Original Article

Content development as a function of content knowledge courses in preservice physical education teachers

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Abstract:

Purpose. To investigate preservice teachers' (PST's) knowledge of instructional task progressions (i.e., content development) as a function of content courses in parkour and basketball.

Methods. Eighteen preservice teachers (PST's) (5 female and 13 male) in Physical Education (PE) from a Belgian university engaged in a parkour and basket content class. Each class consisted of a 4-day unit with a total duration of 12 hours and focused on the acquisition of specialized content knowledge through microteaching sessions. Before and after the content course, PST's content development defined in terms of knowledge of instructional tasks was measured through content mapping. Two trained observers coded content maps independently and reliability was 86%, based on 75% of the total sample.

Results. For parkour, the total number of tasks, informing and extending tasks increased threefold because of the content course ($p<.001$). For basketball, total number of tasks remained the same ($p=.849$). However, extending tasks decreased significantly ($p=.003$) while the number of extending-applying tasks increased significantly ($p=.008$). Depth of content knowledge did not improve following the content course and was 1.77 for parkour and 1.36 for basketball, which is below the recommended index of 3.0.

Conclusion. Content courses can positively increase PST's content development in terms of total number of tasks and extending tasks. For basketball, the increase of extending-applying tasks reflected a game-based approach. Depth of content knowledge did not improve. Further research is needed to investigate how content courses should be designed so that PST's acquire knowledge of instructional tasks.

Key words: content map, specialized content knowledge, professional development, instructional tasks

Introduction

The selection and sequencing of instructional tasks, called content development or content progression, in a developmentally appropriate way so that students achieve an instructional outcome is a critical skill in teaching (Ball, Thames, & Phelps, 2008; Rink, 2009; Siedentop & Tannehill, 2000; Ward, 2013; Ward et al., 2017). Effective teaching is characterized by the development of content that moves students through simple to complex learning experiences towards a higher level of competency (Rink, 2006; Rink & Hall, 2008). Rink (1994) defined four categories of tasks teachers can use to develop content: informing, refining, extending, and applying tasks. An informing task usually is the first task in the progression. The teacher can increase or decrease the complexity or difficulty of the previous task using extending tasks. A refining task is used by a teacher to improve the quality of performance such as focusing on the technical execution of a performance. Applying tasks focus on a student's ability to apply the performance in a particular context such as a game or it can be used as an assessment of student performance. Given the widespread development and implementation of instructional models using small sided games such as Teaching Games for Understanding (Griffin & Butler, 2005), Play Practice (Lauder & Piltz, 2013) and Sport Education (Siedentop, Hastie, & van der Mars, 2011), Ward et al. (2017) refined Rink's initial categories to describe content development within games more precisely by creating four additional tasks: extending-applying, refining-applying, applying-nongame and applying-game tasks. Extending-applying and refining-applying tasks are extending and refining tasks that occur in the context of small sided games or that might be used when teaching in a game. An applying-nongame task is a task where the goal is to assess the use of the movement and to increase the amount of trials. An applying-game task is a task where the goal is to use the content of the lesson in the game but where no particular focus is added.

Research using Rink's (1994) task categories has shown that in general, teachers have little content development beyond the initial informing task (Ayvazo & Ward, 2011; Gusthart, 1985; Ward, He, Wang, & Li, 2018; Ward, Tsuda, Dervent, & Devrilmez, 2018). Often, teachers implement an informing task followed by one or two refining or extending tasks before moving to game play, a combination usually resulting in poor student learning (Ayvazo & Ward, 2011; Kim, 2011; Sinelnikov, Kim, Ward, Curtner-Smith, & Li, 2015; Ward, Kim, Ko, & Li, 2015; Ward et al., 2017). Gusthart and Rink's (1983) study, investigating preservice teachers' (PST's)

content development during school placement, found that on average 31% of tasks were informing, 13% refining, 11% extending and 4% applying. The authors argued that this low amount of refining and extending tasks was probably related to the PST's lack of content knowledge in PE. Also Ingersoll, Jenkins and Lux (2014) reported that the lack of refining tasks in a beginning PST's field experience reflected poor content knowledge. Hastie and Vlasisavljevic (1999) found that teachers used significantly more refining and extending tasks when teaching units in which they reported to have high subject matter expertise. This result was confirmed by Ayvazo and Ward (2011) who observed a larger proportion of refining tasks leading to more correct student trials in teachers teaching their stronger unit of instruction. Extending and refining tasks are considered crucial for student learning and are generally more used by expert teachers (Hastie & Vlasisavljevic, 1999, Masser, 1987; Ward et al., 2017). By using extending tasks, teachers adapt the level of difficulty to the learner's ability to generate more successful practice trials, which improve student performance (Rink, 2014; Silverman, Subramaniam, & Woods, 1998). Refining tasks are used to correct student performance and as a consequence improve performance (Masser, 1987; Rink, 2014). Recently, the depth of a teacher's content knowledge has been conceptualized in a ratio that expresses the task development relative to the informing tasks (Ward et al., 2017). For example, when a teacher teaches two informing tasks each with one refining and one extending task, the ratio is 2 (i.e., four tasks beyond the informing tasks / 2 informing tasks). Research with PE teachers has shown that experts have ratios of 2.0 or higher while non-experts are situated between 0 and 1 (Ward et al., 2017; Ward, He, Wang, & Li, 2018).

