<td>(.35)</td>
<td>(2.36)</td>
<td>(5.91)</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>8.00</td>
<td>13.00</td>
<td>0.00</td>
<td>2.00</td>
<td>4.50</td>
</tr>
<tr>
<td></td>
<td>(range)</td>
<td>(0-35)</td>
<td>(3-54)</td>
<td>(0-1)</td>
<td>(0-9)</td>
<td>(2-25)</td>
</tr>
<tr>
<td>W5</td>
<td>Mean</td>
<td>10.82</td>
<td>21.68</td>
<td>.32</td>
<td>1.91</td>
<td>6.59</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(8.79)</td>
<td>(9.97)</td>
<td>(.84)</td>
<td>(1.19)</td>
<td>(3.75)</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>8.00</td>
<td>20.00</td>
<td>0.00</td>
<td>2.00</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td>(range)</td>
<td>(0-40)</td>
<td>(10-34)</td>
<td>(0-3)</td>
<td>(0-4)</td>
<td>(2-15)</td>
</tr>
<tr>
<td>Total</td>
<td>Mean</td>
<td>42.45</td>
<td>68.90</td>
<td>.60</td>
<td>9.00</td>
<td>24.77</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(26.19)</td>
<td>(28.38)</td>
<td>(1.14)</td>
<td>(5.62)</td>
<td>(13.43)</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>38.00</td>
<td>65.50</td>
<td>0.00</td>
<td>7.50</td>
<td>21.50</td>
</tr>
<tr>
<td></td>
<td>(range)</td>
<td>(6-100)</td>
<td>(25-143)</td>
<td>(0-4)</td>
<td>(0-20)</td>
<td>(7-57)</td>
</tr>
</tbody>
</table>

Note.
CP1: Core Practice 1. Establishing rules and routines.
CP2: Core Practice 2. Providing clear instruction.
CP3: Core Practice 3. Breaking down the content into smaller elements
CP4: Core Practice 4. Checking students’ understanding
CP5: Core Practice 5. Building positive relationships with students
SD = Standard deviation
Figure 4.2

Median of Teaching Adaptations Made by PSTs in Lesson Plans for Five Core Practices by Week

Note.
CP1: Core Practice 1. Establishing rules and routines.
CP2: Core Practice 2. Providing clear instruction.
CP3: Core Practice 3. Breaking down the content into smaller elements
CP4: Core Practice 4. Checking students’ understanding
CP5: Core Practice 5. Building positive relationships with students
Research Question Two: What Types of Adaptation that PSTs Made in Lesson Plans from Week One to Five?

Research question two addressed the types of adaptations that PSTs made in their lesson plans from weeks one to five. One hypothesis was developed for this research question.

Hypothesis 2. PSTs will create various types of adaptations as they develop their adaptive competence as they move from week one to five.

Table 4.2 shows the changes in the types of teaching adaptations made by PSTs in lesson plans for each week, Figure 4.3 shows the percentage of teaching adaptations made by PSTs for each type per week. Four types of adaptation (types one, two, three, and change maintained) were analyzed using the rubric (i.e., the codes for lesson plan adaptability). Type one (modify) was coded when PSTs only modified wordings (expressions) of instructions in the lesson plan. Type two (refine) was given when the PSTs newly add and/or refine instruction in the lesson plan to improve instruction at the class level, not at the individual level. Type three (apply) was coded when PSTs newly add and/or revise an instruction to meet individual students’ needs. Change maintained refers to when the revisions made in a previous lesson plan were maintained in a current lesson plan.

The PSTs did not create type one adaptations across the five weeks except for week one ($Median=1.00$, $range\ 0-7$). The amount of type two adaptations was wide ranged across the five weeks (week 1 [$Median=14.50$, $range\ 0-49$], week 2 [$Median=.50$, $range\ 0-39$], week 3 [$Median=18.50$, $range\ 0-37$], week 4 [$Median=17.00$, $range\ 0-53$], week 5 [$Median=29.00$, $range\ 11-55$]). A minimal number of type three adaptations were observed across the five weeks (total [$Median=0$, $range\ 0-14$]). In conclusion, although PSTs created a very low number of
types one and three, it showed that they made various types of adaptations across the five weeks; therefore, hypothesis 2 was partially accepted.
Table 4.2

Total Number of Adaptations Made by PSTs for Four Different Types (Types One through Three and Change Maintained) across the Five Weeks

<table>
<thead>
<tr>
<th>Week</th>
<th>Type 1 Modify</th>
<th>Type 2 Refine</th>
<th>Type 3 Apply</th>
<th>Change maintained</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
</tr>
<tr>
<td>W1</td>
<td>1.45 (2.02)</td>
<td>16.64 (13.29)</td>
<td>0.05 (.21)</td>
<td>11.95 (13.89)</td>
<td>30.09 (25.15)</td>
</tr>
<tr>
<td></td>
<td>Median 1.00</td>
<td>Median 14.50</td>
<td>Median 0.00</td>
<td>Median 10.50</td>
<td>Median 25.00</td>
</tr>
<tr>
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<td>(range 0-7)</td>
<td>(range 0-49)</td>
<td>(range 0-1)</td>
<td>(range 0-47)</td>
<td>(range 0-79)</td>
</tr>
<tr>
<td>W2</td>
<td>.82 (1.97)</td>
<td>5.50 (9.18)</td>
<td>0.00 (0.00)</td>
<td>6.32 (10.13)</td>
<td>12.64 (15.60)</td>
</tr>
<tr>
<td></td>
<td>Median 0.00</td>
<td>Median 0.50</td>
<td>Median 0.00</td>
<td>Median 0.00</td>
<td>Median 5.00</td>
</tr>
<tr>
<td></td>
<td>(range 0-8)</td>
<td>(range 0-39)</td>
<td>(range 0)</td>
<td>(range 0)</td>
<td>(range 0-47)</td>
</tr>
<tr>
<td>W3</td>
<td>1.14 (2.82)</td>
<td>16.14 (10.67)</td>
<td>0.05 (.21)</td>
<td>6.36 (10.87)</td>
<td>23.68 (19.68)</td>
</tr>
<tr>
<td></td>
<td>Median 0.00</td>
<td>Median 18.50</td>
<td>Median 0.00</td>
<td>Median 0.00</td>
<td>Median 20.50</td>
</tr>
<tr>
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<td>(range 0-13)</td>
<td>(range 0-37)</td>
<td>(range 0-1)</td>
<td>(range 0-34)</td>
<td>(range 0-71)</td>
</tr>
<tr>
<td>W4</td>
<td>1.14 (3.87)</td>
<td>18.64 (12.25)</td>
<td>.64 (2.99)</td>
<td>17.68 (21.44)</td>
<td>38.10 (29.35)</td>
</tr>
<tr>
<td></td>
<td>Median 0.00</td>
<td>Median 17.00</td>
<td>Median 0.00</td>
<td>Median 13.50</td>
<td>Median 27.50</td>
</tr>
<tr>
<td></td>
<td>(range 0-18)</td>
<td>(range 0-53)</td>
<td>(range 0-14)</td>
<td>(range 0-95)</td>
<td>(range 6-121)</td>
</tr>
<tr>
<td>W5</td>
<td>.05 (2.1)</td>
<td>30.68 (11.53)</td>
<td>.09 (.29)</td>
<td>10.50 (16.26)</td>
<td>41.32 (19.52)</td>
</tr>
<tr>
<td></td>
<td>Median 0.00</td>
<td>Median 29.00</td>
<td>Median 0.00</td>
<td>Median 0.00</td>
<td>Median 38.00</td>
</tr>
<tr>
<td></td>
<td>(range 0-1)</td>
<td>(range 0-55)</td>
<td>(range 0-1)</td>
<td>(range 0-63)</td>
<td>(range 18-97)</td>
</tr>
<tr>
<td>Total</td>
<td>4.6 (6.53)</td>
<td>87.6 (32.91)</td>
<td>0.82 (2.99)</td>
<td>52.81 (38.40)</td>
<td>145.82 (67.21)</td>
</tr>
<tr>
<td></td>
<td>Median 3</td>
<td>Median 77.50</td>
<td>Median 0</td>
<td>Median 48</td>
<td>Median 145.00</td>
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<tr>
<td></td>
<td>(range 0-25)</td>
<td>(range 32-160)</td>
<td>(range 0-14)</td>
<td>(range 0-153)</td>
<td>(range 49-297)</td>
</tr>
</tbody>
</table>
Figure 4.3

Total Percentage of Adaptations Made by PSTs for Four Different Types on Lesson Plans for Each of the Five Weeks
PSTs’ Teaching Adaptive Competence in Enacted Teaching (Research Question Three)

The third research question explored how PSTs’ teaching adaptive competence was developed in enacted teaching across the five weeks. The focus of the analysis was the number of adaptations and errors made by PSTs in enacted teaching relative to their lesson plans. Descriptive statistics were used to analyze the data of teaching adaptations in enacted teaching. Table 4.3 shows the number of adaptations and errors made by PSTs in enacted teaching across the five weeks. The bar charts in Appendix E show the number of adaptations (add and miss) and errors that individual PST made while they taught each week.

Two hypotheses were developed to examine research question three. As discussed in Chapter three, adaptation add (AA) was coded when PSTs added a teaching segment in the enacted teaching which was not on their lesson plans. In contrast, adaptation miss (AM) indicates that PSTs missed a teaching segment when they were teaching which was on their lesson plans. Also, when PSTs missed a teaching segment indicated in a lesson plan while they taught, and when that missed segment was considered an obvious error, it was coded as an error. For example, a PST had an explanation of critical elements of overhand throwing in a lesson plan, but the PST did not mention it in the enacted teaching, it was judged as an error. The other example of error would be that a PST did not ask review questions that were on a lesson plan and dismissed students without a specific reason.
Table 4.3

Total Number of Adaptations and Errors in Enacted Teaching across the Five Weeks

<table>
<thead>
<tr>
<th>Week</th>
<th>AA</th>
<th>AM</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Median (range)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>W1</td>
<td>28.89 (9.66)</td>
<td>29.00 (8-47)</td>
<td>11.42 (6.24)</td>
</tr>
<tr>
<td>(n = 19)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W2</td>
<td>22.44 (8.61)</td>
<td>19.00 (11-44)</td>
<td>10.56 (5.19)</td>
</tr>
<tr>
<td>(n = 16)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W3</td>
<td>29.10 (9.43)</td>
<td>28.50 (12-46)</td>
<td>18.85 (6.28)</td>
</tr>
<tr>
<td>(n = 20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W4</td>
<td>28.82 (10.81)</td>
<td>27.00 (11-46)</td>
<td>19.41 (5.96)</td>
</tr>
<tr>
<td>(n = 17)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W5</td>
<td>29.85 (12.27)</td>
<td>32.00 (9-50)</td>
<td>9.85 (3.96)</td>
</tr>
<tr>
<td>(n = 13)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>140.29 (35.10)</td>
<td>142.00 (102-205)</td>
<td>75.14 (11.73)</td>
</tr>
</tbody>
</table>

Note.
AA = Adaptation add
AM = Adaptation miss
E = Error
Hypothesis 3a. PSTs will demonstrate teaching adaptations (add and miss) in enacted teaching from weeks one to five.

