INFLUENCE OF A CONTENT COURSE AND EARLY FIELD EXPERIENCE ON

PRESERVICE TEACHERS' ACQUISITION OF CONTENT

AND PEDAGOGICAL CONTENT KNOWLEDGE

by

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A THESIS

ABSTRACT

The purpose of this study was to examine the influence of one content course and its follow-up early field experience (EFE) on preservice teachers' (PTs) acquisition of content knowledge (CK) and development of pedagogical content knowledge (PCK). The three specific sub-questions which guided data collection and analysis were (a) With what level of CK did PTs enter a PETE program?, (b) How did PTs acquire CK and develop PCK during the content course?, and (c) How did PTs acquire CK and develop PCK during the follow-up EFE connected with the content course? Participants were 16 PTs enrolled in the content course and EFE. Six qualitative techniques were employed to gather data. Data were analyzed using analytic induction and constant comparison. Findings indicated that the majority of the PTs who began the course with very little CK and no PCK acquired impressive levels of both forms of knowledge and were fairly successful in terms of teaching third grade children swimming and basic aquatic skills. Factors that enhanced the acquisition of CK and PCK were the course structure, pedagogical strategies used by the instructor, nature of the content, and the children who took part in the EFE. Factors that negated the effectiveness of the hybrid course were the level of PTs' CK at entry and the length of the EFE. PTs' acculturation either facilitated or negated the acquisition of both forms of knowledge depending on whether they began the course with coaching or teaching orientations.

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CHAPTER I

**INFLUENCE OF A CONTENT COURSE AND EARLY FIELD EXPERIENCE ON
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While the beginning of serious sport pedagogical research on teacher effectiveness across
subject matters in the 1970s and 1980s (see Graham & Heimerer, 1981; Locke, 1977, 1982;
Placek & Locke, 1986; Silverman, 1991) and the earliest theoretical work on teaching styles
(Mosston, 1966, 1981; Mosston & Ashworth, 1986) were undoubtedly extremely positive
developments, it could be argued that they also had something of a negative impact on physical
education teacher education (PETE) in the United States. Specifically, they unwittingly led
university faculty who developed research-based programs to overemphasize preservice
teachers' (PTs) learning of generic pedagogical knowledge (PK) at the expense of their
acquisition of content knowledge (CK) and the specific and unique methods to teach it. As noted
by Siedentop (2002, 2009), this kind of programming led to the production of pedagogically
skillful graduates who, nevertheless, were unable to provide instructional depth in their teaching
because they lacked CK. It could also be argued that the more recent focus in PETE on PTs
acquiring knowledge about different curricular models (Curtner-Smith, Sinelnikov, & Woodruff,
2009; Metzler, 2005; Stran & Curtner-Smith, 2010) has exacerbated this problem. Indeed, the
perceived imbalance between PK and CK has been illustrated in some studies of the effects of
methods classes and early field experiences (EFEs) where PTs have been shown to focus almost
entirely on their acquisition of PK with apparently little or no concern about CK (Curtner-Smith,
1997; O'Sullivan & Tsangaridou, 1992). Not surprisingly, this imbalance has also been central to

much of the criticism aimed at teacher education programs in general by politicians, the public, and teacher educators themselves (Berliner, 2000; Siedentop, 2002, 2009; Siedentop & Eldar, 1989; Ward, 2009).

Although these criticisms continue, and despite their work going largely unnoticed in political circles, for the last 20 years a small cadre of scholars has discussed, debated, and attempted to discover methods by which the balance between pedagogy and subject matter in teacher education could be redressed. The initial catalyst for this work was Shulman's (1987) framework outlining the different types of knowledge quality teachers needed to acquire. Importantly, in that seminal work, Shulman (1987) differentiated between PK ("those broad principles and strategies of classroom management and organization that appear to transcend subject matter," p. 8); CK ("knowledge, understanding, skill, and dispositions that are to be learned by school children," p. 8), which was synonymous with subject matter knowledge; and pedagogical content knowledge (PCK), defined as "that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding" (p. 8). Shulman (1986, 1987) went on to explain that PCK was a blend of pedagogy and content that was contextual in that it was knowledge of how to teach specific content so that particular groups of pupils understood and learned it. Moreover, it involved teachers comprehending the best ways to present, package, break down, and progress through content.

Siedentop and Eldar (1989) were two of the earliest sport pedagogists to respond to Shulman's (1987) framework and apply it to PETE when they examined the difference between teacher effectiveness, experience, and expertise. They argued that the level of CK and PCK expert teachers possessed was superior to that of those who were merely effective. This point

was illustrated by a study conducted by Schempp, Manross, Tan, and Fincher (1998) which revealed that teachers with relatively superior CK were more relaxed, planned in greater depth, and were more able in terms of constructing pedagogical tactics and detecting problems pupils had in learning content when compared with teachers with relatively inferior CK. Siedentop and Eldar (1989) also noted that American physical education PTs entered PETE with a lower level of CK and PCK, and spent less time in coursework specifically aimed at them acquiring and developing CK and PCK than students in other academic fields. Similarly, Rink (1989) called for sport pedagogy researchers to shift from looking for generic teaching skills and behaviors (i.e., a focus on PK) to examining how to teach specific content (i.e., a focus on PCK) and Ennis, Mueller, and Zhu (1991) completed research on PTs' knowledge structures which illustrated the centrality of PCK acquisition in teacher development. Further, Griffey and Housner (1991) emphasized the importance of teachers acquiring both PK and CK. In addition, Griffin, Dodds, and Rovegno (1996) noted it was crucial that physical education teachers understood their pupils, communities, and their program's goals, as well as the activities being taught and a range of pedagogical strategies and tactics, if they were to develop high levels of PCK.

