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Teaching Adaptive Competence to Preservice Teachers in an Introductory Methods Class

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Abstract: The purpose of this study was to examine how preservice teachers (PSTs) adapted their lesson planning components over time. We were particularly interested in the quality of adaptations that were made by PSTs in a practice-based teacher education (PBTE) program. A descriptive analytic design was used to examine the lesson plans of nine PSTs who were peer teaching for 10-weeks. The context for teaching became incrementally more complex in terms of core practices of instructional and managerial skills as the semester progressed. Three PBTE pedagogical strategies were integrated throughout the peer teaching across five phases: rehearsals, repeated teaching, and approximations of contexts. A descriptive analysis of lesson components (e.g., instruction, management, and closure) was conducted, with further examination in three quality indicators: alignment to the lesson, preciseness of the task statements, and the content appropriateness of the lesson plan. Almost three quarters of adaptations were made in instructional statements and content development. Improvements in alignment to the lesson were made faster than improvement in preciseness and content. Approximately 80% of improved adaptations were maintained by PSTs across different lessons over time. The findings in this study suggest that PBTE pedagogical strategies support PSTs' development of adaptive competence in lesson planning and improve PSTs' adaptation in quality indicators as well.

Keywords: *Lesson planning, teaching approximations, repeated teaching, teacher education*

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INTRODUCTION

When teaching is called complex, it is a recognition the lessons occur in settings that are characterized by a large number of events (e.g., social and instructional interactions). These events are occurring simultaneously among teachers and students, and among students, with some unpredictability (e.g., distractions, interesting diversions). Another piece of the complexity is

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grounded in the fact that students and their teachers have and build history with one another (Doyle, 1986), which involves teachers understand and respond to individual differences, past experiences, and navigate evolving teacher-student relationships. Finally, in any lesson in today's schools, students are at different points in their understanding and life experiences, and this creates variability in their learning that teachers must address. Given this complexity of a classroom or gymnasium, preservice teachers (PSTs) and in-service teachers must be highly adaptive in their teaching to accommodate both their pupils and the dynamic nature of the teaching settings.

The notion of teachers adapting to their setting and to students is not new. But it was Shulman (1987) who conceptually situated it within in his definition of pedagogical content knowledge (PCK), defining it 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". It follows then that if the teacher's ability to adapt instruction is a characteristic of PCK, then a teacher's ability to adapt instruction is an important teacher education outcome. Indeed, adaptive teaching competence is increasingly considered to be a critically important component of high-quality teaching (Bransford et al., 2005; Darling-Hammond, 2019). Bransford and colleagues (2005) note that in teacher education adaptive teaching competence is often viewed as a gold standard for teaching education outcomes.

Adaptive teaching is called by a variety of names including adaptive expertise (Bransford et al., 2005), responsive teaching (Dozier et al., 2011), reflective teaching (Souto-Manning & Dice, 2007), and adaptive competence (Xie et al., 2021). In this paper we use adaptive competence to recognize that competence exists on a continuum from novice to expert. Brühwiler and Blatchford (2011) defined adaptive teaching competence as, "a teachers' ability to adjust their planning and teaching to the individual learning processes of students". This definition raises a pertinent question in teacher education, how can teacher education programs can effectively teach preservice teachers adaptive competence? Adaptive teaching competence is a skill and a perspective that is different from the often prescriptive nature of traditional teacher education (Baldinger & Munson, 2020)? In conceptualizing adaptive teaching competence, we do not see it as the antithesis of prescription, but rather as the intentional variation of evidence-based practices taught in teacher education or learned from craft knowledge developed through hands-on experiences. In short, PSTs must learn evidence-based practices, and then be taught to apply them to different settings. Teacher education should teach transferable knowledge and skills that prospective teachers can adapt in different settings. In discussing the idea of transferability, Ward and Cho (2020) note that teaching skills

should be, "Transferable in the sense that their usage in and across contexts during their teacher preparation, and then as practicing teachers, function to help them learn from their practice".

Adaptive competence can be situated within the teaching effectiveness literature in physical education (Kim & Ward, 2021; Rink, 2013) and the practice-based teacher education (PBTE) movement (Baldinger & Munson, 2020). Within the PBTE movement, there is a nascent literature focused on teaching PSTs adaptive competence. Researchers have investigated the effects of reflection following supervisory conferences with clinical educators in field experiences (Soslau et al., 2021); following teaching rehearsals in methods classes using the construct of teacher noticing (Baldinger & Munson, 2020), collaborative lesson study (Schipper et al., 2020) and using a plan-teach-review reflective process in a methods course (Xie et al., 2020; Xie et al., 2021).

Common to the approaches discussed above to teach adaptive competence in teacher education are the use of deliberate practice (Ericsson, 2008) and reflection (Schön, 1983). When PSTs are introduced to teaching, they often find themselves in an unfamiliar context (e.g., grade level, content, setting, pedagogy). In such situations, they may encounter challenges where decision-making becomes difficult, resulting in ineffective teaching episodes for both themselves and their students. "Over time, they are able to figure out adequate responses by practice, problem-solving, and trial-and-error or with help from supervisors, teachers, or colleagues" (Ericsson, 2008). Deliberate practice is a pedagogical strategy developed in the expertise literature (Ericsson, 2008). Researchers in a variety of domains have demonstrated deliberate practice is an effective strategy to move novices (e.g., PSTs) along a continuum toward expertise (Ericsson, 2008; Stigler & Miller, 2018; Xie et al., 2021). Deliberate practice requires individuals 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" (Ericsson et al., 1993). In physical education teacher education (PETE), deliberate practice can occur in planning, teaching rehearsal using core practices, repeated teaching of the same lesson (Xie et al., 2020; Xie et al., 2021; Ward, 2020), and in settings approximating teaching, such as peer teaching (Ingersoll et al., 2014; Xie et al., 2021). Core practices, represent the central teaching task domains that a teacher encounters (Ball et al., 2009; Grossman et al., 2009). In physical education, Ward (2020) identified 19 evidence-based core practices, including establishing and using rules and routines, presenting content in small chunks of information, enacts a developmentally appropriate sequence of lessons to teach content that meets unit objectives, and using accurate demonstrations in presenting content to students.

A second component of adaptive competence studies in teacher education is reflection. Schön (1983) made a distinction relative to when reflection occurred. Reflection-on-action occurs after a

lesson has been taught (post-iterative) and before the first or subsequent lesson (pre-iterative). In contrast, reflection-in-action takes place during the actual teaching process (interactive) when teachers make decisions based on their observations of student performance and their own teaching practice. Teaching PSTs to use and then act on reflection is an important outcome of teacher education and a life-long teaching skill.