Figure 4.4 illustrates the total number (median) of adaptations (add and miss) in the enacted teaching across the five weeks. The results showed that PSTs made a wide range of adaptations (add and miss) during teaching. There was no specific trend (increased or decreased) for AA across the five weeks (week 1 [Median=29.00, range 8-47], week 2 [Median=19.00, range 11-44], week 3 [Median=28.50, range 12-46], week 4 [Median=27.00, range 11-46], week 5 [Median=32.00, range 9-50]). The similar results were found for AM across the five weeks (week 1 [Median=10.00, range 0-22], week 2 [Median=10.00, range 3-21], week 3 [Median=21.50, range 6-33], week 4 [Median=20.00, range 8-29], week 5 [Median=10.00, range 2-15]). In conclusion, although there was no specific trend of increasing or decreasing in the number of adaptations (add and miss) across the five weeks, PSTs demonstrated their adaptive competence (add and miss) in enacted teaching across the five weeks. Therefore, hypothesis 3a was accepted.
Figure 4.4

Median of Adaptations (add and miss) Made by PSTs in Enacted Teaching by Week

Note.
AA = Adaptation add
AM = Adaptation miss
Hypothesis 3b. PSTs will show fewer errors while they teach from weeks one to five.

Figure 4.5 shows the total number (median) of errors (E) in the enacted teaching across the five weeks. The results indicated that PSTs demonstrated fewer errors as they proceed from week one to five (week 1 [Median=7.00, range 0-25], week 2 [Median=4.00, range 2-18], week 3 [Median=2.50, range 0-5], week 4 [Median=3.00, range 1-8], week 5 [Median=1.00, range 0-7]) though there was a slight increase in week four compared to week three. Thus, hypothesis 3b was accepted.
Figure 4.5

Median of Errors (E) Made by PSTS in Enacted Teaching by Week
Relationships between Teaching Adaptive Competence on Lesson Plans and Errors in Enacted Teaching (Research Question Four)

Research question four examined whether there are relationships between PSTs’ teaching adaptations demonstrated in lesson plans and errors in enacted teaching. The focus of the analysis was the number of adaptations PSTs made in their lesson plan relative to the errors that they made in the enacted teaching. Spearman’s rho was employed to analyze the relationships. One hypothesis was developed for this research question.

Hypothesis 4. PSTs who made more adaptations to the lesson plans will have fewer errors in the enacted teaching.

Spearman’s rho analysis showed that there was no relationship between the total number of adaptations in lesson plans and the number of errors in the enacted teaching that PSTs made across the five weeks (week 1: \( r (17) = -.02, p = .94 \), week 2: \( r (14) = -.05, p = .85 \), week 3: \( r (18) = -.08, p = .75 \), week 4: \( r (15) = -.24, p = .36 \), week 5: \( r (11) = .39, p = .19 \), total: \( r (20) = .03, p = .91 \)). Thus, PSTs who made the highest number of adaptations in their lesson plans were no more likely to have lower error rates than PSTs with a low number of adaptations, for example. Thus, the hypothesis 4b was rejected.

Overall Findings

The first section described the results of PSTs’ teaching adaptations to their lesson plan across lesson plans one to three (weeks one to five) relative to both the number and types of the adaptations. In terms of quantity, there were two hypotheses. The first hypothesis was that PSTs would be able to create adaptations on lesson plans one to three (weeks one to five) as they developed their adaptive competence. The second hypothesis was that there would be more adaptations to Core Practices two (providing clear instruction), four (checking students’
understanding), and five (building positive relationships with students) than adaptations to Core Practices one (establishing rules and routine) and three (breaking down the content into smaller elements). The results showed that PSTs created adaptations to lesson plan one to three as it was hypothesized. Regarding the number of adaptations to each Core Practice, PSTs made the most adaptations to Core Practice two (providing clear instruction) followed by one (establishing rules and routine) and five (building positive relationships with students), and there were minimum adaptations made on Core Practices three (breaking down the content into smaller elements) and four (checking students’ understanding). Therefore, it was concluded that hypothesis 1a was partially accepted.

In terms of the types of adaptations that PSTs made to their lesson plan, it was hypothesized that PSTs would create various types of adaptations as they progressed from week one to five. The results showed that the majority of teaching adaptations made by PSTs were type two adaptations, and a minimal number of teaching adaptations were made for types one and three. Therefore, hypothesis 1b was partially accepted.

The second section reported the findings of PSTs’ teaching adaptations in enacted teaching across the five weeks (RQ3). There were two hypotheses for this research question. The first hypothesis was that PSTs would demonstrate teaching adaptations (add and miss) in the enacted teaching across the five weeks as they developed their adaptive competence, and the second hypothesis was that they would show fewer errors while they taught as it progressed from week one to five. The results showed that PSTs were able to make teaching adaptations (add and miss) in enacted teaching that were not on their lesson plans. Therefore, the first hypothesis (2a) was accepted. Relative to the second hypothesis (2b), PSTs showed fewer errors in enacted
teaching as they progressed from week one to five. Thus, the second hypothesis was also accepted.

Research question four investigated whether there were relationships between PSTs’ total number of adaptations in their lesson plan and errors in enacted teaching across the five weeks. It was hypothesized that if there were more adaptations in their lesson plan, there would be fewer errors in the enacted teaching. However, Spearman’s rho analysis showed that there were no relationships between PSTs’ adaptations to their lesson plans and errors in enacted teaching which means that although a PST made lots of adaptations to the lesson plan, this PST could show many errors in the enacted teaching as well. Therefore, hypothesis 4 was rejected. In conclusion, the results showed that PSTs were able to demonstrate a wide range of the total amount of adaptations in both lesson plans and enacted teaching across the five weeks. However, there are no relationships between their teaching adaptations on lesson plans and enacted teaching.
CHAPTER 5

Ball and Cohen (1999) argued that teaching and learning is a process that is complex and unpredictable. Thus, for pre-service teachers (PSTs) to develop teaching effectiveness, providing practicing teaching opportunities in the teacher education program for them to encounter and examine complexity and unpredictability of teaching is essential. Ample teaching opportunities in teacher education programs allow PSTs to learn and apply knowledge and skills to develop adaptive teaching competence to become effective teachers (Ball & Forzani, 2009). Practice-Based Teacher Education (PBTE) is a useful framework that prioritizes the connection between theory and practice and emphasizes the importance of the experiential practice of teaching to develop teaching adaptive competence (Ball & Cohen, 1999; Forzani, 2014).

The purpose of this study was to examine how PSTs develop their teaching adaptive competence through teaching rehearsal and repeated teaching, which is one of the focused teacher education strategies in PBTE. In this study, PSTs’ adaptive competence was explored in two ways, adaptive competence in the planning of a lesson and the actual (enacted) teaching of lessons. In the remainder of the chapter, I discuss the findings from the four research questions by connecting them to the current literature. Next, I discuss the limitations of the study and make recommendations for future studies. The chapter concludes with recommendations for developing PSTs’ adaptive teaching competence in Physical Education Teacher Education (PETE) programs.
PSTs’ Teaching Adaptive Competence in Lesson Plans (Research Questions One and Two)

This section discusses how PSTs’ teaching adaptive competence in lesson plans developed using the PBTE approaches across the five weeks. There are two research questions addressed in this section. Research question one examined how PSTs’ teaching adaptive competence in their lesson plans developed from lessons one to three (weeks one to five), and research question two investigated the types of adaptations that PSTs made in their lesson plans from weeks one to five.

PSTs’ Teaching Adaptive Competence Reflected in Modifications of Lesson Plans

Research question one examined PSTs’ adaptive competence reflected in modifications of lesson plans in two ways: (a) the number of adaptations that PSTs made to their lesson plans across lesson plans one to three (weeks one to five), and (b) the number of adaptations that PSTs made to their lesson plan for each five Core Practices across the five weeks. Two hypotheses were established for research question one:

- Hypothesis 1a. PSTs will make adaptations to lesson plans one to three (weeks one to five).
- Hypothesis 1b. PSTs will make more adaptations on Core Practices two (providing clear instruction), four (checking students’ understanding), and five (building positive relationships with students) than on Core Practices one (establishing rules and routine) and three (breaking down the content into smaller elements).

Pre-service teachers’ adaptive competence in their lesson plans was descriptively analyzed to explore how their adaptive competence developed through deliberate practice and reflection in PBTE. The results showed that there were wide ranges in the numbers of
adaptations that each PST made across the lesson one to three, and PSTs made more adaptations on Core Practices two, one, and five, than three and four across the five weeks.

**Teaching Adaptations on Lesson Plans (Hypothesis 1a)**

The result showed that each PST was able to make adaptations in all lessons one to three (across the five weeks). Although PSTs were new to teaching and the number of adaptations greatly varied among PSTs, the result showed that they were able to make adaptations to their lesson plans. The result of this study has alignment with the previous study mentioned in Chapter two. Scharon (2013) found that although novice teachers had limited teaching experiences, they could adapt their lesson plans to manage student learning. Scharon (2013) also argued that her research on adaptive teaching is also available to be implemented in teacher education programs, by providing the opportunity to reflect on lesson plans, PSTs would be able to identify effective adaptations to the lesson plans.

When we look at weekly results, the total number of adaptations that PSTs made was relatively lower in week two than week one, and the number consistently increased from week three again. It is assumed that PSTs were motivated when they received the lesson plan to make adaptations for the first time; therefore, they made many adaptations in week one. However, in week two, they were asked to edit the same lesson plan (lesson plan one) that they already made adaptations in week one. In addition, they were new to learn about teaching which could have limited their numbers of adaptations due to their minimal knowledge and experiences in teaching (Ayvazo & Ward, 2011; Iserbyt et al., 2020; Kim, 2016). From week three to five, PSTs’ numbers of adaptations increased. This was probably because they received a new lesson plan (lesson plan two) to make edits in week three, and in week four, though they still made edits to the same lesson plan as they did in week two for the first lesson plan, they had more teaching
experiences and had more knowledge of how to best adapt lesson plans. Compared to the first week, PSTs learned more teaching skills and strategies, experienced more teaching scenarios, observed multiple times of peers’ teaching repeatedly, received feedback from supervisors, and had reflections. Similarly, the number of week five adaptations was higher as it was the new lesson plan (lesson plan three) and they accumulated more knowledge and experiences about teaching.