More recently, a number of sport pedagogy researchers have continued to lament and document the lack of CK and PCK with which PTs both enter and leave PETE (Amade-Escot, 2000; Byra, 2009; Castelli & Williams, 2007; Ward, 2009; You, 2011) and the low quality and small quantity of courses aimed at providing them with CK during PETE (Rink, 2007; Siedentop, 2009; Ward, 2009). Ward (2009) suggested that this was the case because PTs were subjected to poor school physical education as pupils, were involved in a small number of extracurricular sports and activities, and that the effectiveness of many courses aimed at teaching CK within PETE was limited because they were performance- rather than pedagogically focused.

Several scholars have also suggested that the number of content courses in PETE programs continues to be low compared with programs preparing teachers in other subject matters due partly to the (over)emphasis on coursework in the kinesiological subdisciplines. Ironically, they also noted that much of the content taught in subdisciplinary courses may have become too specialized to be of much use to PTs (Locke, 1989; Rink, 2007; Siedentop, 2009; Ward, 2009). The relatively small number of content courses in PETE may also be a consequence of the failure of sport pedagogists to agree on what the content of physical education should be (Byra, 2009; Ward, 2009). Specifically, and as noted by Byra (2009), some suggested content courses in PETE should reflect what is taught in school physical education programs and so consist mainly of sports, games, health-related physical activities, and fundamental movement skills (e.g., Siedentop, 1990), others, with a critical bent, have championed a more inclusive wide-ranging content to suit a variety of interests, ability levels, and both genders (e.g., Tinning, 2000).

There appears to be three main models by which American PTs acquire CK and/or begin the process of developing PCK within PETE. The first and most conservative of these, as noted by Ward (2009), involves PTs taking a series of content courses aimed at improving their own performance in a range of sports and physical activities. There is no attempt to focus on or transfer the pedagogies employed by the instructors of these courses which may or may not be appropriate for use with children. In some programs, PTs taught by this model are merely required to take a certain number of "activity courses" within the university's basic physical education program. As Ward observed, the premise behind this type of content course is that "to teach an activity, you must be able to perform the activity, and this is how you come to know the activity" (p. 349). Ward went on to suggest that such courses are useful in that they provide PTs with knowledge of the etiquette, rules, techniques, tactics, and strategies of games, sports, and

physical activities. However, he also noted that they do not provide PTs with the skills to analyze the performances of others, detect errors, and design and sequence instructional tasks.

The second model, which has been described by Siedentop (2009), is similar to the first in that it also involves PTs taking a series of content courses in which one goal is to improve their own performance. An important second goal, however, is that PTs also learn the pedagogies by which they are taught the various activities. For this reason, instructors are sport pedagogy specialists, their pedagogies are those that they would employ when teaching children, and PTs in their courses are essentially positioned as "pupils" except when they take on the role of teacher within peer teaching sessions.

The third model, again as noted by Ward (2009), involves PTs gaining CK and PCK simultaneously as they teach content that is new to them within EFEs or field-based methods courses. Initially, this is accomplished by using pedagogical strategies, tactics, and tasks provided by their instructors. As PTs gain in confidence, they are given more freedom to develop their own strategies and tasks. This model is more likely to be used when attempting to facilitate PTs' acquisition of CK and PCK associated with elementary curricula, particularly fundamental movement skills.

Ward (2009) also described a somewhat unique model for teaching CK and PCK at his own institution. Content courses were designed to provide PTs with knowledge in four domains. These were (a) knowledge of the etiquette and rules of games, sports, and physical activities; (b) knowledge of techniques and tactics; (c) knowledge of skill discrimination so as to enable PTs to detect errors in pupil performance; and (d) knowledge of tasks that could be employed to rectify errors in pupil performances. Two-thirds of the time in these courses was focused on PTs' performance of and ability to teach content. In the other third, PTs learned to detect and rectify

errors in performance by watching film and designing remedial tasks and were assessed on their progress in the four domains by answering questions.

Despite the considerable debate and discussion on the topic, relatively few studies of PTs' CK have been completed in physical education (Byra, 2009; Tsangaridou, 2009; Ward, 2009). The research that has been completed indicates that PTs realize the importance of CK to good teaching and that they are much more confident when they have past participatory experience in and believe they have a good grasp of specific sports or physical activities (Carney & Chedzoy, 1998; Chedzoy, 2000; Curtner-Smith, 1996; Harold & Waring, 2009). Confidence also grows when PTs have the opportunity to practice teaching specific sports and physical activities (Harold & Waring, 2009). Conversely, PTs with limited CK are less confident and the standard of their teaching is relatively low (Carney & Chedzoy, 1998; Chedzoy, 2000; Gower & Chapel, 2004). Moreover, there is also some evidence to suggest that, despite improved confidence, past participation in a physical activity does not necessarily lead to improved teaching performance by PTs in terms of selecting tasks and detecting errors in pupil performance (Stuhr et al., 2007).