Studies conducted by Xie and colleagues (Xie et al., 2020; Xie et al., 2021) have provided valuable insights into how PSTs adapt their lesson planning through two PBTE pedagogies, namely repeated teaching and rehearsals, in both in-person and online contexts. These studies have significant implications for PETE. First and foremost, the findings demonstrate that PBTE pedagogies are effective and meaningful in enhancing PSTs' adaptive competence in lesson planning. By engaging in repeated teaching and rehearsals, PSTs develop a deeper understanding of how to make necessary adaptations to specific core practices. This experiential approach allows them to refine and improve their teaching over time. Furthermore, the research highlights that PSTs make adaptations at different stages and frequencies throughout their courses. The most common adaptation early in their teaching are the modifying and refining instructional tasks and management tasks in lessons (Xie et al., 2020; Xie et al., 2021). As PTS's progress and gain confidence they begin to adapt game play and to different contexts (Xie et al., 2020; Xie et al., 2021). Lastly, the ways in which teacher educators create teaching situations that approximate the complexity and authenticity of real-world scenarios have a significant impact on promoting PSTs' adaptive competence. By providing PSTs with authentic teaching experiences and challenging them to navigate complex instructional challenges, teacher educators can better prepare them for the demands of actual teaching environments.

In this present study we aimed to expand upon the previous work of Xie and colleagues (Xie et al., 2020; Xie et al., 2021) by further investigating the quality of adaptations made by PSTs in their lesson planning. Specifically, we sought to apply quality indicators that are more precisely defined to evaluate the adaptations made by PSTs during the pre-iterative and post-iterative stages of lesson plan development. This study differs from prior studies in several ways, (a) it has a longer data collection phase, (b) it systematically increases the complexity of the settings that PSTs encounter as they move through the course, and (c) it uses more precise variables to describe the adaptations and the quality of the adaptations as PSTs progressed across the semester. Our research questions were: (1) What are the adaptations made in the lesson plans? (2) What is the quality of adaptations made in the lesson plans? and (3) What evidence is there that PSTs transferred adaptations to a new lesson?

METHODS

Participants and Setting

The study was conducted in a large Midwest public university in the United States during the fall of 2021. Institutional review of human subjects was approved by the university and informed consent was obtained from all participants prior to the study. Nine of 13 (8 males and 1 female) second-year PETE students enrolled in an introductory teaching methods course participated in this study.

Introduction to Methods Course

The goal of the 15-week introductory teaching methods course was for the PSTs to develop their adaptive competence in core practices (Ward, 2020) in instruction and management in physical education. Specifically in instruction, we focused on developing PSTs ability in the learning and applying the following core practices: (1) providing precise instruction; (2) using accurate demonstrations in presenting content to students; (3) using feedback, cues, and prompts to correct and shape student learning, (4) breaking down content into smaller chunks; and (5) checking for understanding. For management, we emphasized PSTs' learning of establishing and using rules and routines and time and equipment organization and management. To achieve these goals, the instructor designed the course based on the PBTE cycle (Ward et al., 2018), that included lectures, class discussion, video analysis, lesson planning, peer teaching, reflection, and regular online and in class quizzes. The course instructor is a highly effective teacher educator with strong credentials in teaching this introductory methods course following a PBTE approach for more than 20 years. The course was delivered in person, with both lecture and lab components where the PSTs taught peers while demonstrating core practices. Each Thursday, the PSTs completed a 32-question online quiz for the assigned textbook readings and emailed their edited lesson plan iterations based on the sample lessons or previously edited lesson plan iterations to the supervisors. Each Friday, the class started with a written 15-minute quiz on the lesson content following the instructor provided a 2-hour lecture to more closely examine and to apply the content from the assigned textbook readings. This involved class discussion, examining likely teaching scenarios that could occur in their teaching and using these discussions to edit their lesson plans on their laptops in class. On Friday afternoons, the PSTs taught their peers team handball using the edited lesson plans. Each lesson was videotaped and supervised by at least one graduate student. All supervisors were doctoral students who were well-trained and experienced supervisors. The course instructor facilitated supervision trainings before and after the lecture and lab. Specific feedback foci for each lab session was

emphasized in each session. Supervisors provided their assigned PSTs specific feedback right after the teaching, with a varied focus each week (e.g., week 2 focused on precise instruction). Meanwhile, the course instructor provided group feedback before, during, and after the peer teaching. Following each lesson and at the end of the labs, the PSTs received specific feedback that they used to modify their lessons after the lab. They were also provided with a video of their lesson and reflection questions to focus their attention on what they did well and what they needed to improve.

This cycle of quizzes, lecture, peer teaching, feedback, videos, and reflection created three occasions for PSTs to modify their lesson plans. Once prior to class and based on their review of their video of the previous lesson, a second time in class based on the application of the content of assigned textbook readings, and a final time directly following their peer teaching using feedback from supervisors and peers.

Systematic Changes Across the Semester in the Teaching Settings. In this class PSTs progressed through five phases that systematically increased the demands on teaching. Each phase had a more demanding context as shown in Figure 1. The PSTs were given sample lessons of lessons 1-3 which they then developed into their own lessons. The sample lessons consisted of lesson components with scripts, including introduction, warm up activities, sequential learning tasks on different skills and strategies (e.g., overhand and underhand pass, give and go, diamond formation), application/keepaway games, and closure. To explore how PSTs transferred what they learned from adapting lessons 1-3, we gave the PSTs an outline of lesson four with only basic lesson component headings and content to be taught. Neither scripts nor task progressions were included in the outline. The lessons were designed to teach a team handball unit to middle school students who had not previously been instructed in team handball. The lesson plans were developed using key components of Play Practice (Launder & Piltz, 2013) and Sport Education (Siedentop et al., 2020). However, the students in this class were not introduced to the models specifically, just the model components (e.g., team affiliation in Sport Education, game-based extending and refining learning tasks from Play Practice). In later classes in the PETE curriculum, the components used in this class are introduced as they learn the specific models.

Phase one (Weeks 1-3). In phase one, PSTs taught introductory team handball skills such as overhand and underhand throws and applied them in non-scoring keep away games to one group of 3-4 PSTs. They taught the same lesson for three weeks. The PSTs taught the lesson three times and participated as a peer student approximately 11 times depending on the size of the group. Our

reason for doing this was to use the repeated teaching of the same lesson to help students understand the nuance of the lesson (Xie et al., 2020; Xie et al., 2021). The focus of this phase was for the PSTs to gain familiarity with the teaching environment, understand the flow of the lesson, and how to apply and adapt a specific core practice in instruction and management through repeated teaching.