Overall, this result supports the literature arguing that PBTE is a useful framework to develop adaptive teaching competence (Forzani, 2014; McDonald et al., 2013; Zeichner, 2012). In particular, based on the observed adaptations made by PSTs across the five weeks, it is suggested that a practice-based pedagogies cycle used in this study (edit lesson plan - quiz - lecture with discussion – edit lesson plan – enacted teaching with feedback – reflection with videos; see Chapter three for more descriptions) was a useful approach to foster the development of teaching adaptive competence among PSTs although more research is needed. Effectiveness of this cycle for PSTs to learn about lesson planning was also found in science education (Kang, 2017). In Kang (2017)’s study, through the cycle of planning, enacting, analyzing teaching videos, and reflection, eight PSTs in science education produced more effective lesson plans which can occur learners’ deeper understanding and engagement.

Within the practice-based pedagogies cycle, the following components would have impacted the development of adaptive teaching competence: the discussion on teaching cases/scenarios and reflection on their teaching. First, during the lecture, the instructor provided different cases of teaching for PSTs to discuss. Using those cases, for example, PST talked about what they learned from the case, how teachers in the example provided performance cues and feedback, and which teaching skills PSTs would want to adopt in the future. The use of teaching
scenarios is an effective strategy in teacher education programs as it enables teacher educators to prepare PSTs that they have not encountered yet but they could face in the future (Ward et al., 2022). With the limited curricular space in teacher education programs, it is impossible for PSTs to experience all those possible teaching cases. Thus, the teaching scenario is an effective way to provide PSTs opportunities to learn and think about how to tackle and problem-solve those challenges. In addition, after the discussion of those cases, PSTs received the instructor’s feedback on the discussion, and they had the opportunity to adapt their lesson plan. It is assumed that this opportunity for lesson plan revisions allocated during the lecture was helpful for PSTs to develop their adaptive teaching competence on lesson plans to be able to apply their learning through teaching scenarios right away. However, more research is necessary to examine how much this lesson plan revision opportunity was critical to develop PSTs’ adaptive competence in lesson planning because current study did not conduct changes on lesson plans before and after this opportunity.

The second component of the practice-based pedagogies cycle that helped PSTs develop adaptive teaching competence on lesson plans was the reflections of their teaching. Reflections play an important role for PSTs in facilitating deeper understanding of teaching and application of adaptive teaching (Anthony et al., 2015; Ericsson et al., 1993; Xie et al., 2021). Developing adaptive competence in lesson planning can be the outcome of ‘reflection on action’, the process of looking back on the action to improve action in the future. This process requires materials to prompt reflection such as videos and guided questions (Schon, 1983). In this study, videos and questions were used for this process. After the actual teaching session during the labs, PSTs watched two videos, one was their own teaching and the other was from their peer who demonstrated strong teaching skills. The observation of good teaching is another critical
approach in PBTE as it allows PSTs to learn different ways of how to effectively address challenges and solve problems during instructions (Ward et al., 2022). After watching two videos, PSTs answered reflection prompts, such as “What went well and did not go well in your teaching, and what do you think was the reason?”, “What would you do to further develop your teaching skills?”, and “What was the best feature that you want to take from a peer’s teaching video?”. After answering these reflection prompts (reflection on action), PSTs adapted their lesson plan once more. As it is shown in data of PSTs’ adaptations in lesson planning, PSTs demonstrated adaptations although they were new to teach; therefore, it is assumed that processes of reflection were another key factor for PSTs to develop adaptive teaching competence as they were able to think more deeply and objectively about what happened during a lesson and what changes need to be made. As such, through the combination of the use of teaching scenarios and reflection on action, PSTs likely learned more about students (e.g., task engagement and off-task behaviors), teaching contexts (e.g., court size and learning environment), and pedagogy (e.g., voice projection and tone and clarity of instructions), which promoted the development of adaptive teaching competence on lesson plans among PSTs.

In addition to the teaching scenarios and teaching video, in the lab teaching session, PSTs observed their peers’ teaching three to four times repeatedly every week. Modeling is one of the six essential features for high-quality practice-based opportunities (Benedict et al., 2016). Bandura (1977) argued that learning can occur by observing and modeling others which is known as observational learning. Each PST could observe same lesson three to four times every week as they played role as student in the group. Through this process, it is assumed that PSTs were able to further deepen their learning about teaching and had opportunities to think about how they would adapt their lesson plan.

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Another notable finding in hypothesis 1a was the wide range of adaptations made by PSTs (lesson plan one [range 6-101]; two [range 14-184]; three [range 18-97]). Specifically, although approximately 20% of PSTs only made less than 10 adaptations from week one to three, the majority of PSTs (80% and higher) made more than 10 adaptations each week, and 50% of them applied above 20 adaptations. Moreover, in week four, only one PST made less than 10 adaptations, and in week five, all the PSTs, except for one, made higher than 20 adaptations. These trends suggest that as PSTs learned more about teaching and had more experience in teaching, they could develop their lesson plans better through the process of adaptation.

There are two possible reasons for the wide range of number of adaptations. First, PSTs received feedback on their lesson plans from two different supervisors. One group received feedback from one supervisor and the other half received feedback from the other supervisor. Although both supervisors shared consistent expectations and used the same communication tool (sending feedback and comments in a written manner), their tone or expressions might have impacted PSTs’ understanding which in turn impacted the number of adaptations made by PSTs.

Second, though all PSTs had limited teaching experiences, some might have had more experience in teaching/coaching compared to others. Teachers with greater experience are likely to be more detailed oriented (Irvine, 2019) and therefore have higher number of adaptations, although the association between teaching experience and number of adaptations was not examined in this study directly. These backgrounds of PSTs may have been another reason why the number of adaptations made by PSTs was notably different.
Lesson Plan Adaptations in Each Core Practice (Hypothesis 1b)

The second hypothesis in research question one examined the number of adaptations for each of the five core practices. The result showed adaptations were made most frequently on Core Practices two (providing clear instruction; Median=65.50 [range 25-143]) followed by one (establishing rules and routine; Median=38.00 [range 6-100]), and five (building positive relationships with students; Median=21.50 [range 7-57]). A minimal number of adaptations were made on Core Practices three (breaking down the content into smaller elements; Median=.00 [range 0-4]) and four (checking students’ understanding; Median=7.50 [range 0-20]). This is a similar finding that is revealed from the previous study. In Xie et al. (2021)’s study, PSTs demonstrated the least adaptations to Core Practice three and four. In the current study, though no conclusion can be made for the reasons why more adaptations were observed in some Core Practices compared to others, the following could be considered the possible reasons that contributed to these findings.

The highest number of adaptations were made in Core Practice two (providing clear instruction). The commonly observed adaptations were adding a teaching segment of demonstrations to enhance the clarity of instructions. This result showed consistent finding with the previous study. Vaughn (2019) found that participants (teachers) during reading instruction in elementary school made more adaptations on modeling (demonstration) than any other adaptations. In Vaughn (2019)’s study, participants provided examples of good readers in reading as adaptations for students’ better understanding. Similarly to this, PSTs in this current study added many demonstrations to the verbal instruction to make students understand team handball better as adaptations.
In this study, for instance, when PSTs introduced the court dimension of team handball, though the original lesson plan only mentioned the specification of the court, a PST added “Follow me as I show you the court.” This adaptation was meaningful in facilitating learners’ understanding of the court size by physically moving to those lines. Another example of adding a demonstration was observed when a teacher explained the critical elements of throwing. Specifically, in the original lesson plan, the instruction was only a verbal statement of four performance cues, including “L shape, arms back, trunk rotation, push forward, and follow through.” However, a PST added “(Show demonstration)” in addition to verbal explanations of the critical elements. These findings of adaptation relative to demonstration reflect what was emphasized in the course, specifically, during lectures and supervisor feedback.

Clear instruction accompanied by demonstrations is fundamental to effective teaching strategies (Rink & Hall, 2008). It is especially true in physical education where the teaching environment is large and dynamic compared to regular classrooms (Rink & Hall, 2008). Thus, the fact that PSTs were able to adapt lesson plans to incorporate more demonstrations, reflected in a large number of Core Practice two adaptations, during instructions was a significant finding of the study.

The second most frequently observed adaptations were in Core Practice one (establishing rules and routines). This result was surprising as rules and routines are typically consistent across the lessons and minimal changes are required during instruction. One of the reasons that could describe this finding would be the lack of teaching experiences among PSTs as this was the first time teaching for many of the PSTs. One of the examples of Core Practice One adaptation is the following. At first, a PST planned to say “When I (do this), I want you to stop what you are doing”, but he adapted it to “When I say pause, you will need to stop your task.” Then, again, he
adapted it to “Pause!” Similarly, PSTs adapted the beginning signal in various ways using “Begin”, “Ready and go”, or whistle twice, as well as the gathering signal using “Gather”, “Gather please”, “Hustle up!”, or “Huddle.” Developing consistent rules and routines is another fundamental effective teaching strategy to maximize class time (time on task; Rink, 2019). Particularly, the stop-and-go signal and gathering signals were highlighted areas during lectures and supervisors’ feedback for both lesson plans and teaching. Thus, it can be considered this result demonstrates PSTs could apply what they learn as PBTE emphasizes connection between learning theory and its application.

Core Practice five (building positive relationships with students) was the third most observed adaptation made by PSTs. This result was not surprising as this is an area that PSTs could personalize their instructional communication based on who they are and their relationships with students (Coupland, 2003; Frisby & Martin, 2010; Jorgenson, 1992). This was a notable finding, especially, considering this study was executed in peer-teaching settings, where they are familiar with each other. The study provided evidence that even if they are teaching peers, if it is conducted in an authentic setting, PSTs would be able to think about how to best establish rapport with their students. The commonly observed adaptations were their use of team names during instructions, which was assigned to each group on the first day of the lab teaching session. As the original lesson did not have team names indicated, PSTs were expected to add their team names to personalize the instructions. For instance, one PST added “Let’s go team Denmark”, or “Team Germany! Gather, please.” Another commonly observed adaptation in Core Practice five was providing compliments. Because the original lesson plans included minimal compliments, PSTs added phrases such as “Great”, “Good job on throwing with the L shape”, or “Nice move!” to develop positive relationships with students. Being able to develop a positive relationship with
students is a critical skill set to provide a safe and positive learning environment to all students (Coupland, 2003; Frisby & Martin, 2010; Jorgenson, 1992). Thus, the results of high adaptations in Core Practice five demonstrate positive results in developing effective teaching strategies for early-stage teachers.