Research on PCK has been relatively plentiful (Byra, 2009). It has indicated that teachers develop PCK as they learn to break content down into manageable chunks that include key components of an activity, and sequence it in a series of progressive tasks in order to achieve their goals (Rovegno, 1991, 1992a, 1992b, 1993a, 1993b, 1998; Sebren 1995). In time, teachers progress from understanding how to teach various components of an activity to seeing how these components are related and connected (Rovegno, 2003) and the organization, sophistication, detail, and flexibility of their knowledge improves (Amade-Escot, 2000; Brya, 2009; Byra & Sherman, 1993; Dodds, 1994, Graham, French, & Woods, 1993; Rink, French, Lee, Solmon, &

Lynn, 1994). In addition, teachers improve their ability to anticipate when to transition pupils from one task to another and their knowledge becomes less general and more contextualized (Amade-Escot, 2000). As they develop more mature forms of PCK, teachers also increase their teaching repertoires in terms of the number of tasks they have at their disposal to teach specific content and their ability to modify or adapt these tasks in response to their pupils' needs (Ayvazo & Ward, 2011). Using Rink's (2010) task classification system, Ayvazo and Ward (2011) noted that having provided pupils with initial or *informing* tasks, teachers with greater expertise and superior CK were able to modify and adapt tasks when their pupils struggled, had instant success, or misunderstood initial instructions by *extending* tasks so they were more or less difficult, *refining* tasks so as to focus on one or two key elements, or *applying* tasks in a competitive situation. Tasks were adapted by making changes to the space in which they took place, the number of pupils taking part, rules, and equipment. When pupils failed to comprehend an informing task, modification involved restating the task in a different way.

The process of acquiring PCK is heavily influenced by previous experience, the school context, and the ability of teachers to rework prior knowledge (Byra, 2009; Rovegno, 2003). It begins in PETE through a great deal of practice and reflection within a variety of high quality EFEs (Amade-Escot, 2000; Lund, Metzler, & Gurvitch, 2008) and may be helped by peer coaching (Jenkins, Garn, & Jenkins, 2005), reading case studies (Bolt, 1998), and observing expert teachers in action (Amade-Escot, 2000). Moreover, the process takes considerable time and so tangible results may not be seen until the end of PETE programs (Ennis et al., 1991). Drawing from the work of Rovegno, (1993a, 1993b), Amade-Escot (2000) observed that as PTs attempt to acquire PCK they can make a number of potentially fatal errors against which faculty teaching courses need to guard. These include oversimplifying content while teaching during

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EFEs to the extent that it hinders pupils' learning, teaching technical skills out of context, and merely expecting pupils to acquire tactics and strategies of sports rather than teaching them. Further, some PTs may underestimate the time it takes pupils to learn in physical education or believe that all that is required for this to occur is an explanation and/or demonstration of content. Finally, if learning does not occur, some PTs will simply blame their pupils due to their inability to comprehend instructions, attend to details, and put forth the required effort.

Purpose

A number of scholars have suggested that sport pedagogists need an improved understanding of the CK with which PTs enter PETE and to conduct more research aimed at discovering how to provide coursework that improves PTs' CK and PCK (Byra, 2009; O'Sullivan, 2003; Siedentop, 2009; Ward, 2009). To these ends, the purpose of this study was to examine the influence of one content course and its follow-up EFE on PTs' acquisition of CK and development of PCK. The three specific sub-questions which guided data collection and analysis were

1. With what level of CK did PTs enter a PETE program?

2. How did PTs acquire CK and develop PCK during the content course? And

3. How did PTs acquire CK and develop PCK during the follow-up EFE connected with the content course?

Method

Participants

Participants were 16 PTs enrolled in a 12-week content course and a connected 3-week follow-up EFE. Fourteen of the PTs were male and two were female. They ranged in age from 20 to 31 years. Prior to the study's commencement, participants completed an informed consent

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form in congruence with the university's internal review board's regulations for doing research with human subjects.

Content Course

The 12-week content course was aimed at facilitating the acquisition and development of CK and PCK in swimming. A related goal of the content course and the follow-up EFE was Water Safety Instructor (WSI) certification. WSI certification is commonly recognized at the basic standard needed to teach aquatic skills commercially in the United States.

PTs in the course acted as "pupils" and were taught using the same pedagogies and content they were expected to use while working with young swimmers of various abilities. Furthermore, the course included verbal descriptions, readings, and handouts of how and what to teach young non-swimmers. Readings for the course came from the American Red Cross (2009a, 2009b) and Lawton (2001). In addition, the instructor of the class, an experienced sport pedagogy professor, provided PTs with his lesson plans and evaluation materials.

Content taught in the course included front crawl (4 sessions), breaststroke (3 sessions), backcrawl (3 sessions), sidestroke (2 sessions), elementary backstroke (2 sessions), butterfly (2 sessions), basic diving (1 session), and water safety skills (3 sessions). PTs' ability to perform the various strokes, dives, and water safety skills was evaluated by the instructor through process evaluation, in the form of a checksheet focused on technique, and product evaluation, which involved PTs swimming as far as possible in 5 minutes. In addition, as a prerequisite for WSI certification, PTs had to demonstrate their ability to swim 50 yards using all the strokes taught, with the exception of butterfly with which they were required to swim 15 yards. PTs' acquisition of CK and PCK related to swimming was assessed through cognitive evaluation in the form of a 120-question multiple-choice examination.

The content course involved PTs meeting twice weekly for 50 minutes. The majority of sessions took place in the university's 25-yard student recreation pool. Diving and water safety skills were taught in the university's 25-yard aquatic center pool where deeper water was available.

Early Field Experience

The EFE was supervised by the same sport pedagogy professor who taught the content course. It involved PTs teaching swimming and water safety skills to 78 third grade children from a local elementary school in the university's 25-yard aquatic center pool. Prior to the EFE, parents were asked to sign a consent form and classify their children as non-swimmers ("little to no experience in the water"), very inexperienced swimmers ("able to swim 10 yards at best"), inexperienced swimmers ("able to swim 25 yards"), and experienced swimmers ("able to swim 50 yards"). The children were bussed to the pool under the supervision of their classroom teachers. On arriving at the pool, supervision of the children's changing and all instruction were carried out by the PTs.