Phase two (Weeks 4-5). In phase two, the PSTs focused on teaching lesson two, which covered throwing and catching skills in the context of passing lanes. They introduced basic rules of team handball, shuffle passing, wall defense, shooting, and playing the game to a group of 3-4 students for two class sessions. The PSTs taught the lesson twice and participated as a peer student approximately seven times depending on the size of the group. The focus of phase two was for PSTs to continue to modify and apply core practices with new content.

Phase three (Weeks 6-7). In phase three, the PSTs taught lesson three twice which introduced the shovel pass, give-and-go, fake-and-cut, and more rules and refined game play to one group of 3-4 PSTs in weeks 6-7. During this phase in the second lesson one PST in each group was instructed to engage in 2-3 instances of misbehavior (e.g., talking to peers when the instructor was talking, being off task, and not following the rules). The focus of this phase was for the PSTs to generalize their adaptations made in the previous two lessons and apply them to new and more demanding content as well as dealing with misbehaviors.

Phase four (Weeks 8-9). During phase four, the PSTs extended their teaching of lesson three twice in weeks 8-9, with instructing two groups of 3-4 PSTs. Similar to the context in phase three during the second week, one peer per group per lesson was deliberately instructed to misbehave. The PSTs in this phase were expected to develop their core practices to address a more complex instructional and managerial context.

Phase five (Week 10). In phase five, the PSTs were asked to develop a new lesson (i.e., lesson four) and to teach two groups of 3-4 students once in week 10. The content included diamond and triangle formation. The purpose of this phase was for the PSTs to generalize their ability to adapt their planning skills into new content.

Dependent Variables and Data Collection

Table 1. Definitions and examples of lesson components

Component	Definition	Example
Welcome	That period of the lesson where teachers: • greet students, • introduce themselves and provide class rules.	Greetings, name use, rules and signals
Advance Organizer	That period of the lesson where teachers: • provide an overview of what is to be taught in the lesson	"Good morning! We are going to be covering the overhand and underhand throw and playing a keep away games today."
Transition	That period of the lesson where teachers move students to and from activity: • efficient (occurs <10 seconds) • using commands/signals	Moving from demonstration to practice or from practice to the teacher.
Equipment Organization/ Distribution	That period of the lesson where teachers distribute equipment: • efficient (occurs <10 seconds), • using commands/signals	Handing out pinnies, balls,
Warm Up	That period of the lesson where teachers warm students up for the activity of the lesson: • upper body is stretched (at least shoulders) • Lower body (at least quads. Hamstrings, achilles)	Running, stretching, agility
Instructional Statement	When teachers provide a description of the activity: • description of the task • description of critical elements	I want to get open by moving away from the defender
Content Development	The progressive development of content. • content is developed (introduced) in an incremental way in small stages.	Teaching progressions
Closure	That period of the lesson where teachers summarize and recognize the lesson. • review the main instructional points of the lesson • recognize pupils' performance (individual and/or group) • preview the next class	"Good job today" can someone tell me the critical elements of the overhead pass? Great. Juan, Louise, Charlie and Selena you did well today in performing our tasks. Next class we get to play a game"

Our focus in this study was on the specific adaptations in the lesson plans as PSTs prepared for and taught lessons in each phase. In total, the PSTs taught 10 lessons in 10 weeks, with lesson one three times (phase one: weeks 1-3), lesson two twice (phase two: weeks 4-5), lesson three four times (phase 3: weeks 6-7; phase 4: weeks 8-9), and lesson four once (phase 5: week 10). Each week, the PSTs emailed their lesson plan iterations before the lecture, after the lecture, and after the lab with their edits highlighted in a different color for each lesson plan iteration. After excluding missing data, we collected 24 lesson iterations in total from each PST (lesson 1: 9 iterations; lesson 2: 6 iterations; lesson 3: 8 iterations; lesson 4: 1 iteration) throughout ten weeks. The details of lesson plan iterations for each lesson per week across five phases are shown in Figure 1. For each round of adaptations, the PSTs were asked to highlight any edits they made in their lesson plans and submit the highlighted lesson plans to the researchers electronically. Each lesson plan was organized into eight lesson components: welcome, advance organizer, equipment organization/distribution, warm-up, transition, content development, instructional statement, and closure. The content presented in each sample lesson plan was thoughtfully sequenced and tailored to the needs and experience levels of the intended middle school students.

To examine how the PSTs made adaptations in different lesson components and how they transferred the adaptations into a new lesson plan, we developed a coding sheet to code all identified adaptations within the PSTs' lesson plans. The coding sheet followed the sample lesson organizational structure with the eight components. Any event that was identified as an adaptation from the PSTs' lesson plans was copied and pasted into the coding sheet under its lesson component and was numbered based on the order of occurrence in the lesson.

An operational definition for each lesson component was developed to provide the scope and explanations of adaptations that were expected. Table 1 presents the eight lesson components where adaptions could occur and presents definitions and examples of each component. In previous studies (Xie et al., 2020; Xie et al., 2021), descriptions of the adaptations have been noted, but judgments about quality have typically not been made. In this study, we introduced a new coding system to address quality. For each lesson component each individual adaptation was coded according to three criteria: alignment, preciseness, and content.

Alignment. In judging alignment, we examined whether the adaptations made in a specific lesson component aligned with the definition. The criteria for each definition are shown in Table 1. The adaptation was coded as "improved" if all criteria were met and coded as "poor" if any criteria were missing. If an improved adaptation in a lesson was carried forward into the future lessons, it

was coded as "maintained". For example, in transition if a signal was used, but students took more than 10 seconds to gather. If the PST modified the lesson by using a countdown from 5..4..3..2..1 and this occurred in all future lessons, then this modification was viewed as maintained.

Preciseness. In judging the quality of preciseness, we investigated whether the clarity of descriptions within the adaptations improved compared to the previous lesson or the sample lesson (in the case of the first modification). If the edits improved the clarity of the text, then it was coded as "improved". If the previous version was unclear and the new adaptation just as unclear, it was coded "poor". If the previous improved adaptation was carried forward into the future lessons, it was coded as "maintained". For example, if in the previous lesson plan the PST wrote for a transition "When I blow my whistle, please come over here." If in the adaptation they wrote "When I blow my whistle, please come over here and stand on the white line facing me" it would be coded as improved. If this was included in future lesson iterations or other lesson plans, then it was coded as maintained.