Two Core Practices that PSTs made minimal adaptations were Core Practice three (breaking down the content into smaller elements) and four (checking students’ understanding). Regarding Core Practice three, the result of minimal adaptations was not surprising as the given lesson plan already included detailed and comprehensive descriptions of the tasks and task progressions. Also, as the study was conducted in the introductory pedagogy course, the focus was more on how to execute tasks rather than what tasks to teach in the lessons. One the other possible reason is that it is assumed that PSTs had lack of knowledge on team handball because it was their first time to teach team handball. A sufficient level of content knowledge would be necessary for adaptations because if teachers do not know about the content, they would not have enough options to choose for adaptations (Ayvazo & Ward, 2011; Iserbyt et al., 2020; Kim, 2016). The importance of content knowledge is emphasized through the national standard for initial physical education teacher education (SHAPE America, 2017), and studies have shown that content knowledge is the basic for PSTs to equip pedagogical content knowledge (Chang et al, 2020; Kim et al., 2018; Stefanou et al., 2020; Ward et al., 2020). In addition, Kim et al. (2018) found that if teachers’ level of content knowledge increased, teachers showed more appropriate tasks and adaptations while they taught. Therefore, PSTs not having a sufficient level of content knowledge could be the one possible reason that they showed low numbers of adaptation to Core Practice three (breaking down the content into smaller elements). The association between PSTs’ knowledge level of team handball and adaptations on Core Practices
made in lesson plans was not directly evaluated in the present study. Future research examining the PSTs’ adaptive competence in lesson plans may consider including PSTs’ content knowledge level, or comparing the development of adaptive competence between novice and experienced teachers.

Similar assumptions can be made for Core Practice four. It is assumed that PSTs paid more attention to task executions and classroom management over what questions to ask to check for understanding because they were new to teach, it might difficult for them to focus multiple components of teaching at the same time. However, as checking for understanding is one of the fundamental effective teaching strategies (Rink, 2019), developing adaptive competence in Core Practice four is critical as PSTs go through their teaching education programs. Therefore, in the future study examining experienced teachers’ adaptive competence, it is expected to see more number of adaptations on Core Practice four.

It is important to note that there is currently no consensus on the number of adaptations to demonstrate teaching effectiveness. Rather, adaptations are considered to be contextual, and thus a low number of adaptations may not always signal ineffective teaching. For instance, if a PST made an appropriate adaptation for the first revision of a lesson plan, no further adaptations would be required. In contrast, if PSTs made inappropriate adaptations and decided to provide further changes, the total number of adaptations within lesson plan may increase. In the previous research (Xie et al., 2021), five PSTs made a total of 620 adaptations to their lesson plans across the five weeks. In comparison, 22 PSTs in the present study made 3208 of total adaptations across five weeks. Although Xie and colleagues (2021) did not mention the specific number of adaptations for indicating teaching effectiveness, they concluded that PSTs were able to adapt Core Practices to their lesson plans through using rehearsals and repeated teaching. Based on this
argument, overall, it is arguable that the number of adaptations observed among PSTs in this study was notably higher than we could expect from early-stage PSTs. Although it was the first time for PSTs to learn about teach, the number of adaptations that they made across the five weeks may support the efficacy of teaching rehearsals and repeated teaching in PBTE to develop PSTs’ adaptive competence in the planning of lesson.

Grossman et al. (2009) argued that teacher education programs should provide a set of teaching practices that could develop core teaching skills among PSTs. In particular, Lampert (2010) highlighted the importance of teaching repetition (including teaching rehearsals) and ongoing feedback for PSTs to be able to acquire specific teaching skills. One of the significant approaches used in the current study was to revise the same lesson plans three times (before coming to a lecture, after discussing a teaching scenario in a lecture, and after a reflection); anecdotally, in other PETE programs, PSTs revised lesson plans once at most. Through revising the same lesson plan on three different occasions, it is possible to argue that PSTs were able to acquire a more in-depth understanding of teaching skills and strategies, students, and contexts (Ward et al., 2018; Xie et al., 2021). In addition, timely feedback from their supervisors is critical for PSTs to reflect on and improve their teaching competence. Furthermore, practicing their teaching in lab settings (teaching rehearsals) before they teach in school is a useful strategy for developing PSTs’ teaching competence (Berliner, 1985). Collectively, the results of research question one supported this line of literature (Berliner, 1985; Grossman, 2009; Lampert, 2010) indicating the efficacy of repetitive teaching practice opportunities, teaching rehearsals, and supervisors’ timely and specific feedback to promote PSTs’ fundamental teaching strategies and adaptive competence. “Learning to teach effectively is like learning to be good at a sport. If you want to get better, you have to know a lot about the skills and strategies of the sport, practice
frequently under good conditions, and get help in the form of instruction, supervision, and feedback from those who know more than you do” (Siedentop & Tannehill, 1999, p 3).

Overall, the results of research question one demonstrated the effectiveness of some of the primary focuses of PBTE, to develop teaching adaptive competence tied to Core Practice on lesson plans (Ball & Forzani, 2009; Grossman et al., 2009; Ward et al., 2020); those include the use of teaching scenarios, the repeated teaching practices, and the use of videos for reflections coincide with allocated opportunities to revise their lesson plans. If we could establish authentic teaching settings (e.g. same tasks and task progressions, court sizes, and equipment; Ward et al., 2020), peer-teaching is an effective strategy to develop teaching adaptive competence; in this study, peer-teaching was conducted in the context of middle school physical education lessons. In addition, it is critical to highlight the instructional alignment across different elements of the courses (i.e., lectures, discussions, labs, and reflections) to develop PSTs’ adaptive competence. Collectively, PBTE was a useful framework to develop teaching adaptive competence in lesson plans.

Types of Adaptation that PSTs Made in Lesson Plans

Research question two addressed the types of adaptations that PSTs made in their lesson plans across the five weeks, and one hypothesis was developed for research question two:

- Hypothesis 2. PSTs will create various types of adaptations (modify, refine, and apply) as they develop their adaptive competence as they move from week one to five.

The result indicated that PSTs made type one (modify) adaptations mostly in week one, and it was rarely seen in the following weeks (week 1 \[Median=1.00, range 0-7\]). Type two (refine) adaptations were made across the five weeks, but the amount was wide-ranged among
PSTs (week 1 [range 0-49], week 2 [range 0-39], week 3 [range 0-37], week 4 [range 0-53], week 5 [range 11-55]). There was a minimal number of type three (apply) adaptations observed across the five weeks.

This study used a revised rubric of Xie and colleagues (2021). One of the major changes applied to the current study’s rubric was taking out the notion of higher or lower stage levels. In Xie and colleagues’ (2021) rubric, different types of adaptations were described using stage levels. However, in the current study, the data on the types of adaptations that PSTs made showed that higher-stage levels of adaptations are not always necessary. To illustrate, if a teacher is simply explaining where to gather students to describe the next activity, the adaptation could be just changing what phrase to use (e.g., “hustle up”, “huddle” or “bring it in”). Thus, the rubric in the current study was revised in a way to explain different types rather than judging the quality (which one is higher or lower levels of adaptations). Four different types adopted in the rubric used in this study are one (modify), two (refine), three (apply), and change maintained, and the definition of each type is explained in detail in the previous chapter.

Another change applied in the rubric was to improve the clarity of different types of adaptations. For example, for Core Practice one (establishing rules and routines), in Xie and colleagues’ rubric, stage one stated “Modify the rules and/or routines by adding, deleting, and changing content in the lesson plans” and in stage two, it was mentioned, “Refine the rules and/or routines in lesson planning based on the contexts.” However, these definitions were difficult to distinguish in different scenarios, and thus, the current study revised the rubric to clarify definitions for each type of adaptation (see Chapter three for details).

One of the possible reasons that type one (modify) adaptations were observed the most in the first week would be that type one adaptations were easier to make as it only requires PSTs to
edit wordings/expressions of the instructions in their own words. However, as PSTs learned more about teaching and developed their adaptive competence from weeks one to five, they might have realized the necessity of type two adaptation, refining lesson plans to meet the needs of the students. Type three might have not been observed in the current study as individualizing instruction requires a more in-depth understanding of students and contexts as well as obtaining fundamental effective teaching strategies (Rink, 2019). Another reason would be that this study occurred in the lab setting where PSTs taught their peers, and thus, students were more similar than different compared to real teaching settings. Regardless, overall, the fact that PSTs were able to create type one and two adaptations supported the efficacy of the PBTE to develop teaching adaptive competence among PSTs.

**PSTs’ Teaching Adaptive Competence in Enacted Teaching (Research Question Three)**

This section discusses how PSTs’ teaching adaptive competence in the enacted teaching developed through PBTE across the five weeks. Research question three addressed how PSTs’ teaching adaptive competence in the enacted teaching developed through PBTE from weeks one to five in two ways: (a) the number of adaptations (add and miss) that PSTs demonstrated while they taught across the five weeks, (b) the number of errors that PSTs made while they taught from weeks one to five. Two hypotheses were established for research question three:

- Hypothesis 3a. PSTs will demonstrate teaching adaptations (add and miss) in enacted teaching from weeks one to five.
- Hypothesis 3b. PSTs will show fewer errors while they teach from weeks one to five.
Adaptations (add and miss) in Enacted Teaching (Hypothesis 3a)

The results showed that each PSTs made adaptations (add and miss) in enacted teaching across the five weeks (AA: week 1 [Median=29.00, range 8-47], week 2 [Median=19.00, range 11-44], week 3 [Median=28.50, range 12-46], week 4 [Median=27.00, range 11-46], week 5 [Median=32.00, range 9-50]; AM: week 1 [Median=10.00, range 0-22], week 2 [Median=10.00, range 3-21], week 3 [Median=21.50, range 6-33], week 4 [Median=20.00, range 8-29], week 5 [Median=10.00, range 2-15]). This data showed that although PSTs had limited teaching experiences they did not stick with the plan, but could be independent from lesson plan while they taught. Capel et al. (2019) conducted a survey research in the PETE program in England and found that around half of PSTs in their study answered that they were independent from the lesson plan in teaching. The PSTs in Capet et al. (2019)’s study said when they taught a lesson, they deviated from the lesson plan, and they were flexible to adapt the lesson in unpredicted situations. Also, some of PSTs answered that they learned how to address unpredicted situations from the previous teaching training opportunities in the teacher education program. Similar to Capel et al. (2019)’s study, PSTs in this current study learned how to adapt their teaching through repeated teaching practice opportunities with the authentic teaching setting as is shown in the data of adaptations that PSTs made in the enacted teaching.