The EFE comprised five 40-minute lessons. PT-pupil ratios for non-swimmers and very inexperienced swimmers ranged from 1:3 to 1:5. These small classes took place in the shallow section of the pool. PTs working with these groups taught in the water. Their main goals were to improve their pupils' water confidence, water safety knowledge, basic water skills, and, if possible, to teach non-swimmers to swim. Lessons consisted of a variety of tasks designed by PTs or selected from Lawton (2001); the Red Cross texts (American Red Cross, 2009a, 2009b); and materials provided in the content course by the sport pedagogy professor and a supporting graduate teaching assistant. Each lesson also included a water safety tip.

PTs assigned to teach inexperienced and experienced swimmers team-taught in pairs. For each lesson, the lead PT taught from the deck of the pool while the supporting PT remained in the water to demonstrate skills, aid pupils, assist with the provision of verbal feedback, and provide tactile feedback. PTs alternated taking on the lead and support roles for each class session throughout the EFE. Class sizes for these groups ranged from 8 to15 pupils. PTs teaching inexperienced swimmers aimed to teach or improve their pupils' front crawl, breaststroke, backcrawl, sidestroke, and elementary backstroke. A secondary focus was on their pupils' knowledge of water safety principles. One lesson was assigned as the focus of each stroke. PTs, however, were encouraged to revisit previously taught strokes during subsequent lessons. Lessons consisted of a warm-up, a progressive series of practices for the leg action of the stroke, a progressive series of practices on the arm action of each stroke, practice of the whole stroke, a fun concluding activity, the relaying of a water safety tip, and a 2-minute closure in which key points of the lesson were discussed and emphasized during a short question-and-answer session.

PTs were required to write all lesson plans and evaluate their pupils using process evaluation checksheets they developed. Their teaching was evaluated by the instructor using a three-stage rubric. Elements examined by the rubric included PTs' ability to plan lessons and employ effective teaching behaviors, including the "development of content . . . by extending practices and tasks, building on previous content, and including new challenges." In addition, the rubric assessed PTs' ability to display professional qualities (e.g., "enthusiasm" and "having a good rapport with cooperating teachers and pupils"), and to evaluate and assess their pupils' progress.

Data Collection

Six qualitative techniques were employed to collect data aimed at answering the four main questions that guided the study. *Fieldwork* involved the observation of PTs during the

content course and EFE and the taking of extensive notes. Each PT was also *formally*

interviewed toward the end of the EFE. Questions were aimed at discovering the degree to which

PTs had acquired CK and PCK during the content course and EFE. These interviews were

recorded and transcribed verbatim. In addition, whenever the opportunity arose PTs were

informally interviewed. Early informal interviews were focused on gaining information about

PTs' prior experience of swimming. Later informal interviews were focused on ascertaining the

degree to which they had acquired CK and PCK and the mechanisms by which any acquisition

had occurred. Notes on the contents of informal interviews were typed as soon after the

conclusion of informal interviews as possible. Five purposefully selected PTs were also asked to

complete stimulated recall interviews. Each of these PTs had one lesson filmed during the EFE

while they were teaching from the deck of the pool. Subsequently, the film was viewed by the

PTs and paused periodically to allow PTs describe their thought processes regarding content

chosen, tasks selected, and content development. Following each of the five EFE lessons, PTs

were also be asked to complete a *critical incident report* (Flanagan, 1954). This involved each

PT being asked to "describe anything about the tasks you employed and the content you taught in

your lesson today that you found particularly significant. When you have described the incident

finish with the statement: This was significant because . . . " Finally, PTs were asked to supply

copies of their lesson plans and process evaluation for *document analysis*.

Data Analysis

Data were analyzed using standard interpretive techniques. Phase 1 involved sorting data

from all sources into those that indicated (a) the level of CK with which PTs began the content

course, (b) how PTs acquired CK and developed PCK during the content course, and (c) how

PTs acquired CK and developed PCK during the EFE. Phase 2 involved using analytic induction

and constant comparison (Goetz & LeCompte, 1984) to sort the data in each of the three data sets into categories and themes. Credibility and trustworthiness of these analyses were established by triangulating findings from the six qualitative techniques employed to collect data, a search for negative and discrepant cases (Goetz & LeCompte, 1984), and continual and extensive member checking.

Findings and Discussion

Level of PTs' CK Prior to the Content Course

Limited experience and CK. Although all the PTs were able to swim at a "recreational" level, all of them also indicated that they had limited experience of swimming prior to the commencement of the content course. Specifically, they had never been engaged in swimming on a regular basis or involved in competitive swimming. Moreover, they had not earned any swimming qualifications, taught swimming, or lifeguarded. On the contrary, they were only familiar with a rough and recreational brand of "front crawl" or "freestyle." For example, Megan[1] noted that she was "comfortable with the front crawl . . . I am not comfortable with the other strokes" (informal interview, session 1, front crawl, content course), while Alan explained that "I usually stick to the front crawl whenever I am swimming. . . . The last time I swam before this class was during the summer at the lake" (informal interview, session 1, front crawl, content course). Consequently, and in congruence with the assertion of Siedentop and Eldar (1989), the PTs recognized that they began the content course with very limited CK: "I do not know the proper techniques for any of the strokes. . . . I can swim front crawl but that's about it," (Jack, informal interview, session 1, front crawl, content course). Moreover, while early observational data indicated that 6 of the PTs were fairly competent recreational swimmers, it also confirmed that the remaining 10 were not very well skilled technically and that their water fitness was poor:

Many of the PTs are having trouble breathing properly . . . while using a kickboard to support them in the water. Instead of placing their opposite ear . . . in the water to breathe to the left side, they are bringing their heads straight up out of the water. . . . Their hips are sinking and their legs are dropping. (Field notes, session 2, front crawl, content course)

At the conclusion of the EFE, many of the PTs, including Megan, realized that "not having enough prior experience [of swimming] made teaching the children challenging" (formal interview).