Content. In judging the content element, we evaluated whether the content being added, deleted, or modified was appropriate in the sense that it was a reasonable adaptation in the content of the lesson. If the content reflected a good content step (e.g., progressive, incremental) compared to the original (lesson sample), it was coded as "good"; otherwise, it was coded as "poor". If the previous improved adaptation was carried forward into the future lessons, it was coded as "maintained". For example, if the PST made a change of the content by adding a new upper body stretching activity in a throwing lesson, then this edit would be coded as "good" as it was relevant to the skill being taught that day. If the same change of the warm-up activities was kept in the later lesson iterations, then it would be coded as "maintained".

We used a coding sheet to record the adaptations for each lesson plan iteration. The edits in each lesson iteration were copied and pasted from the PSTs' lesson plans into the worksheet. Here is an example of how one PST's edits in the first and second iterations of lesson plan one were recorded in the worksheet template. At the beginning of draft lesson plan one, the PSTs were required to ask their students' names and introduce themselves as 'students' come over. For example, a PST might in their first iteration of lesson plan one (LP1.1a) say: "Hello everyone, my name is Carol Jones (pseudonym). I am here from Happy University. We will be visiting you all weekly, teaching you the game of team handball." All italic were edits made by the PST, and they were copied and pasted in the Word worksheet as one event for that lesson iteration.

Coder Training. Five researchers coded the lesson plans. Before coding, the following steps were used to ensure coding quality. Four training sessions were provided to all researchers, with each session lasting between 30 minutes to one hour. The foci of the training sessions were to (a) introduce the predetermined codes and coding template, (b) practice using the predetermined codes to code example lesson plans, and (c) discuss and clarify coding disagreements among researchers. Then researchers coded examples of lesson plans to practice coding while using the codes and coding template. Next, all researchers met to discuss the coding results and disagreements. Once all disagreements were clarified, four researchers coded one assigned PST's lesson plan iterations. Then each researcher's coding results were compared with one primary researcher, an experienced expert in this coding using interobserver agreement (IOA). The total agreements were divided by the sum of agreed and disagreed codes and multiplied by 100 to create a percentage. For training we established a criterion of at or above 90% agreement. The mean IOA was 90.3% (ranging from 87% to 98%), which met our criterion. The coders then proceeded to code their assigned participants' lesson plans individually. All lesson plan iterations were coded.

Data Analysis

We had four researchers who experienced a series of training sessions to code all the lesson plan iterations, then we summarized the coding results of each PST at different phases into one Excel worksheet using numbers. If one edit was coded as "improved", then the researcher would enter "1" under the quality category "improved". If one edit was coded as "poor", the researcher would enter "0". If one edit was coded as "maintained", then the research would enter "1". Each researcher aggregated the data by summing up the total numbers of adaptations and their quality frequency in each lesson component and lesson iteration for each PST at phases one to five. Data were converted to a master spreadsheet and the results were analyzed descriptively at both individual and group levels. Specifically, to address the first research question, we aggregated all PSTs' adaptations from phase one to phase four to understand where the adaptations were made in the lesson plans. To answer the research question two, we looked further into the quality categories (i.e., alignment, preciseness, content) of all the adaptations made by the PSTs across four phases, such as frequency, sum, and mean. To examine whether there was any change of PSTs' adaptations across different phases (research question three), we aggregated the adaptation data of each phase, respectively. For research question three, we analyzed the phase five data to explore how the PSTs generalized their adaptations into a brand-new lesson (lesson four). We specifically analyzed all the adaptations in lesson four using descriptive statistics and using the same three

indicators (i.e., alignment, preciseness, content) to evaluate the adaptation quality in a brand-new lesson.

RESULTS

The result section is presented based on the research questions addressed in this study.

Research Question 1. What Are the Adaptations Made in the Lesson Plans?

Table 2. Adaptations in different lesson components

Rank	LP Components	Frequency	%	Mean/PST	Mean/Iteration /PST
1	Instructional Statement	3443	42.0%	382.6	143.5
2	Content Development	2426	29.6%	269.6	101.1
3	Transition	781	9.5%	86.8	32.5
4	Closure	443	5.4%	49.2	18.5
5	Warm Up	428	5.2%	47.6	17.8
6	Advance Organizer	306	3.7%	34.0	12.8
7	Welcome	225	2.7%	25.0	9.4
8	Equipment Organization	138	1.7%	15.3	5.8
	Total	8190	100.0%	910.0	341.3

Table 2 shows an overview of the adaptations made by the PSTs in different lesson components. Descriptive data, including frequency, means, and percentage, were reported. The nine PSTs made a total of 8,190 adaptations in their lesson plan iterations over 10 weeks. The frequency of adaptations made in different lesson components are ranked from high to low as follows: instructional statements (n=3,443, 42.0%), content development (n=2,426, 29.7%), transition (n=781, 9.5%), closure (n=443, 5.4%), warm up (n=428, 5.23%), advance organizer (n=306, 3.74%), welcome (n=225, 2.8%), and equipment organization (n=138, 1.7%). Regarding the adaptations made in different phases, the data showed that the PSTs made 2,375 adaptations ()in phase 1 (mean=263.9 per PST; mean=29.3 per PST per iteration), 2,167 adaptations in phase 2 (mean=240.8/PST; mean=40.1/PST/iteration), 2,090 adaptations in phase 3 (mean=232.2 per PST; mean=46.4 per PST per iteration), and 1,179 adaptations in phase 4 (mean=131 per PST; mean=43.7 per PST per iteration).

Research Question 2: What Is the Quality of Adaptations Made in Lesson Plans?