This is the first study examining the development of PSTs’ adaptive teaching competence in enacted teaching through PBTE. This result supports that the assumption of PBTE is a useful framework to develop PSTs’ adaptive teaching competence in enacted teaching as it did for lesson planning. In particular, the following approaches used in this study were assumed to have contributed to these findings.
First, as mentioned earlier, PSTs had opportunities to learn and discuss different teaching scenarios (Ward et al., 2022), which was expected to facilitate PSTs’ understanding of how to address different situations and their application of those knowledge bases. Second, as mentioned earlier, PSTs could observe peers’ teaching repeatedly in the lab teaching sessions. As they took a role as student in the group, they observed teaching same lesson three to four times. Through this opportunity, it is assumed that they were able to learn about teaching and how to adapt their teaching by observing and modeling (Bandura, 1977). Third, the supervisors provided one on one detailed feedback promptly right after PSTs’ teaching in the lab settings. As Xie et al. (2021) mentioned, specific and relevant feedback tied to Core Practices from supervisors is central to developing teaching competence among PSTs. Last, by watching videos and reflection questionnaires, PSTs had opportunities to reflect on their own teaching and observe good teaching examples. Watching and observing good teaching is one of the key approaches in the PBTE framework (Ward et al., 2022). Collectively, the key approaches of the PBTE framework (i.e., the use of teaching scenarios, feedback, and reflection; Ward et al., 2022) were helpful to develop PSTs’ teaching adaptive competence in enacted teaching as well as in lesson planning.

The other notable findings from PSTs’ adaptations in enacted teaching was the wide-ranged adaptations made by PSTs as it was the case in lesson planning adaptations (AA: week 1 [range 8-47], week 2 [range 11-44], week 3 [range 12-46], week 4 [range 11-46], week 5 [range 9-50]; AM: week 1 [range 0-22], week 2 [range 3-21], week 3 [range 6-33], week 4 [range 8-29], week 5 [range 2-15]). Similar reasons as lesson planning could be considered as the contributing factors for this finding. First, five different supervisors provided feedback to PSTs in enacted teaching. As mentioned in the lesson plan section, though supervisors had consistent expectations and focus relative to teaching strategies, their communications and approaches
could have been different which might have impacted PSTs’ understanding of the feedback which consequently impacted the total number of adaptations made by PSTs. Although five supervisors rotated every week to provide feedback to the different groups each week, the differences in supervisions each week might have impacted the range of adaptations in enacted teaching. Second, PSTs’ understanding of the content covered in the lecture and/or a supervisor’s feedback might have different depending on PSTs’ background. As this class was an introductory pedagogy course, the majority of the PSTs were new to teaching which may have impacted their understanding of nuances of their learning acquired throughout the course.

However, it is important to note that, as was discussed in the lesson planning section, there is no certain number of adaptations that determines PSTs’ effectiveness in the practice of teaching. To illustrate, if PSTs developed robust lesson plans, it may require minimal adaptations while they are teaching; especially, if they know their students and teaching contexts well during the planning phases. However, it is also possible to argue that PSTs would still make more adaptations if their teaching environment changed or if one of the students behaved differently than usual or get injured. Further investigation is necessary to determine the appropriate amount of adaptation to demonstrate teaching effectiveness.

Errors in Enacted Teaching (Hypothesis 3b)

Relative to errors in enacted teaching, the result showed that PSTs demonstrated fewer errors as they proceed from week one to five (week 1 [\textit{Median}=7.00], week 2 [\textit{Median}=4.00], week 3 [\textit{Median}=2.50], week 4 [\textit{Median}=3.00], week 5 [\textit{Median}=1.00]). As stated in Chapters three and four, when PSTs missed the teaching segment on a lesson plan and when this segment is considered an obvious error, it was coded as an error. One example would be that, in the lesson plan, a PST planned to say “My name is John (pseudonym), and I am from a State
University to teach you team handball for the next 5 weeks”; as it was his first class meeting, he was supposed to introduce himself. However, during teaching, he only said “My name is John.” This was considered an obvious error, as mentioned earlier, building a positive relationship is important for learners to have positive learning experiences (Coupland, 2003; Frisby & Martin, 2010; Jorgenson, 1992).

Another example of an error is missing review questions. A PST planned to say “Here are two questions. Where I can shoot the goal? And what is the special characteristic of the crease” after explaining the team handball court. This PST, however, completely missed the whole segment of this review questions to check students’ understanding while he taught. Checking for understanding questions are critical for ensuring students’ understanding (Rink, 2019). Thus, missing these questions is considered an obvious error. The last example is missing to instruct the critical elements of a motor skill. A PST was supposed to say “Here are four things to do for throwing; step, L shape, rotation, and follow through”; however, this PST missed explaining those critical elements in enacted teaching. Critical elements are essential for students to learn motor skills (Rink & Hall, 2008). As such, this was also judged as an obvious error.

Though at present, there is no certain cut-point number for errors to judge teaching effectiveness or ineffectiveness similar to adaptations (add and miss), there was a clear positive trend of decreasing number of errors from weeks one to five, except for week four, with a smaller range in the number amongst the PSTs (week 1 [range 0-25], week 2 [range 2-18], week 3 [range 0-5], week 4 [range 1-8], week 5 [range 0-7]). The consistent trends of decreasing the errors and the range were significant results in the current study to demonstrate the efficacy of the PBTE framework as they demonstrate that PSTs were consistently able to learn not to make these errors through the approaches used in the course.
Relationships between Teaching Adaptive Competence on Lesson Plans and Errors in Enacted Teaching (Research Question Four)

This section discusses the relationships between PSTs’ teaching adaptive competence on lesson plans and errors in enacted teaching (research question four). There was one hypothesis for this research question.

- Hypothesis 4. PSTs who made more adaptations to the lesson plans will have fewer errors in the enacted teaching.

The result revealed that there was no relationship between the number of adaptations in lesson plans and errors in enacted teaching that PSTs made which did not support this hypothesis. There are three possible reasons for this. First, although PSTs made many adaptations to their lesson plans, with their lack of teaching experiences, those adaptations to lesson plans were still insufficient to effectively instruct in enacted teaching. Second, there is also a possibility that the PSTs did not make adaptations to their lesson plans because they thought their lesson plans were sufficient, and their teaching also went well as they were well-prepared during the planning phase, which solicited fewer errors during teaching. Further observations are necessary on in which conditions PSTs make errors while they teach to find out the more meaningful relationships between the adaptations in lesson plans and errors in enacted teaching that PSTs make. Last, a small sample size might have impacted the result because there was not a sufficient number of participants to draw statistical significance. In conclusion, no particular relationships were observed between lesson planning and errors during enacted teaching, which rejected the hypothesis.
Summary

Overall, the finding of this study demonstrated the efficacy of developing PSTs’ adaptive competence in the planning of lessons and enacted teaching through the PBTE. First, the results demonstrated that the PBTE is a useful framework to develop teaching adaptive competence among PSTs on lesson plans though the number of adaptations that PSTs made was wide-ranged. This result highlighted the importance of modeling (Bandura, 1977), deliberate practice (Kavanagh et al., 2020) and accompanied reflection (Anthony et al., 2015; Ericsson et al., 1993; Xie et al., 2021) to develop adaptive teaching competence.

Second, PSTs were able to develop teaching adaptive competence in different Core Practices, particularly, Core Practices one (establishing rules and routines), two (providing clear instruction), and five (building positive relationships with students), which are all fundamental principles of effective teaching (Rink, 2019; Rink and Hall, 2008). With consistent emphases in these areas across the courses (lectures, supervisions, and reflections) and repeated teaching in an authentic teaching context, PSTs were able to develop teaching adaptive competence in different areas of Core Practices.

Third, the results demonstrated that PSTs were able to develop teaching adaptive competence in actual teaching though the numbers of adaptations were wide-ranging as was the case in lesson planning. PSTs’ adaptive competence in the enacted teaching was occurred as a result of reflection in action. Schon (1983) argued that practitioners act immediately when they encounter unexpected situations, and they make decisions based on the recognition and the observation with the tacit knowledge in the middle of acting. This study demonstrated that PSTs are capable of making decisions on adapting their lesson based on the learners and the contexts of classroom in the middle of teaching. This result of PSTs’ developing teaching adaptive
competence further supports the efficacy of the PBTE framework (Forzani, 2014; McDonald et al., 2013; Zeichner, 2012) with the use of deliberate practice (Kavanagh et al., 2020) and accompanied reflection (Anthony et al., 2015; Ericsson et al., 1993; Xie et al., 2021) with repeated teaching in an authentic setting. Repeated observations of peers’ teaching and modeling was another possible critical factor that contributed for the development of PSTs’ adaptive teaching competence.

Finally, no relationships were identified between PSTs’ adaptations in lesson plans and errors in enacted teaching. The possible reasons for this finding included (a) the lack of PSTs’ teaching experience, (b) the success of enacted teaching with preparations during a planning phase, and (c) a small sample size to produce statistical significance. Further study is needed in this area to make conclusions about the relationships.

**Limitations and Future Directions**

This section discusses the limitations of the study and future directions based on those limitations. Overall, there are seven limitations. The first limitation is the use of a convenient sample from one course of a PETE program ($n = 22$). Thus, the generalization of the findings needs to be cautiously made. Future studies should include participants from multiple courses or multiple PETE programs which uses similar curriculum approaches as well as with randomly selected participants.

Second, due to the technical error in audio recording, a few teaching data were missing from some PSTs. Having weekly teaching data from all PSTs would allow us to further look at the weekly trends in the data. Preparing backup audio recording would be suggested for future studies.
Third, this was a descriptive study with no comparison group. Without a comparison group, we cannot know what would have happened under traditional approaches to introductory pedagogy classes. Future studies should compare the efficacy of PBTE with different groups (e.g., teacher education programs that have limited teaching practice experiences and/or that do not use PBTE approaches in their teaching practices, such as discussing teaching scenarios or repeated teaching). Another suggestion relative to the research design is to use a longitudinal study by comparing the first and last year in a teacher education program to examine how much PBTE helps PSTs to develop adaptive competence over the years.

A fourth limitation is that this study was conducted in a lab teaching setting, which may have produced different results compared to conducting this study in real teaching settings in schools. While the teaching lab is an ecologically valid setting where almost all initial teaching in PETE programs occurs, generalizing these effects to actual teaching is unknown. For example, PSTs might have made adaptations in different Core Practices or different types of adaptations on lesson plans (i.e., more type three [refine] adaptations to meet individual students’ needs). To address this limitation, future studies could examine and compare PSTs’ adaptations in both a lab and a real teaching setting.