Sources of CK. The main source of PTs' CK was invariably their own swimming instructors. For two of the PTs, this was a parent or relative:

Growing up, my mom's side of the family always went to the pool and helped us in the water with floating and jumping off the side of the pool and swimming to her. My dad's side of the family doesn't go to the pool that often. (Les, informal interview, session 1, front crawl, content course)

For the remaining 14 PTs, it was a paid swimming instructor. In line with the suggestions of Ward (2009), however, those PTs who had received formal swimming instruction had not done so as part of their school physical education or extracurricular sport programs.

As all the PTs learned to swim between the ages of 4 and 6 years, not surprisingly, the majority of their recollections of these experiences contained little in the way of specific skills, techniques, or tips they were taught or given. For example, Cindy only remembered "taking swim lessons in the first and second grade and already knowing how to swim at that time" and Bob recalled "doing swim lessons when I was little with my friends." As illustrated by the following excerpt, however, only Megan remembered some of the content she was taught and this still formed the basis of her CK: "I don't remember all of the cues and techniques I learned when I was little, but I remember learning the 'frog stroke' which is how I swim most of the time now" (informal interview, session 1, front crawl, content course).

Lack of confidence. In line with previous research (Carney & Chedzoy, 1998; Chedzoy, 2000; Gower & Chapel, 2004), their limited experience of and low level of technical skill in swimming meant that as the content course began the PTs' level of confidence was generally low. Consequently, and as illustrated by the extracts below, all of them appeared "nervous" and "worried."

> This (breaststroke) is hard. . . . Whenever I think about my arms I mess up my legs. Whenever I think about my legs I mess up my arms. I want to do both of them right . . . but do them right together. (Zach, informal interview, session 6, breaststroke, content course)

Acquisition of CK and Development of PCK During the Content Course

Data revealed that PTs acquired CK and developed PCK via three main avenues during the content course. These were a *focus on their own performance*, *instructor modeling and pedagogy*, and *class materials*.

Focus on own performance. In congruence with Siedentop (2009), the fact that they were positioned as pupils and that one goal of the content course was to improve their own swimming skills facilitated PTs' acquisition of CK. This relationship between performance and CK acquisition was recognized by the PTs. For example, Bob explained that "it helped being able to practice the strokes—I learned more about stroke technique through practice in class" (formal interview). As illustrated in the following extracts, other PTs shared this view:

> While learning the backcrawl, I understood the kick because it was similar to front crawl and I did that fine. The pull was harder because I'm not used to that motion. It was a little frustrating not being able to do it at first, but getting multiple repetitions to work on just the pull, then incorporating the kick allowed me to improve my technique in both areas. (Les, informal interview, session 10, backcrawl, content course)

> I learned a lot about the different strokes and all that goes into making sure you are kicking and doing the arm motions right during class. It was nice to have the time set aside to learn how to do it properly because I wanted to make sure I was teaching the right thing when we started teaching the kids. (Alan, formal interview)

Following Ward (2009), holding PTs accountable for performing to a level that would enable them to earn the WSI certification and basing their course grades partially on their own swimming performance amplified PTs' motivation to work on their own technique and thus facilitated their acquisition of a decent level of CK by the end of the content course.

Finally, there was also consensus among the PTs that knowing in advance that they were going to have to teach what they were performing in the content course was an incentive to learn CK. For example, Megan noted that "actually having to know it (i.e., swimming) well enough to teach, not just perform. This helped me understand the content better" (formal interview).

Instructor modeling and pedagogy. The amount of CK acquired by PTs was boosted by the use of a graduate student with a high level of aquatic skill to model strokes and key techniques. Again, PTs' recognized the impact of this modeling on their teaching: "It was helpful to have a demonstration of what we were going to do before we did it . . . because my partner didn't know how to do it right, and I certainly didn't know how to do it right" (Les, informal interview, session 6, breaststroke, content course).

The main methods by which the PTs acquired CK and PCK in the content course, however, were through the pattern of teaching styles (Mosston, 1981) the instructor employed and his modeling of the content that could be used to teach children the various strokes and aquatic skills.

Initially, the PTs learned CK related to each stroke and aquatic skill taught through command and practice style teaching: "With their towels, PTs sit on the pool deck around the lead instructor as he lies on his right side and provides a verbal description and visual demonstration of sidestroke. PTs then mirror the action on their towels" (field notes, session 12, sidestroke, content course). "PTs swim widths of backcrawl across the pool. . . . The instructor

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and graduate student observe looking for proper form and giving feedback . . . ("head back, hips up") (field notes, session 9, backcrawl, content course).

Having worked on their own performance with feedback from the instructor and his graduate student assistant, PTs were then asked to form pairs and take turns in the role of teacher and pupil. These relatively short reciprocal teaching episodes lasted from 5 to 10 minutes and enabled the instructor to transition the PTs from "thinking like pupils to thinking like teachers." Specifically, it was during this process that PTs were first required to observe a performance in the pool, detect errors, provide specific performance feedback, and work at improving someone else's technique. Early on in the course, PTs struggled mightily during these reciprocal episodes. For example, Megan explained that "I'm still not exactly sure what the correct stroke is supposed to look like, so correcting someone or knowing exactly what to look for and how to fix it is a little challenging" (critical incident, session 9, backcrawl, content course). As they gained experience and became more comfortable, however, their pedagogical skills improved dramatically:

> Instructor (talking to Alan, a PT in the teacher's role): Do you see your partner's feet? Are they correct?
> Alan (PT): Uh . . . yea, I think so.
> Instructor: His feet should be plantar-flexed and right now they are dorsi-flexed.
> Alan (PT): Oh, ok (Alan then proceeds to inform his partner he needs to plantar flex his feet). (Field notes, session 3, front crawl, content course)