Table 3. Adaptation quality across phases

Alignment		**Phase 1**			**Phase 2**			**Phase 3**			**Phase 4**	
	Quality	Poor	Improved	Maintained	Similar	Improved	Maintained	Similar	Improved	Maintained	Similar	Improved	Maintained
	Welcome	1	13	85	0	12	49	0	8	36	0	3	21
	Advance Org	3	16	102	0	11	60	0	12	57	0	3	26
	Transition	8	42	181	6	35	120	2	52	153	11	9	103
	Equipment Org	1	5	16	3	9	26	2	9	34	1	0	22
	Warm Up	4	22	84	0	31	78	0	24	92	0	1	63
	Instructional State	16	213	814	1	195	716	0	161	687	0	117	368
	Content Development	7	139	428	0	120	589	0	150	518	0	21	360
	Closure	6	26	144	6	12	88	3	13	77	0	3	47
	Total	46	476	1854	16	425	1726	7	429	1654	12	157	1010
	Percent	1.9%	20.0%	78.0%	0.7%	19.6%	79.7%	0.3%	20.5%	79.1%	1.0%	13.3%	85.7%
	Mean/PST	5.1	52.9	206	1.8	47.2	191.8	0.8	47.7	183.8	1.3	17.4	112.2
	Mean/Iteration/PST	0.6	5.9	22.9	0.3	7.9	32	0.2	9.5	36.8	0.3	4.4	28.1
Preciseness		**Phase 1**			**Phase 2**			**Phase 3**			**Phase 4**	
	Quality	Poor	Improved	Maintained	Similar	Improved	Maintained	Similar	Improved	Maintained	Similar	Improved	Maintained
	Welcome	10	21	68	9	7	45	4	5	34	0	4	19
	Advance Org	6	18	97	3	15	53	4	11	54	1	5	23
	Transition	28	28	174	24	27	104	17	29	158	9	22	102
	Equipment Org	3	0	19	3	8	27	6	6	33	1	2	20
	Warm Up	14	18	76	14	20	75	5	20	91	2	10	52
	Instructional State	76	159	809	91	137	677	109	131	597	18	55	408
	Content Development	89	89	382	80	102	517	73	140	454	12	41	328
	Closure	20	32	117	13	14	79	7	18	73	2	7	41
	Total	246	365	1742	237	330	1577	225	360	1494	45	146	993
	Percent	10.5%	15.5%	74.0%	11.1%	15.4%	73.6%	10.8%	17.3%	71.9%	3.8%	12.3%	83.9%
	Mean/PST	27.3	40.6	193.6	26.3	36.7	175.2	25	40	166	5	16.2	110.3
	Mean/Iteration/PST	3.0	4.5	21.5	4.4	6.1	29.2	5	8	33.2	1.3	4.1	27.6
Content		**Phase 1**			**Phase 2**			**Phase 3**			**Phase 4**	
	Quality	Poor	Improved	Maintained	Similar	Improved	Maintained	Similar	Improved	Maintained	Similar	Improved	Maintained
	Welcome	5	25	69	6	7	48	0	8	36	0	3	21
	Advance Organizer	5	18	98	2	16	53	3	12	52	1	4	24
	Transition	28	27	175	25	23	107	18	28	158	21	22	102
	Equipment Org	4	0	18	3	8	27	6	6	32	1	1	21
	Warm Up	12	23	73	15	20	74	5	21	90	0	5	59
	Instructional State	220	194	625	111	149	645	108	135	594	15	56	413
	Content Development	84	103	373	102	105	491	74	144	449	12	46	323
	Closure	4	32	133	8	16	82	3	18	77	0	8	42
	Total	362	422	1564	272	344	1527	217	372	1488	50	145	1005
	Percent	15.4%	18.0%	66.6%	12.7%	16.1%	71.3%	10.5%	17.9%	71.6%	4.2%	12.1%	83.8%
	Mean/PST	40.2	46.9	173.8	30.2	38.2	169.7	24.1	41.3	165.3	20.3	25.4	1.3
	Mean/Iteration/PST	4.5	5.2	19.3	5	6.4	28.3	4.8	8.3	33.1	5.1	6.4	0.3

Table 3 shows the descriptive data of the PSTs adaptations in the three quality indicators of alignment, preciseness, and content across phases 1-4. In the alignment to the lesson component, the PSTs made 22.8% (n=1,870) improved adaptations, 76.0% (n=6,224) of the adaptations were maintained across the lessons, with 1.2% (n=94) of poor or similar adaptations. For the quality criterion of preciseness, we found 17.5% (n=1,425) of adaptations were improved, 71.2% (n=5,797) were maintained across lessons, and 11.3% (n=919) of adaptations were similar to the lesson samples. For the third quality category of content appropriateness, 18.5% (n=1,512) of adaptations were improved from the lesson samples or previous adaptations, and 68.3% (n=5,583) were maintained into later lessons that were relevant. There were 13.2% (n=1,080) of adaptations that were similar or were not changed. Regarding data within phases, the PSTs made 2,376 adaptations (mean=264 per PST; mean=29.3 adaptations per lesson iteration) in their lesson one planning in phase one (week 1 to 3). In phase two (week 4 and 5), the PSTs made 2,167 adaptations in the lesson two planning among six lesson iterations (mean=240.8 per PST; mean= 40.1 per lesson iteration). In phase three (week 6 and 7), 2,090 adaptations were made by the PSTs in lesson

three planning for teaching small groups within five lesson iterations (mean=232.2 per PST; mean=46.4 per lesson iteration). During phase four (week 8 and 9), the PSTs made 1,179 adaptations in lesson three planning for teaching more groups within three lesson iterations, with each PST making 131.0 and 43.7 adaptations per lesson iteration.

Alignment. For alignment of the adaptations, we found a total of 7,812 adaptations made in phase one to phase four, and the order of the most adaptations to least is following: phase one (n=2,376, 30.4%), phase two (n=2,167, 27.7%), phase three (n=2,090, 26.8%), and phase four (n=1,179, 15.1%). Among all adaptations, 1,487 of the adaptations (19%) were improved from the lesson samples or previously edited iterations, and 6,244 adaptations (80%) were maintained over the later lessons, which were coded as aligned with the operational definitions and met the criteria of the specific lesson component. Only 81 adaptations (1%) were poor adaptations compared to the sample or previously edited lesson iteration. Specifically, in phase one (lesson one teaching small group), the PSTs made 476 improved adaptations (20.0%), 1,854 maintained adaptations (78.0%), and 46 poor adaptations (1.9%) to the previous edit or the sample across nine lesson iterations. In phase two planning (lesson two teaching small group), the PSTs made 425 (19.6%) improved adaptations, 1,726 (79.6%) maintained adaptations, and 16 poor adaptations (0.7%) to the previous edits across all six lesson iterations. In phase three (lesson three teaching small groups), the PSTs made a total of 429 (20.5%) improved adaptations that demonstrated good alignment with the operational definition of each lesson component, and 1,654 adaptations (79.1%) were maintained to different lesson components. Only 7 adaptations (0.3%) were poor adaptations to the previous edits across five lesson iterations. In phase four (lesson three teaching more groups), the PSTs made a total of 157 (13.3%) improved adaptations that were aligned with each lesson component, and 1,010 (85.7%) adaptations were maintained to different lesson iterations. There were 12 adaptations (1.0%) that were coded as similar or no change.

Preciseness. Overall, among all valid adaptations, 753 (9.7%) had similar or no changes in their preciseness, and 1,201 (15.5%) of the adaptations improved from the sample or previous lesson iterations. About three quarters (n=5,806, 74.8%) were maintained across the different phases of the class. Similar to alignment, phase one had the most adaptations overall (n=2,357), then followed by phase two (n=2,144), phase three (n=2,079), and phase four (n=1,184).