A fifth limitation is the lack of analysis tied to Core Practices in teaching adaptations in enacted teaching for both adaptations and errors. Though the current study showed that PSTs were able to develop adaptive competence in enacted teaching, in which Core Practices those adaptations were made is unknown. Knowing which Core Practices PSTs made adaptations or errors is also important to examine the alignment of adaptive competence in lesson planning and enacted teaching. Future studies should add another set of analyses to examine which Core Practice PSTs made adaptations or errors in enacted teaching.
A sixth limitation is having different supervisors to provide lesson plans and enacted teaching. Though the supervisors used consistent expectations and a common understanding of effective teaching principles, their communication of feedback could have been different. In addition, some PSTs received feedback on lesson plans and enacted teaching from different supervisors as two supervisors provided feedback to all PSTs for lesson plans and five supervisors gave feedback to PSTs in enacted teaching. Though it could be practically difficult, future studies should use consistent supervisors for lesson plans and enacted teaching to minimize the confounds associated with supervision.

The final limitation is the lack of assessments to check the knowledge acquired through lectures. Though PSTs took a quiz for each week’s assigned reading prior to the start of each lecture, their knowledge was not assessed after covering those content areas in lectures. Considering the acquisition of knowledge bases is central to delivering effective instructions, making sure that PSTs have a certain level of understanding of the content covered in lectures is important. Thus, future studies should include an assessment to capture the knowledge of PSTs to further examine PSTs’ teaching adaptive competence.

**Recommendations for Physical Education Teacher Education**

This study was conducted in the introductory teaching methods course of a PETE program. As mentioned in Chapter three, this course employed the recurring cycle of practice-based pedagogy, which was central to producing positive findings of this study. Within the cycle, lectures (using Core Practices and teaching scenarios), supervisors’ feedback, and reflection were particularly important to develop teaching adaptive competence. Thus, this section discusses recommendations for PETE programs for those three areas.
Lecture (Using Core Practices and Teaching Scenarios)

One key suggestion for lectures is to select the content to cover to avoid overwhelming early-stage PSTs. Teaching is a complex process (Ball & Cohen, 1999) and there are numbers of teaching strategies and principles (Rink, 2019) that PSTs need to understand. However, it is impossible for PSTs to understand and apply those principles in a short period of time with limited teaching practice opportunities. Specifically, in the current study, the instructor was selective to determine which topics of instructional strategies to include (i.e., stop-and-go signals, rules of safety, and routines of entering and leaving the gym), which were also consistently focused on in the lab teaching sessions. As such, it is important for instructors to be intentional and selective with the content covered in lectures.

Another key suggestion for the lecture is the use of teaching scenarios. Through learning and discussing teaching scenarios, PSTs could learn how to react the situations that they have not encountered yet (Ward et al., 2022), and apply them to their lesson plans and teaching. As mentioned earlier, specific questions were provided for PSTs to discuss for each teaching scenario in the course. Additionally, it is important to allocate the time for PSTs to apply their learning through teaching scenarios to their lesson plans. Having the opportunities to apply their learning in a timely manner is critical while their knowledge is still fresh.

Supervisor’s Feedback

Another set of suggestions is regarding supervisors’ feedback. First, as was the approach used in the current study, detailed and prompt feedback from supervisors is essential for PSTs to develop adaptive teaching competence for both lesson plans and teaching. The specific feedback from the supervisors which is relevant to the Core Practice is important in the deliberate practice for PSTs to develop teaching adaptive competence (Xie et al., 2021). Second, if there are
multiple supervisors to support PSTs’ learning, it is critical that those supervisors share consistent expectations and focuses on effective teaching principles. Teaching practice in PBTE is grounded in deliberate practice (Ericsson, 2006). Because for deliberate practice, there should be well-defined goals and feedback for PSTs to reflect on (Ericsson 2002; Ericsson et al., 1993; Kavanagh et al., 2020), the supervisors’ specific intention to develop PSTs’ adaptive competence needs to be consistently maintained throughout the practice opportunities.

Reflections

The final component of recommendations is relative to reflections. The first example is the use of videos including PSTs’ own teaching and a strong teacher’s teaching. In this study, PSTs completed reflection as homework with PSTs’ own teaching video and one good example video of their peers. By watching their teaching, PSTs would be able to realize what they should focus more on when they teach, and they could learn how to solve some challenges during teaching with an effective teaching strategy observed in a peer’s teaching video (Ward et al., 2022).

Another suggestion is the use of specific questions to facilitate PSTs’ reflection process. Reflection-on-action in this recurring cycle is the process of looking back PSTs’ practice of teaching and analyzing it. However, as PSTs are new to teaching, they are new to engaging in this important reflective cycle. Therefore, specific questions need to be addressed to foster PSTs’ reflection which is designed to elicit pedagogical reasoning (Ward et al., 2018).

Conclusions

This study demonstrated that teaching rehearsal and repeated teaching, which are one of the critical teacher education strategies of PBTE, are effective in promoting PSTs’ teaching
adaptive competence. Preservice teachers developed their teaching adaptive competence in lesson plans and enacted teaching with multiple teaching opportunities in an authentic setting, high-quality feedback from supervisors, and structured reflection. Although further research is needed, it was witnessed that as PSTs practiced teaching more, the number of errors made by PSTs decreased, which was a positive result of teaching practice opportunities. Collectively, teaching rehearsals and repeated teaching opportunities in authentic settings with supervisors’ feedback and constructed reflection, PSTs will be able to develop effective teaching strategies and teaching adaptive competence. In conclusion, PBTE provides a useful framework for teacher education programs to prepare effective teachers.
References


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https://doi.org/10.1177%2F0022487117717467

https://doi.org/10.1177%2F0022487111409551


Appendix A: Institutional Review Board Letter
The Ohio State University Consent to Participate in Research

Study Title: Preservice Physical Education Teacher’s Development of Adaptive Competence

Researcher: Phillip Ward Ph.D

This is a consent form for research participation. It contains important information about this study and what to expect if you decide to participate.

Your participation is voluntary.

Please consider the information carefully. Feel free to ask questions before making your decision whether or not to participate. If you decide to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose: We want to examine how your planning and teaching changes as you progress through the KNPE 2601 introduction to teaching course.

Procedures/Tasks:

There are two things we do routinely in this class such as examining changes you make in your lesson plans and videoing your rehearsal lessons and having you analyze them. We would like to once the semester is concluded analyze these lesson plans and teaching videos to document how you have improved. This will involve no additional time from you or for you to do anything different than that you are required to do for this class.

Duration:

This study will occur in the first half of the semester. You may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you, no consequences to your grade, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.

Risks and Benefits:

Because you are already doing these tasks we wish to document in this class, there are minimal risks to you as a participant that result from our documentation of your planning and practice of teaching.

Future research:
Your de-identified information will not be used or shared with other researchers.
Confidentiality:  
Efforts will be made to keep your study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law. Also, your records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;

Incentives: You will not be paid to participate in the study.

Participant Rights:

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you are a student or employee at Ohio State, your decision will not affect your grades or employment status.

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights you may have as a participant in this study.

This study has been determined Exempt from IRB Review.

Contacts and Questions:

For questions, concerns, or complaints about the study, or you feel you have been harmed as a result of study participation, you may contact Dr. Phillip Ward ph: 614-688-8435 or by email: ward.116@osu.edu.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.
Signing the consent form

I have read this form and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

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Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

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Appendix B: Example of the Lesson plan
<table>
<thead>
<tr>
<th>Teacher Name:</th>
<th>Date to be Taught:</th>
<th>School</th>
<th>Grade &amp; # of Students:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit:</strong> Team Handball</td>
<td><strong>Central Focus:</strong> Transferring the throwing to a 4v4 keep away game.</td>
<td></td>
<td>Lesson # 1</td>
</tr>
<tr>
<td><strong>Connection to Previous Lesson(s)/Unit:</strong></td>
<td>None – this is the first lesson we are teaching.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Learning Objective(s), Content Standard and Related Assessment:</strong></td>
<td><strong>Learning Objectives Stated Behaviorally:</strong></td>
<td><strong>Content Standard:</strong> Benchmark</td>
<td><strong>Assessment Strategy:</strong></td>
</tr>
<tr>
<td></td>
<td>Psychomotor Goals</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><em>TSWBAT</em> To use the overhead and underhand pass demonstrating all critical elements in a keep away game</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>TSWBAT</em> Pass to an open, undefended teammate maintaining the possession of the ball during keep away games</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><em>TWBAT</em> use throws and moves to get open in a 4v4 team handball game</td>
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<td></td>
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<tr>
<td></td>
<td>Physical Activity goal: Demonstrate an appropriate level of activity by engaging in vigorous activity for at least 50% of the lesson</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cognitive goal:</strong></td>
<td><strong>TSWBAT name and use the following rules:</strong> 3 step and 3 second rule; crease no step rule and the shooting zone rule.</td>
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<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td><strong>Academic Language Demand:</strong></td>
<td>Students will be learning the basic skills and tactics of playing a game of team handball</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Academic Language Vocabulary, Syntax and/or Discourse</strong></td>
<td>Get open, keep away and the game rules:</td>
<td></td>
<td></td>
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<tr>
<td><strong>Materials &amp; Equipment:</strong></td>
<td>2 goals, 18 hotspots, 1 balls.</td>
<td></td>
<td></td>
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<tr>
<td><strong>Accommodations</strong></td>
<td></td>
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</table>


<table>
<thead>
<tr>
<th>Time - Activity Development &amp; Management Tasks &amp; Organizational Arrangements [T=TASK]</th>
<th>How will the task be communicated include Teaching Cues/Critical Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>As students come over ask them their names and introduce yourself. “Thank you for coming over so quickly. My name is Ms/Mr (XXX) and along with my colleagues, from Ohio State. We will be here every Friday for the next 4 weeks teaching you all. We are going to be working on playing team handball.</td>
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I have three rules. When I (do this) I want you to stop what you are doing. If say (gather) I want you to run over to me as stand in front of me. If I am talking eyes on me, and no talking. Does everyone understand this? Super.” |

“Before we get started I want to show you the court. Walk with me as I describe the court. (Walk to the feature and name it) This is the side and end lines of the court. There are 2 goals with a crease-you can never step over the crease, a midline, and a shooting zone line-you can only shoot at a goal when you are inside the shooting zone.” |

To warm up today I am going to name a feature and I want you to run to it. Ready: “a sideline (any), the other sideline, a goal, the crease at the other goal, the furthest shooting zone from where you are standing, the midline. ….wonderful (gather). Two quick questions in the game when can I shoot at a goal? ..that’s right only when I am in the shooting zone. What is special about the crease? Yes, no one offense or defense can step on the crease.
Task development in a 10x10yd grid.