> Andy (a PT in the teacher's role working with Scotty): You need to keep your head back in the water and look up [points to the ceiling and touches the top of his head]. During Scotty's next width of backstroke he keeps his head back in the water. (Field notes, session 10, backcrawl, content course)

Use of the reciprocal teaching style facilitated a deeper level of CK acquisition as Jenkins et al. (2005) had suggested it would. It was also a key method by which PTs began to acquire

PCK in the form of the practices and drills they were asked to use in each reciprocal episode and because they were required to detect and correct errors and provide performance feedback:

> I like the reciprocal style teaching because I can get feedback on what I am doing wrong or right. But sometimes it is hard when you don't know what you are looking for within the stroke. But when you do know how to do something, you can spot it right away and help them improve. (Cindy, formal interview)

On numerous occasions the instructor followed up reciprocal episodes of teaching with equally short episodes of guided discovery teaching. During these episodes, PTs the instructor had previously observed using correct technique or making a variety of errors were asked to swim widths or lengths of the pool while the remaining PTs observed from the side of the pool and were guided in the process of recognizing good quality performance, errors, and providing technical feedback:

> The lead instructor has . . . Cindy . . . and Bob swim two widths of backcrawl while the rest of the PTs observe from the pool deck. . . . He then asks the class, "What is the difference between Bob's stroke and Cindy's? Why is Cindy able to stay on top on the water?" The PTs do not respond directly. Then Alan answers, "Cindy kept her head back and Bob didn't." The lead instructor then asks, "In order to keep your hips up and stay flat in the water you must do what?" Alan responds by saying, "Keep your head back and don't bring your head forward or else you will sink." The instructor responds, "Yes, well done!" (Field notes, session 8, backcrawl, content course)

Regardless of the teaching styles employed, a key component of the content course was the instructor's use of practices, drills, and tasks to teach the PTs which could also be employed to teach children the same content. These are illustrated in the lesson plan extract in Table 1. Moreover, the instructor emphasized that these practices, drills, and tasks were sequenced and packaged in ways he thought would facilitate maximal learning:

> Now, during the field experience you can use the same tasks and progressions that I have used while teaching you . . . which are in my lesson plans. . . . I have broken down each stroke and used specific tasks and progressions which you can use when it is time for you to teach the kids. (Field notes, session 7, breaststroke, content course)

Table 1.

An Extract From the Instructor's Lesson Plan for Session 2 on Front Crawl

Pupil Activity	Organization	Teacher Activity
2. Warm-up	widths of pool	"Ok, enter the pool and to warm up swim four widths, full stroke, front crawl."
3. Revision of work on leg-kick	widths of pool	
a. Hold side and kick	Organize into 1s and 2s.	a. "Stop." Gather on the wall and practice kick. Guided discovery on main teaching points (TPs)—kick from hip, plantar flex toes, floppy ankles, turbulence.
b. Kick with board (face up)		b. "Now I want you to swim 4 widths using a kick-board" (kick hard)
c. Kick with board (face in water, lift head to breathe)		c. As b but add breathing (exhale and lift head to take on breath)
d. Kick with board (take pulls while breathing)		d. As c but breathe by turning head (keep ear wet, eyes sideways). Partners on side checking technique (reciprocal)

Furthermore, and in congruence with Rink (2010), having provided an informing task, the

instructor provided (and modeled) a variety of extending and refining tasks and usually

concluded each session's activity with an application task. For example, during session 5, the

first session on breaststroke, as detailed in his lesson plan, the instructor introduced the leg-kick

by requiring PTs to practice it on land (informing task), and then asking them to "kick while

holding the side of the pool" and "kick widths using a kickboard" (extending tasks). He then

followed up by requiring the PTs to "continue kicking widths" but to "focus," first, on making

sure that they were in the "correct kicking position" by "holding in the bent knee position and

self-checking," and second on "gliding after the kick" (refining tasks). The last activity prior to lesson closure involved groups of PTs racing using breaststroke leg-kick in order to propel a "boat" made of noodles and containing one of their teammates (application task).

Finally, the instructor also modeled the use of metaphors and key words, phrases, and imagery, emphasized how useful these could be when teaching any content, and encouraged the PTs to "come up" with more of these when they taught in the EFE. For example, when teaching breaststroke, the instructor likened the arm position immediately after recovery to being in the "cartoon thief position" (field notes, session 7, breaststroke, content course). He also suggested that the sidestroke resembled a "50s dance step" and described the top arm within sidestroke as being "attached to the knee of the top leg by a string." Moreover, PTs who failed to get their bottom leg and foot in the correct position during sidestroke were told to "imagine you are kicking a ball" (field notes, session 11, sidestroke, content course). In addition, PTs who failed to recover their arms into the correct position while performing elementary backstroke were asked to "tickle your armpits" (field notes, session 13, elementary backstroke, content course).

Class materials. PTs clearly learned most of the CK and PCK they acquired during class sessions. It was, however, also apparent that the instructor's lesson plans, and to a lesser extent, readings for the class and online video helped to supplement and reinforce what was learned by doing and listening. Typical of comments made by PTs on this topic was the following: "It helped when he [i.e., the instructor] sent us his lesson plans after each class. . . . Also, looking at the non-swimmer handout and reading the books helped me focus on what I needed to teach for the next lesson" (Wade, formal interview).

Acquisition of CK and Development of PCK During the EFE

Data within two themes indicated how PTs acquired CK and developed PCK during the EFE. These themes were *planning and teaching* and a *shift from filling the time to a focus on learning*.