Content. The content of adaptations showed a similar pattern as the preciseness. Overall, the PSTs made the most adaptations in phase one (n=2,348, 30.2%), followed by phase two (n=2,143, 27.6%), phase three (n=2,077, 26.7%), and phase four (n=1,200, 15.5%). The PSTs made 1,283

improved adaptations (16.5%), 5,584 maintained adaptations (71.9%), and 901 adaptations (11.6%) that were similar or no change to the lesson components.

Research Question 3: What Evidence Is There That Participants Transferred Adaptations to a New Lesson?

To investigate whether the PSTs could generalize what they adapted from the previous weeks through rehearsals and repeated teaching to teach new content to more groups of students, we looked at the PSTs' lesson four plans in phase five, in which they developed a brand-new lesson and taught the planned lesson to 2-3 groups of PSTs once. The total adaptations made by nine PSTs in lesson four were 409, with each PST making about 45 adaptations in one lesson iteration. At a lesson component level, the PSTs made the most adaptations in instructional statement (n=155, mean=17.2) and content development (n=127, mean=14.1), followed by transition (n=49, mean=5.4). The adaptations made in other lesson components ranged from 8 to 28. The adaptations that were categorized as "improved" in alignment account for 94.6% (n=387), and the adaptations that had poor alignment or were similar to the previously edited lesson account for 2.4% (n=10). About three percent of the adaptations were maintained from the previous lessons (n=12). As to the quality of preciseness, we found that 54.0% of the PSTs' adaptations in the new lesson were improved (n=221), 44.0% were similar (n=180), and 2.0% (n=8) were maintained from the previous lessons. A similar pattern was found in the quality indicator of content appropriateness to preciseness, with 56.0% (n=229) improved adaptations, 41.1% (n=168) similar adaptations, and 2.9% (n=12) maintained adaptations.

DISCUSSION

In this section, we will discuss the results reported in the previous section and further explore what we have learned from the data and how it provides insights to our three research questions. This section is organized into three major findings: (1) Adaptations made in lesson components and phases; (2) evaluation of adaptation quality; and (3) transfer of adaptive competence in lesson planning.

Adaptations Made in Lesson Components

We observed that the PSTs made most adaptations in two lesson components: instructional statements and content development, which accounts for 72% of the total adaptations. Three possible reasons may help interpret this phenomenon. First, the lesson plan format provided more

modification opportunities with the most texts in these two lesson components than others. Second, the feedback from the supervisors were mostly on PSTs' instruction and learning tasks, which may also facilitate their adaptations in later iterations. Thirdly, PSTs' personal style and preference. We observed the most edited adaptations when PSTs rephrased the statements using their own words. These edits reflect PSTs' personal style or preference as well as their efforts of making sense of the lesson plan to shape it as they saw fit.

The next most adapted lesson component is transition, which lesson component accounted for almost 10% of the total adaptations. We observed that most adaptations in transition were made in rules and routines while the PSTs were providing directions to progress the learning tasks, etc. One possible reason for this could be that the PSTs incorporated and adjusted the rules and routines they had established in lesson one for subsequent lessons. The other possible reason is the supervisors constantly reminded the PSTs during their peer teaching in the labs to use their signals to start and stop the tasks. Closure and warm-up showed similar amounts of adaptations made by the PSTs, with the adaptations in closure more focused on adding review questions of the content being learned, while adaptations in warm up more focused on rephrasing the statements and modifying the activities. Few adaptations were observed in the components of welcome, advanced organizer, and equipment organization. One potential explanation for this observation is the consistent number of students (PSTs) and court arrangement that corresponded to the specific learning tasks assigned to each individual PST, when teaching the same lesson multiple times.

There are several implications here. First, with guidance PSTs were able to adapt by refining their lesson plans based on the supervisors' feedback, their observations of other peers teaching and their personal reflections. This suggests that beginners with guidance can unpack and develop a lesson plan and learn from experience by continuously refining a lesson plan. This has been reported as a key element in successful professional development of practicing teachers (Doutis & Ward, 1999). Secondly, it provides additional validation for the idea of repeated teaching of the same lesson. This approach enables PSTs to observe how a single lesson can improve over time, allowing them to grasp the intricacies of lesson planning as their competence grows and the complexity of their teaching settings increases. Examples of such complexity include peers engaging in off-task behavior or performing tasks incorrectly. Our findings are consistent with previous studies on this topic (Xie et al., 2020; Xie et al., 2021). Thirdly, these results provide strong evidence that the use of deliberate practice is a valuable teacher education pedagogical strategy. Very few physical educators would support the idea that students in their classes could learn a layup in 10 attempts. Similarly, teacher educators should view the creation and refinement of lesson plans

similarly. We repeat here for emphasizing the quote we used earlier in the paper that deliberate practices requires individuals 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" (Ericsson et al., 1993). This is precisely what happened in this study.

Evaluation of Adaptation Quality

The high percentage of improved and maintained adaptations in alignment provides further evidence that the PSTs reflected and refined their plans as a result of experience and feedback. We hypothesize that this was likely to the work completed in class sessions, that focused strongly on alignment. It took a few iterations of the lesson plan for changes in preciseness and content appropriate changes to affect the lesson plans. This is likely because of the lack of familiarity with the content (team handball) and the fact that the first few lesson edits were new and being able to conceptualize an entire lesson from scratch may have taken time. But with the repeated planning and teaching of the same lesson provided the PSTs opportunities to constantly modify the statements based on their peers' responses to the lessons, their perceived quality of lesson plan implementation, and supervisors' feedback. This finding is consistent with past studies (Xie et al., 2020; Xie et al., 2021).

As to adaptations in specific phrases, we find that the PSTs gradually made more adaptations per lesson iteration from phase one to phase three, then the adaptations maintained at a similar level but slightly less in phase four (more groups) as in phase three (small group). The means of the adaptations suggest that the number of adaptations on average per PST per lesson iteration increased from lesson one to lesson three while the PSTs planned different content to the same small groups. Specifically, in alignment, we find that the PSTs' adaptations were progressively more aligned with the definitions for the following lesson components: welcome, advance organizer, warm up, instructional statement, and content development. Almost all the similar adaptations were made in phase one in these lesson components. From phase two onwards to phase four, the PSTs improved their alignment of adaptations to a specific lesson component suggesting specific adaptations to teach the lesson content. In preciseness, the result suggests some lesson components tend to become precise quickly, such as welcome, and warm-up; while in other lesson components which focus on the content of the lesson, it takes longer. Planning for different lesson components often requires demands in terms of details. For example, while editing the welcome component, the PSTs were expected to include greeting students and introducing themselves and their rules. The adaptations made in lesson one, to a large degree, could be maintained in lessons two to four.