Move the zone markers to make a 10x 10 grid

T 4 v 0 (depending on the amount of students in the group )-throwing and catching stationary to assess throwing and catching skills. Introduce first the overhead, then underhand pass, then use both. Lets move to this grid. The borders are defined by these four hot spots (show). No stepping outside the borders. Each of you stand away from each other in this grid. I want to quickly review how to use an overhead pass. I know that you can do this but I want to be sure you are technically correct. There are two parts to the throw (demonstrate), First step towards the target with the opposite foot that is holding the ball, as bring your arm to an L, as you throw I want you rotate your hips and to push the ball forward. If you are receiving the ball please have your hands up ready to catch it.” So four things step, L rotate, and push. Here’s the ball lets begin with throws and catches” correct errors….. (1 min max)

T Great work. (Demonstrate) Here are three more things to think about that add power and direction- move your arm quickly as you push and snap your wrist as you release, your arm should follow through to the side of your body. So move your arm quickly, snap the wrist and follow through, but as you do this I want to control for now how hard your throw. Begin. Excellent. correct errors….. (1 min max)

T (XXX) Super work. (Demonstrate) The underhand throw is easy and its useful because it can be thrown low and under the stretched arms of an opponent who is expecting an overhead throw. (Demonstrate) The critical elements are stepping to the target as before, releasing the ball out front by pushing your hand toward the target. Begin throwing underhand throws (1 min max).

Critical Elements of underhand pass:
1) Step towards target
2) Release ball out in front
3) Pushing hand toward target when releasing

Critical Elements of the overhand pass:
1.) Step towards target
2.) Bring arm up in a L
3.) Rotate hips forward
4.) Bring arm through
5.) Snap wrist
6.) Follow through

Receiver: catching
1) Hands open
2) Thumbs touching,
3) Hands facing toward the thrower to present a target
“Good work - lets make this harder. Now we are going to play keep away game. I have (name of student) going to be a defender. She cannot run she cannot intercept the ball but she can provide a barrier. If you pass then move quickly to get open-away from the defender - if you are waiting to receive a pass you can stand still for only the 3 s If you hold the ball longer than 3 seconds it is a change of possession. Defense needs to count to 3 seconds so they can cause a turnover. I only want to see overhead passes in this game. Ready begin.”

- T “(Freeze) lets change the defender and add a new rule –you cannot throw over the defender. Begin”
- T “(Freeze) lets change the defender and now allow the defender to run but not intercept. Begin”
- T “(Freeze) lets change the defender and now allow the defender to intercept. Begin”
- T “(Freeze) you can now use both underhand and overhand throws.”

(Freeze and gather) You have done well. Lets play.

**Application game:**

T “Let play a 4v4 (size of group) half court keep away game. I want you to match up for person-to-person defense no double teaming. The goal is to keep possession of the ball. A final rule if you have the ball you cannot run with it but you can take up to three step rule” Ready, lets begin”

Use Freeze replay to stop the game and work on emphasizing one element at a time. Such as “in this game I want to see everyone using the 3 second rule.” See points to emphasize next column/

**Emphasize:**
- Three step rule
- Good passing choices
- Hands up to catch the ball
- Moving to get open
- 3 second rule
- only correct overhand or underhand passes –both can be used all the time.
- Consider moving back to a passive defense for groups who are struggling to pass.
**Lesson Closure**

Share what they did well?

Ask 3-4 questions about the rules (list these)

Thank them for their hard work “

What else might you say?

Dismiss them when told

---

**ATTACH ALL INSTRUCTIONAL MATERIALS** (handouts, worksheets, task cards, activity sheets, assessments, etc.) USED IN THE LESSON. (there will be none for our lesson)

**Reference**
Appendix C: Syllabus of Introductory Teaching Methods Course
Instructor: Phillip Ward Ph.D.  
Office: PAES building – 2nd floor A256

Office Hours: Friday, 11:00 - 12:00 pm, Monday 4.00-6.00 pm

Above are my open office hours, but the door is open. I enjoy teaching and talking with you. So, if you have questions that we did not answer in class or if you need clarifications, please email me and we can set up a time to chat.

Email: ward.116@osu.edu  
Mailbox: PAES building 2nd floor mail room

Supervisors  
Kelsey Higginson  
Email: Higginson.4@osu.edu  
Office: A216 PAES building

Kyuil Cho (Q)  
Email: cho.915@osu.edu  
Office: A216 PAES building

On campus class location: Friday Lecture PAES building 143; Friday Lab PE 0060 (RPAC North Gym)

On campus Meeting times: Friday Lecture 9:10 – 11.00am; Friday Lab 12.00-1.50pm

Off campus teaching locations: Hastings Middle School Upper Arlington and Ridgeview Middle school, Columbus City Schools-you will be assigned a specific school during the semester.

Off campus Meeting times: 7:30 – 11.30am If you have a Friday morning class BEFORE this one you will need to check with Kyuil or Kelseyat the end of the first class. (On days we meet off-campus there are no Friday afternoon sessions)

The Mission of the College of Education and Human Ecology:

The mission of the College of Education and Human Ecology of The Ohio State University is to build upon a tradition of excellence in promoting outstanding teaching, research, and outreach and engagement that impacts and influences our global society in meaningful ways.

Mission of the Educator Preparation Unit at The Ohio State University:

The mission of the educator preparation unit of The Ohio State University is to prepare educators, through the generation and use of research, who are highly qualified for and who are passionate about maximizing Teacher Candidate learning across all P - 12 school age and demographic groups and in developing skillful physical activity specialist leaders.

Course Description:

The purpose of this course is to introduce you to teaching and management strategies which have been linked to pupil learning, the design of instructional materials and techniques, and strategies for working with a diversity of learners in various contexts. This course is designed to teach effective instructional skills in physical education and in physical activity settings. This course will study, discuss, and apply effective teaching skills.
Rationale:
The Physical Education, Sport and Physical Activity degree offers the opportunity to earn a license to teach P-12 physical education in the State of Ohio. A requirement for licensure is the ability to demonstrate competency relative to both content and pedagogy applied to pupils in P-12 physical education contexts and settings where physical activity specialists will work parks and recreation centers, as well as sports and fitness settings. In addition, the degree offers majors and minors as a physical activity specialist or a coach. The instructional skills needed for teaching or working as physical activity specialist are identical the contexts are more similar than different.

Relationship to Other Course/Curricula:
This course is part of a lock-step sequence of courses offered for prospective physical education teacher candidates and physical activity specialists in the Physical Education, Sport and Physical Activity major in the Department of Human Sciences. This course is a requirement for entrance into the professional development phase of the teacher education program and a prerequisite for KNPE 4740 and 4741.

Course Objectives:
You will demonstrate acquisition of teaching behaviors, knowledge, and skill necessary to:

1. Develop and maintain an orderly and supportive learning environment in a variety of settings;
   - develop, teach, and monitor classroom/gymnasium routines
   - teach and maintain classroom/gymnasium rules
   - develop preventive management skills and discipline strategies
   - demonstrate techniques and strategies of active supervision
   - demonstrate an effective an efficient introduction and closure
   - transition learners/clients to learning tasks/activities efficiently

2. Design and implement challenging instruction and learning experiences that allow for successful participation across a range of skill levels and diverse populations;
   - compare and contrast philosophical/sociological perspectives in a variety of physical activity settings
   - plan to optimize learning for a diverse population of children, youth, and adults
   - plan progressions that allow for success and challenge
   - select and implement delivery techniques to meet learning goals, needs of learners, and diverse experiences/backgrounds
   - modify and create games and activities that are educationally sound
   - use questioning, explanations, and demonstrations to enhance learning

3. Design instructional materials using media/technology resources and deliver that instruction using the appropriate formats.

4. Develop skills in systematic observation and reflection of teaching to promote analysis of behavior (both of the teacher and the pupil) in many different contexts.

5. Develop a personal philosophy and vision as a physical education teacher or physical activity specialist.

Course Evaluation:
Quizzes on Chapters (20%)
Over the course of the quarter there will be 6 25-minute timed multiple-choice online-quizzes covering the required reading of the course. These timed quizzes will take place on our CANVAS website and will be scheduled from 6.00am to 11.59 pm on Thursday’s as indicated in the schedule. Each Quiz is worth 20 points for a total of 180 points. The Canvas web site has study guides for each quiz. You must score at least a 80% pass on the test or you will be asked to retake the test in the following week prior to the next class until you pass 80%.

In-class quizzes (10%)

At the start of most classes there will be a 10-20 minute quiz of the content of the lesson plan to be taught. You must score 75% pass on the test or you will be asked to retake the test in the following week prior to the next class until you pass 75%.

Reflection on Teaching (15%)

Professionals grow only from improving their practice. Reflection and tinkering with your teaching allows you to improve your teaching in intentional ways. Our specific goals for this task include:

- critically reflect on teaching practice
- develop awareness of assumptions (your own and others) about teaching/students
- identify problems of practice, articulate them, and solve/manage them
- develop a discourse for talking about/improving teaching
- engage in reflection-in-action and reflection-on-action
- differentiate instruction

Reflection on your teaching in labs from video analysis. During our lab experiences your teaching will be videotaped and posted on buckeye box. Each week of the labs you will be given set of issues to reflect on and these need to be completed and sent to your supervisor either Kyuil or Kelsey by Tuesday 9pm.

Reflection on your teaching in schools. You will be given a set of issues each week for you to reflect on relative to your teaching. The reflection should be sent to your supervisor either Kelsey or Kyuil by 2pm Friday the day of your teaching.

Failing to complete the video analysis for any week will result in a drop of one letter grade for each occurrence.

Professional discourse of the issues as evidenced by in-class discussions. (10%)

Participation in class activities and discussions is important not only for your learning, but also the learning of classmates and the children and youth you will be teaching. In this class we will by studying, discussing observing and practicing teaching. So, listening, interacting, and reflecting are important skills to use and develop in this class. By professional discourse I expect you to demonstrate via discussions, presentations and debates, characteristics that include (a) clearly articulated positions and critiques grounded in the textbook; (b) a willingness to challenge views different from your own; and (c) respectfulness of different views

- A grade of A (9-10%) would reflect clearly articulated positions and responsiveness to the discourse that will occur in class discussions reflecting the characteristics described above.
- A grade of B (7-8%) would reflect responsiveness, but only moderately clear articulations of positions.
- A grade of C (5-6%) would reflect only minimal preparedness and responsiveness to class discussions.
- A grade of D (0-4 %) would reflect a lack of preparedness and little responsiveness to class discussions.

Teaching Laboratories (15%)

During this course, there will be teaching laboratories on Fridays (12-1.50pm). These labs will require that you (a) prepare for the lab by reading and rehearsing the lesson that will be taught on Fridays to your peers and middle
school students on the following Wednesdays. It is expected that you are VERY WELL PREPARED for these sessions or you will waste your peers and the instructor’s time. You might be asked to reteach a section of your lesson if we are not satisfied with the standard of your instruction. At the end of each day you will receive a grade of:

**A = 19-20**; Indicating that you were very well prepared, you delivered your instruction well and followed the lesson plan precisely.