Planning and teaching. The depth of PTs' CK continued to develop during the course of the EFE. Having to plan to teach using the content and then attempt to execute the plan reinforced what they had learned in the content course. In line with Harold and Waring (2009), this process led to the PTs becoming increasingly more comfortable and confident about their CK and their ability to teach it:

> Prior to the first lesson I really didn't know what to expect. . . . But with the help of Dr. [Jones'] lesson plans and being able to practice in class really helped. . . . It got easier to teach and I felt good about what I was teaching them because I knew what changes I needed to make and I got to see what I was doing right and what I was doing wrong. (Andy, formal interview)

Shift from filling the time to a focus on learning. At the beginning of the EFE, regardless of whether they were teaching basic aquatic skills or strokes, the majority of the PTs main objective was to "fill the time" with tasks and not "run out of things to do with them [i.e., pupils]." To this end, the pedagogies of those PTs teaching strokes to the more experienced children mirrored those of the instructor of their content course. As illustrated in the following extract, they organized their lessons and packaged and sequenced the content for their children just as the instructor had done when teaching them:

> Alan (PT): For the first lesson, I used a sample lesson plan [Dr. Jones] provided and I went from there. I put it in my own words, but used all of the tasks he had listed in the lesson plan.
> Researcher: Did you find yourself using what you were taught—the same cues, tasks, progressions?
> Alan (PT): Yea, a lot of time.
> Researcher: Were they helpful?

Alan (PT): Yeah they were. Because the only thing I knew about swimming is what I learned from him. (formal interview)

As well as employing the same practices, progressions, and drills as the instructor of the content course, the PTs teaching specific strokes also used many of the same phrases and metaphors that he had employed when teaching them. For example, during the first lesson of the EFE on front crawl, Bob, told his students "to breath to the side . . . pick your favorite ear (points to his left ear). . . . You are going to stick your favorite ear into the water then turn your head and take a big breath." (field notes). At times, however, they still struggled to convey key points to their pupils:

> Bob (PT): I told them the top leg needs to be dorsiflexed and the bottom foot plantar flexed.
> Researcher: Do they (the pupils) understand what dorsiflexion and plantar flexion mean?
> Bob (PT): I don't really know. . . . I went over it, but I don't think they really got it, I just told them to point and flex their foot.
> Researcher: Was that helpful? Were they able to understand what 'pointing' and 'flexing' meant?
> Bob (PT): Yes! They understood it better than plantar flexion and dorsiflexion. (Bob, stimulated recall interview, lesson 3, EFE)

Similarly, and again during the early lessons of the EFE, the PTs teaching basic aquatic and water safety skills to less experienced children employed the tasks and progressions that were suggested by the instructor and his graduate teaching assistant during the content course:

> I had the real beginner students . . . . Some were afraid to put their face in the water. [At the beginning of the EFE] Jill gave me tasks to help them feel comfortable in the water . . . like blowing bubbles, bobbing up and down, and floating. We were able to practice those at the beginning of each session so they could improve on them each time . . . and it gave them something they could succeed in. (Alan, stimulated recall interview, lesson 5, EFE)

At this relatively early stage of the EFE, however, the PTs were plan-dependent in the extreme and there was little relationship between the timing of task presentation, time allocated to tasks, types of follow-up tasks presented, and the reactions of children to these tasks. In

addition, there were relatively few attempts to correct errors and provide technical feedback, partly because PTs were still "unsure of what to look for" and, as noted by Scotty, "it was hard to tell if the student was doing the right thing—like sometimes I do not see what the student is doing wrong" (informal interview, lesson 2, EFE). To the contrary, most of the feedback provided was motivational: "Initially, I would always say things like 'good job' because I wasn't comfortable telling them [i.e., the pupils] what they were doing right or wrong" (Andy, formal interview). In short, and in agreement with the findings of Rovegno (1991), the PTs were generally "going through the motions" of "teaching:" "To be honest, during the first lesson I was going with the flow. . . . At that point I was not comfortable teaching swimming" (Les, formal interview).

As the EFE progressed, however, and again in congruence with the findings of Rovegno (1991), 13 of the PTs appeared to shift from this kind of superficial instruction to focusing on learning. In line with previous research (Amade-Escot, 2000; Ayvazo &Ward, 2011, Rovegno, 1991), this shift meant that the type of tasks they asked their students to perform, the progressions they employed (i.e., extending, refining or applying), the time allocated to tasks, and their decisions to move from one task to another were more likely to be based on the pupils' progress and reactions:

> My teaching has changed since the first lesson . . .. I have become more aware of my students' abilities and have made adjustments to make it more challenging for some, and simplified some of the tasks for others. I am allowing some of my students to swim on their own, which I wasn't doing in the first lesson. (Jack, critical incident, lesson 4, EFE)

> I had to adapt my teaching to my students' ability and confidence in the water. Some of my students required more assistance because they were scared of being in the water. They were very hesitant about trying some of the skills and tasks I had planned so I had to change the way they learned the skills by providing more support for them in the water so they felt safe enough to try it. (Jim, critical incident, lesson 5, EFE)

In general, those teaching the two least experienced groups of pupils tended to make this shift before those teaching strokes and of their own accord. This was because the needs, struggles, and progress of their pupils were more basic and obvious as was their feedback to the PTs. Specifically, the pupils were "frightened" or "worried" and wanted to learn how to swim. Conversely, key to those PTs teaching strokes making the same shift was the course instructor's contrasting of teachers who "fill time" with those who "focus on learning" following lesson 3:

> Now, the kids aren't going to get better by themselves. If you don't provide them with the right instruction and tell them what they're doing right and what they're doing wrong they won't improve. . . . You know what you are looking for and how to correct it. . . . You need to press your kids to get better. (Field notes, lesson 3, EFE)

> In congruence with previous research (Amade-Escot, 2000), those PTs who made this

switch, planned lessons in more detail, became more flexible in their teaching, spent more time looking for technical flaws, and provided more performance feedback. In addition, they were more likely to employ the more pupil-centered teaching styles (i.e., reciprocal and guided discovery) with which they had been taught during the content course:

> Have partners (1s and 2s) watch each other as they complete 2 widths of breaststroke. . . . (Looking for wide sweep, wedge kick, breath on every stroke, big glide). When partner 1 gets back to the wall partner 2 will inform partner 1 if they accomplished those tasks or need to improve. After partner 2 provides feedback to partner 1, partner 2 will swim 2 widths of breaststroke and partner 1 will observe for correct form and provide feedback. (Cindy, document analysis, extract from lesson plan 4, EFE)

> Finally, while most PTs who made the shift from filling time to a focus on learning

continued to use the tasks and pedagogies with which they were taught during the content course, seven PTs went a stage further. Specifically, as these PTs grew in confidence, they developed their own tasks and progressions "added some cues of [their] own" and borrowed "techniques and cues from other people teaching the same lesson" (Andy, informal interview, EFE 5).

> I used some of the same cues [as the instructor of the methods course] like "point your toes," but when you say "hips up" they don't understand what that means. When I said,

"booty to the ceiling" they understood that a lot better. They all meant the same thing but I had to put it in third grade terms. (Cindy, stimulated recall interview, lesson 4, EFE)

Moreover, other PTs with less prior experience of swimming inferred that, had the EFE been longer, they, too, might have made a similar second pedagogical shift:

Having to learn all of the different strokes and the correct techniques for each stroke, then have to teach it . . . this was a first for me. I think if I had had more opportunities to teach them [i.e., the pupils], I would have gotten it down a little bit better. (Andy, formal interview, lesson 5, EFE)

Conclusions

This study illustrated how PTs acquired CK and PCK from a content course on a specific subject matter and a related follow-up EFE. The majority of the PTs, who began the course with very little CK and no PCK, acquired impressive levels of both forms of knowledge and were fairly successful in terms of teaching third grade children swimming and basic aquatic skills. A number of factors both enhanced and negated the acquisition of CK and PCK and, assuming that these transfer, they may be of practical use to other PETE faculty and programs.

Key enhancers were the course structure, pedagogical strategies used by the instructor, nature of the content, and the children who took part in the EFE. The course structure was a hybrid of the first two pure models that have previously been employed by PETE faculty to teach CK and PCK. It consisted of both a content course in which the PTs were positioned as pupils and pedagogies by which they could teach children were modeled (i.e., model 2, Siedentop, 2009) and an EFE in which the goal was to teach this content so as to learn PCK (i.e., model 3, Ward, 2009). Importantly, the results of this study suggested that the close connection between these two components meant that the resulting hybrid model was significantly more potent than either of the two models employed by themselves. Crucial to this potency was the fact that the content course flowed straight into the EFE with no break and hence no chance for learning that

had occurred during the content course to decay. In addition, the fact that the EFE built directly from the foundation of knowledge established in the content course was also obviously important.

Four teaching styles employed by the instructor during the content course also appeared play a significant role in the PTs' development. These were his initial use of the command and practice styles to teach the content to the PTs and his use of the reciprocal and guided discovery styles in order to transition the PTs from the role of pupil to teacher.

That swimming was the content that the PTs learned and taught was also advantageous for two reasons. First, it consists of a series of closed skills. This means that the focus is solely on technical improvement and there is no concern about teaching tactics or strategies which PTs find more difficult to master (McNeill et al., 2004). Second, the unique context of the pool, particularly the concern for safety, means that PTs may have a greater focus on teaching and learning than they do in and with more familiar contexts and content.

A number of researchers have pointed to the contextual nature of PCK (Byra, 2009, Rovegno, 2000) and the importance of understanding and knowing the children being taught (Griffin et al., 1996). In the current study, the children in the EFE were young, extremely enthusiastic, and very cooperative. Consequently, there were virtually no behavioral issues at all to concern the PTs. Without this distraction, the PTs were able to form close bonds with their charges fairly quickly. This allowed them to relax and focus most of their pedagogical thought and effort on instruction rather than management.

Key factors that negated the effectiveness of the hybrid course were the level of PTs' CK at entry and the length of the EFE. Their low level of CK at the beginning of the content course almost certainly curtailed some PTs' progress. Not surprisingly, those with the lowest levels of

CK at entry were less likely to make the shift from filling time to a focus on learning during the EFE and were even less likely to move on to integrating their own pedagogies with those modeled by the instructor. Moreover, the relatively short duration of the EFE also curtailed the level of CK and PCK which PTs acquired. Had the EFE been more lengthy, we are confident that PTs would have become much more comfortable with the content and that more of them would have moved on to experimenting with their teaching.

Finally, and drawing from the literature on occupational socialization (Curtner-Smith et al., 2009), the PTs' acculturation served to either enhance or negate their progress during the content course and EFE. Specifically, those who began the course with coaching orientations were less likely to work at their own performance in the content course or their teaching in the EFE than those who began it with a teaching orientation. Moreover, those who had hard core coaching orientations made least progress during the content course and, consequently, were unable make the shift from filling time to a focus on learning.

Future research in this line might first seek to replicate our results with this hybrid model in other contexts and with other content. Studies in which the duration of the EFE is increased would also be of use, as would studies of PTs who begin the content course with higher levels of CK.

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Footnote
[1]The names of all participants in this paper are fictitious.