This is less complex compared to content development, which requires the PSTs first to understand the content and know the basics of different skills and concepts, and then to develop and evaluate the task progressions. The PSTs may choose to first follow the tasks given in the sample lesson. As they develop more knowledge about the content through lectures, video discussion, and peer observation, the PSTs may gradually feel more comfortable and confident in modifying the learning tasks and integrating different skills and rules. With the active supervision by the instructor and graduate assistants and observation of their peers' teaching, the PSTs were constantly prompted and/or given examples of how to be efficient with their instruction, and transitions. As Stout (1989) and Zeichner (2007) argued, microteaching or peer teaching provided PSTs the opportunities to grow their knowledge and reflect on feedback. With repeated teaching and rehearsals, we provided even more opportunities to PSTs for observations and reflections, which may further increase their knowledge and understanding of teaching and learning. In the quality of content appropriateness, we observe that the PSTs improved their quality in content appropriateness in different lesson components over time. More improved adaptations were maintained into the other lesson iterations. However, the data suggests that the PSTs made less improved adaptations (11.6%) in the content quality area, compared to the adaptations made in the quality indicators of alignment (19%) and preciseness (15.5%). Moreover, the total maintained adaptations show the similar pattern, with less in the content quality area (71.9%), compared to alignment (80%) and preciseness (74.8%). The findings above suggest that the PSTs made improvement in all three quality indicators of their adaptive competence in lesson planning. However, the pace of adaptations in different quality areas varies. Our data shows PSTs develop their adaptive competence in alignment at a relatively faster pace than preciseness and content appropriateness. Compared to adaptations in alignment and preciseness of lesson planning, it is more challenging for the PSTs to adapt in the content quality area. This is consistent with the other study findings (Xie et al., 2020; Xie et al., 2021).

Transfer of Adaptive Competence in Lesson Planning

The high percentage of improved adaptations and very low percentage of poor adaptations in alignment quality indicator shown in the new lesson may suggest that the PSTs have transferred their ability to adapt their lesson planning to be aligned with the new content among different lesson components. The percentages of improved adaptations to the total adaptations in the quality of preciseness and content appropriateness are around 55%, which is about 40% lower than that in the alignment. This may suggest that the pace of transferring PSTs' ability in adapting preciseness and content appropriateness may be comparatively slower compared to the alignment indicator.

This observation can be attributed to two potential explanations. Firstly, striking a balance between incorporating detailed elements and ensuring efficiency is a challenging task, particularly in an introductory methods course where most students have limited or no prior experience in lesson planning and team handball. Secondly, the approximation utilized in a peer teaching setting offers ample opportunities for PSTs to become familiar with the flow of teaching and instructional strategies. However, the content knowledge and its appropriateness may require longer time than alignment for PSTs to develop and be competent in making judgements.

Moreover, we are interested in knowing how the PSTs made adaptations when they taught the same lesson to different group sizes, which might be another way to understand whether PSTs transfer their adaptive competence in lesson planning. Specifically, we look at the lesson three planning in phase three (1 group, 3-4 students) and phase four (2-3 groups, 6-12 students). Approximately 85% of the adaptations made in phase four maintained or underwent minimal adaptations, the remaining 15% of adaptations in this phase contributed to further enhancing the quality mainly in preciseness and content appropriateness. Among three lesson plan iterations in phase four, we observe that the PSTs made the most improved adaptations in the first iteration, following an apparent decrease in iterations 2 and 3. This indicates that when the teaching context changed from teaching one group to two groups of students, the PSTs in this study were still able to make additional 15% adaptations even after they already taught the same lesson twice and edited five lesson plan iterations before. Both findings might provide some evidence of the PSTs' ability to transfer their adaptive competence into planning a lesson, and appropriations of contexts from simple to more challenging may create additional opportunities for the PSTs to make adaptations further. In addition, we observed that the PSTs made minimal adaptations in planning during their fourth time of teaching lesson three. This might stem from a sense of increased confidence and competence in planning and teaching after three repeated teaching sessions. They may perceive themselves adapting well in teaching and planning more groups and are ready to seek more new challenges. This observation prompts a thought-provoking question for future research: Could there be an optimal threshold for the number of repeated teaching experiences provided to PSTs to both enhance their adaptive competence and sustain their engagement?

These results are important to view in context. This was an introductory class and the first time the PSTs both encountered lesson planning and taught in the program. In most methods classes, there are substantive person hours devoted to editing lesson plans by instructors and PSTs (Capel et al., 2018). In this course, this was handled in each class where students had their laptops out and the instructor provided feedback on what was written on the last plan, and by feedback following

instruction and by their written reflective observations of their teaching videos being used to modify the lesson plans. The PSTs were held accountable for these changes. If they did not address the changes, the lesson plan was returned to the PST. The person hours saved in the development of lesson plans was significant. But what is important here is that the PSTs made many edits of their lesson plans and continued their edits on existing edits as the semester progressed.

CONCLUSION

There is widespread agreement on the importance of teachers being adaptive to the context they are teaching in (Darling-Hammond, 2019) and of it being an important outcome in teacher education (Bransford et al., 2005; Darling-Hammond, 2019). Despite this there is little research on the topic in physical education. The lack of an empirical base on teacher adaptability likely accounts for its absence as a teacher education outcome in teacher education policy documents such as standards for teachers. Thus, there is a pressing need to develop an evidence base in support of the rhetoric in developing PSTs' adaptive competence in teaching.

In this study, we used two PBTE pedagogical strategies (i.e., repeated teaching and rehearsals) following a full PBTE design cycle (Ward et al., 2018), and purposefully structured an introductory methods course with well sequenced approximations of teaching contexts in phases. We extended the work by Xie and colleagues (Xie et al., 2020; Xie et al., 2021) in three ways. First, by using more precise measures of the adaptations tied to lesson components reflective core practices. Second, by adding three quality indicators alignment, preciseness, and content development. Third, by systematically and incrementally increasing the complexity of the teaching setting over time. Our findings provide support for PBTE and the pedagogies of teaching rehearsal and repeated teaching grounded in deliberate practice and reflection strategies. Our results show that beginning PSTs are capable of making substantive and quality adaptations that they can carry them forward from lesson to lesson. This indicates a core assumption of PBTE that PSTs can learn from their experiences and feedback.