**A- = 17-18** Indicating that you were well prepared, you delivered your instruction well and followed the lesson plan precisely.

**B+ = 15-16** Indicating that you were prepared, you delivered your instruction well and followed the lesson plan correctly but not precisely.

**B = 14** Indicating that you were prepared, you delivered your instruction reasonably well and followed the lesson plan correctly but not precisely.

**B- = 13** Indicating that you were not as prepared as you needed to be, you delivered your instruction with some difficulty and followed the lesson plan correctly but not precisely.

Fail. <12 Indicating that you were not prepared, AND/OR you delivered your instruction very poorly AND/OR followed the lesson plan incorrectly. **If you fail a lab you will fail the course.**

Note that being prepared means that you have a up to date lesson plan in terms of content development and management.

**Teaching in schools (20%)**

During this course you will be teaching lessons in schools. Details on this later in the class.

**Final application-focused written exam (10%)**

You will find on canvas a list of 30 questions from which 15 questions will be selected for the final exam.

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**Note in addition there will be BONUS PERCENTAGE POINTS available for each of the three evaluation areas for outstanding work by individuals and groups. Bonus percentage points can increase your final grade significantly and can be awarded by instructors at any time.**

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**Grading Scale**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Grade</th>
<th>Percentage</th>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93%-100%</td>
<td>A-</td>
<td>90% - 92%</td>
<td>B</td>
<td>67% - 69%</td>
</tr>
<tr>
<td>B</td>
<td>87% - 89%</td>
<td>B+</td>
<td>74% - 76%</td>
<td>C</td>
<td>60% - 66%</td>
</tr>
<tr>
<td>C</td>
<td>84% - 86%</td>
<td>C-</td>
<td>70% - 73%</td>
<td>C-</td>
<td>59% - below</td>
</tr>
</tbody>
</table>

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**Textbook:**

Our textbook is:

Siedentop, D. & Tannehill, D. (2013). *Developing teaching skills in physical education.* McGraw-Hill CREATE available by online order then pick up from Zips
Online order link:

Pickup address and link 1313 Chesapeake Ave, Columbus | OH 43212-2169

You need to this textbook for the first online quiz

Other required resources: Canvas Web Site for KNPE 2601.

Class Procedures and Requirements:
1. All assigned work is due on the due date. **Any work turned in after the due date will not be graded** (even if you are unable to attend class).
2. If you have a conflict due to an excused absence the quiz I can arrange for the quiz to be taken before the test date.

Attendance:

It is a professional expectation that you would provide notification in advance of absences from class.

Excused absences: I understand conflicts arise. The following absences are considered excused.
- Religious observance – no documentation needed
- Court appearance – summons from the court
- Illness – letter needed from student’s doctor stating when the illness began and for how long he/she should be staying home
- Family emergencies, such as death or serious illness of immediate family member – Contact me to determine what kind of documentation is required.

Absences are only excused in documented cases listed. Please note that there can be no more than two excused absences in the semester-after which absences will be unexcused. If your absences result in you missing a substantive part of the course I may suggest to you to withdraw from the course.

The University exceptions to the excused absence policy above are military service and athletic competitions (athlete or coach). But because these are planned in advance, let me know by the second week any absences your foresee and I will talk with you specifically about these absences

Unexcused absences: Missing class. Your absences will not be excused for interviews, weddings, student activities, conferences, personal travel, etc. You will drop a letter grade for each unexcused absence- **on the third absence you will receive a failing grade**.

- Teachers are expected to be at schools well before class starts and to be prepared to teach. Likewise, I plan to start the class on time and I expect that you will be there on-time ready to work and having read the materials necessary for being successful in that day’s session.
Teaching whether in schools or as a physical activity settings is not like other jobs - if you are not in attendance I consider that unprofessional, just as I would view that situation if you were a teacher. Thus, please be aware that (a) I do not expect you to be absent for any classes, and (b) On the first unexcused absence you will drop a letter grade, on the second unexcused absence a student will receive an “E”. This applies to the morning and afternoon sessions.

Teachers and physical activity specialist instructors whether as undergraduate interns in this class, volunteers or teachers working in schools must hold to ethical standards. You will find a copy of the professionalism standards and guidelines in the school site information on Canvas under content.

Districts have specific dress codes for teachers. You will find a copy of the OSU Dress guidelines in the school site information on Canvas under content.

Finally, do not be late to class or field placements. We work in teams being late puts you out of sync with your team; in class there are quizzes to be taken at the start of class if you are late you will have less time to answer the quiz or miss it entirely and forfeit the points, being late to schools is unacceptable and typically you will be asked to leave and not teach and the event treated as an excused absence.

Diversity:
The Department of Human Sciences is committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the department seeks to develop and nurture diversity, believing that it strengthens the organization, stimulates creativity, promotes the exchange of ideas, and enriches campus life. The Department of Human Sciences prohibits discrimination against any member of the department’s community on the basis of race, religion, color, sex, age, national origin or ancestry, marital status, parental status, gender identity, sexual orientation, ability status, health status, or veteran status. Course content will be considered as it relates to intellectual, social, cultural, racial and economic perspectives.

Special Accommodations:
If you have a documented disability and require special accommodations please see me at the end of our first class session. Together we will work with the Office for Disability Services to identify appropriate accommodations.

Academic Misconduct:
You are expected to behave in accordance with the Student Code while enrolled in this course. Examples of student misconduct include, but are not limited to, use of unauthorized materials during testing; receiving/providing answers from/for others during testing; submitting written reflections for an observation that is not an accurate reflection of your observation or does not represent an observation you completed; claiming as your own, the written work of others; and plagiarizing from the literature without referencing. These are some examples of academic misconduct. All instances of academic misconduct will be reported and dealt with according to the procedures outlined by the University Committee on Academic Misconduct.

Per University Rule 3335-31-02, "Each instructor shall report to the committee on academic misconduct all instances of what he or she believes may be academic misconduct.” Cheating on examinations, submitting work of other
students as your own, or plagiarism in any form will result in penalties ranging from an "F" on an assignment to expulsion from the University, depending on the seriousness of the offense.

**But the bigger issues are:**

*Who would want to hire a teacher or a PAS instructor who cheated?*

**AND**

*Who would want their child taught by someone who cheated?*
# Master Schedule for KNPE 2601 AU 2019

<table>
<thead>
<tr>
<th>Wk</th>
<th>Day/Date</th>
<th>In Class Focus</th>
<th>Readings/Assignments</th>
<th>Quizzes Thursdays 6am-11.59pm</th>
<th>Friday Lab</th>
</tr>
</thead>
</table>
| 1  | Aug 23   | • Introduction to the course  
       • Teaching as a goal directed activity  
       • What's going on in the gymnasium?  
       • Active teaching and time analysis of assignment 1. | • Assignment 1: videotape analysis. | • Quiz 1 (ch 1 and 2). | • Two team handball lessons  
       • OSU approach |
| 2  | Aug 30   | • Knowledge for teaching and teaching effectiveness. | • In class Quiz on Team Handball Lesson 1.  
       • Chapters 1 & 2 | | Lesson 1: Intro and first half of lesson. |
| 3  | Sept 6   | • The ecology of the gymnasium  
       • Content development in physical education? Tasks and progressions. | • In class Quiz on Team Handball Lesson 1.  
       • Chapters 3 & 11  
       • Content Development worksheet  
       • Video analysis | • Quiz 2: (ch: 3 & 11) | |
| 4  | Sept 13  | • Teaching skills for physical educators | • In class Quiz on Team Handball Lesson 2.  
       • Chapters 13 – 14  
       • Video analysis | • Quiz 3 ch 13 & 14 | Lesson 2 |
<p>| 5  | Sept 20  | • Classroom management and discipline | • In class Quiz on Team Handball Lesson 3. | • Quiz 4 (ch 4 &amp; 5) | Lesson 2 or 3 |</p>
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</table>
| **6** | Sept 27 | - Assessment | - Chapters 4 & 5  
- Video analysis |  
- In class Quiz Content  
- Chapter 10  
- Video analysis | - Quiz 5 (ch 10) |
|   |   |   | Lesson 3 |
| **7** | Oct 4 | Teaching | On site in schools | No Lab |
| **8** | Oct 11 | No Class Fall Break | XXXXXXXXXXXXXXXXXXXXXXXXXXXX | XXXXXXXXXXXXX | XXXXXXXXXXXXX |
| **9** | Oct 18 | Teaching | Hastings teach/ Ridgeview on campus | Quiz 6 (ch 7) | No Lab |
| **10** | Oct 25 | Teaching | On site in schools | No Lab |
| **11** | Nov 1 | Teaching | On site in schools | No Lab |
| **12** | Nov 8 | Teaching | On site in schools | No Lab |
| **13** | Nov 15 | Teaching | Hastings on campus /Ridgeview teach | Quiz 6 (ch 7) | No Lab |
| **14** | Nov 22 | Teaching in the elementary school | Lecture and lab (in class) | No Lab |
| **15** | Nov 29 | No Class  
Thanksgiving, Indigenous people’s & Columbus day celebrations |   |   |
| **16** | Dec 6 | Final Exam |   | No Lab |
Appendix D: Distribution of the Total Number of Adaptations on Lesson Plans and in Enacted Teaching
Distribution of the Total Number of Adaptations that Each PSTs made on Lesson Plan across the Five Weeks
Distribution of the Total Number of Four Different Types of Adaptations that Each PSTs made on Lesson Plans

Note.
Type 4: Change Maintained
Distribution of the Total Number of Adaptations (add) that Each PSTs made in Enacted Teaching across the Five Weeks
Distribution of the Total Number of Adaptations (miss) that Each PSTs made in Enacted Teaching across the Five Weeks
Distribution of Total Number of Errors that Each PSTs made in the Enacted Teaching across the Five Weeks
Appendix E: Individual Data
Each figure demonstrates individual PSTs’ adaptation data for lesson plans and enacted teaching. The abbreviations in the figure illustrates the following: LP = Lesson plan adaptations, AA = Adaptation add, AM = Adaptation miss, E = Error.

Note: No teaching data for Week 1 and 5.

Note: No teaching data for Week 3 and 5
Note: No teaching data for Week 2 and 5

Note: No teaching data for Week 4 and 5
Note: No teaching data for Week 2 and 5

Note: No teaching data for Week 2 and 5
Note: No teaching data for Week 1 and 4

Note: No teaching data for Week 5
Note: No teaching data for Week 5
Note: No teaching data for Week 3 and 4
Note: No teaching data for Week 2

Note: No teaching data for Week 1
Note: No teaching data for Week 2 and 4

Note: No teaching data for Week 4
Note: No teaching data for Week 2 and 5