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REFERENCES

Baldinger, E.E., & Munson, J. (2020). Developing adaptive expertise in the wake of rehearsals: An emergent model of the debrief discussions of non-rehearsing teachers. *Teaching and Teacher Education, 95*, Article 103125. https://doi.org/10.1016/j.tate.2020.103125

Ball, D.L., Sleep, L., Boerst, T., & Bass, H. (2009). Combining the development of practice and the practice of development in teacher education. *Elementary School Journal, 109*(5), 458–474. https://doi.org/10.1086/596996

Bransford, J., Derry, S., Berliner, D., & Hammerness, K. (2005). *Theories of learning and their roles in teaching. In Preparing teachers for a changing world: What teachers should learn and be able to do* (pp. 40-87). CA: Jossey-Bass.

Brühwiler, C., & Blatchford, P. (2011). Effects of class size and adaptive teaching competency on classroom processes and academic outcome. *Learning and Instruction, 21*(1), 95–108. https://doi.org/10.1016/j. learninstruc.2009.11.004

Capel, S.A., Bassett, S., Lawrence, J., Newton, A., & Zwozdiak-Myers, P. (2018). How trainee physical education teachers in England write, use and evaluate lesson plans. *European Physical Education Review, 25*(4), 964 - 982. https://doi.org/10.1177/1356336X18785053

Darling-Hammond, L. (2019). *A license to teach: Building a profession for 21st century schools*. Routledge.

Doutis, P., & Ward, P. (1999). Teachers' and administrators' perceptions of the Saber-tooth Project reform and of their changing workplace conditions. *Journal of Teaching in Physical Education, 18*, 417-427.

Doyle, W. (1986). Classroom organization and management. *Handbook of research on teaching, 3*, 392–431.

Dozier, C., Garnett, S., & Tabatabai, S. (2011). Responsive teaching through conversation. *The Reading Teacher, 64*(8), 636-638. https://doi.org/10.1598/RT.64.8.13

Ericsson, K. (2008), Deliberate practice and acquisition of expert performance: A general overview. *Academic Emergency Medicine, 15*, 988-994. https://doi.org/10.1111/j.1553-2712.2008.00227.x

Ericsson, K., Krampe, R., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review, 100*(3), 363–406. https://doi.org/10.1037/0033-295X.100.3.363

Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, reimagining teacher education. *Teachers and Teaching, 15*(2), 273–289. https://doi.org/10.1080/13540600902875340

Ingersoll, C., Jenkins, J. M., & Lux, K. (2014). Teacher knowledge development in early field experiences. *Journal of Teaching in Physical Education*, *33*(3), 363-382. https://doi.org/10.1123/jtpe.2013-0102

Kim, I., & Ward, P. (2021). Changes in the content development and adaptive competence of teachers following a specialized content knowledge workshop. *Journal of Teaching in Physical Education, 40*(4), 626-634. https://doi.org/10.1123/jtpe.2020-0082

Launder, A., & Piltz, W. (2013). *Play practice* (2nd ed.). Human Kinetics.

Rink, J. (2013). Measuring teacher effectiveness in physical education, *Research Quarterly for Exercise and Sport, 84*(4), 407-418. https://doi.org/10.1080/02701367.2013.844018

Schipper, T. M., van der Lans, R. M., de Vries, S., Goei, S. L., & van Veen, K. (2020). Becoming a more adaptive teacher through collaborating in Lesson Study? Examining the influence of lesson study on teachers' adaptive teaching practices in mainstream secondary education. *Teaching and teacher education, 88*, 102961. https://doi.org/10.1016/j.tate.2019.102961

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Basic Books.

Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard educational review*, *57*(1), 1-23. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Siedentop, D., Hastie, P., & van der Mars, H. (2020). *Complete guide to sport education*. Champaign, IL: Human Kinetics.

Soslau, E., & Gartland, S. (2021). "I want them to feel heard. I want their voices to be agents of change": Exploring a community-engaged partnership focused on critical service-learning. *Journal of Community Engagement and Scholarship, 13*(2), 13-14. https://doi.org/10.54656/YIMW9070

Soslau, E., S. Kotch-Jester, K. Scantlebury, and S. Gleason. (2018). "Coteachers' huddles: Developing adaptive teaching expertise during student teaching." *Teaching and Teacher Education,* 73, 99–108. https://doi.org/10.1016/j.tate.2018.03.016

Souto-Manning, M., & Dice, J. L. (2007). Reflective teaching in the early years: A case for mentoring diverse educators. *Early Childhood Education Journal*, *34*, 425-430. https://doi.org/10.1007/s10643-007-0151-1

Stigler, J., & Miller, K. (2018). Expertise and expert performance in teaching. In A. Ericsson, R.R. Hoffman, A. Kozbelt, & A.M. Williams (Eds.), *The Cambridge handbook of expertise and expert performance* (2nd ed., pp. 431–452). Cambridge University Press.

Stout, C. (1989). Teachers' views of the emphasis on reflective teaching skills during their student teaching. *Elementary School Journal, 89*(4), 511–527.

Ward, P. (2020). Core practices for teaching physical education: Recommendations for teacher education. *Journal of Teaching in Physical Education, 40*(1), 98–108. https://doi.org/10.1123/jtpe.2019-0114

Ward, P., & Cho, K. (2020). Five trends in physical education teacher education. *Journal of Physical Education, Recreation & Dance, 91*(6), 16–20. https://doi.org/10.1080/07303084.2020.1768182

Ward, P., Chen, Y., Higginson, K., & Xie, X. (2018). Physical education teacher education pedagogies: Unpacking teaching rehearsals and repeated teaching. *Journal of Health, Physical Education, Recreation and Dance, 89*(6), 20–25. https://doi.org/10.1080/07303084.2018.1476937

Xie, X., Ward, P., Oh, D., Li, Y., Atkinson, O., Cho, K., & Kim, M. (2020). Preservice physical education teacher's development of adaptive competence. *Journal of Teaching in Physical Education, 40*(4), 538-546. https://doi.org/10.1123/jtpe.2019-0198

Xie, X., Ward, P., Chey, W., Dillon, L., Trainer, S., & Cho, K. (2021). Developing preservice teachers' adaptive competence using repeated rehearsals, Opportunities to Reflect, and Lesson Plan Adaptations. *Journal of Teaching in Physical Education, 41*(4), 553-561. https://doi.org/10.1123/jtpe.2021-0093

Zeichner, K. (2007). Accumulating knowledge across self-studies in teacher education. *Journal of Teacher Education, 58*(1), 36–46. https://doi.org/ 10.1177/0022487106296219