About a decade ago Ward (2009), drawing upon the work of Shulman (1987) and Ball et al. (2008), discriminated two types of content knowledge in physical education (PE): common and specialized content knowledge. Common content knowledge (CCK) consists of knowledge about the rules and etiquette of the game (i.e., knowing the three-second rule in basketball) and knowledge of technique and tactics (e.g., knowing how to perform a give and go in basketball). Specialized content knowledge (SCK) on the other hand consists of knowledge of content development (i.e., what instructional tasks to use when teaching the give and go to beginners), knowledge of task representations (e.g., how to present the give and go to learners by means of a demonstration and the use of critical elements), and knowledge of common errors and how to correct these (i.e., how to correct shooting the basketball with a stiff wrist). While CCK is considered to be necessary for successfully participating in the activity, SCK is necessary for teaching the activity. The SCK a teacher possesses is reflected in his knowledge of a range of instructional tasks and the deeper that knowledge the larger the basis a teacher has to draw on to adapt instruction for students with different needs (Ayvazo & Ward, 2011; Ward, He, et al., 2018). Recent experimental studies with in-service teachers have shown that following a content knowledge workshop with a focus on SCK, teacher effectiveness in terms of student learning improves (Iserbyt, Theys, Ward, & Charlier, 2017; Iserbyt, Ward, & Martens, 2016; Kim, 2011; Sinelnikov, Kim, Ward, Curtner-Smith, & Li, 2016; Ward, Kim, Ko, & Li, 2015). Since SCK is generally not acquired from participating in the activity during PE or sport club activities (Stuhr, 2009; Ward, Tsuda, Dervent, & Devrilmez, 2018) nor from experience (Ward, He et al., 2018), it needs to be taught in preservice teacher education. Very often however, preservice PE teacher education curricula emphasize CCK with little focus on SCK which represents a common misconception that the primary knowledge needed to teach an activity is learned from playing the activity (Kim, Lee, Ward & Li, 2015; Ward, Li, Kim & Lee, 2012; Ward, Tsuda et al. 2018).

To date, little is known about the depth of SCK in preservice teachers when they enter the teacher education program, how best practices to develop SCK look like, and how deep the level of SCK is when PST's complete their training. In one of the first studies in this domain, Kim and Ko (2017) measured PST's knowledge of instructional tasks for teaching manipulative skills in elementary PE at the entry and exit level of their program. They reported that PST's task knowledge was poor and that only a marginal improvement occurred from entry to exit. They also noted that PST's listed very few developmentally (i.e., appropriate for elementary school children) and sequentially (i.e., appropriate progression from the previous tasks) appropriate tasks. In an experimental study with 191 university students, Ward, Tsuda, Dervent and Devrilmez (2018) investigated the acquisition of SCK as a function of content knowledge courses in badminton, tennis, basketball, and volleyball focusing on learning how to play (i.e., CCK) versus learning how to teach (i.e., SCK). In the CCK group, the aim was to improve students' skillfulness in playing those games. In the SCK group, students learned to teach these games by means of peer teaching. It was found that the median depth of students' SCK in both groups was below 0.5. Students learning how to play did not improve their SCK whereas students learning how to teach improved to a median SCK score of 3.4. In general these recent studies have shown that (1) SCK defined in terms of knowledge of instructional tasks is not acquired as the result of engagement in PE or extracurricular activities and (2) that it can be explicitly taught to teachers (Ward, Tsuda et al., 2018). Therefore, there is a pressing need to investigate how PST's can acquire SCK defined in terms of knowledge of instructional tasks in a given content area during their preservice training. Since research has shown that teaching effectiveness is strongly influenced by a teacher's ability to select and sequence instructional tasks (i.e., content development), research investigating PST's acquisition of SCK is significant.

In this study we investigated PST's content development as a function of content courses in parkour and basketball. Content development was measured by means of content maps, a reliable and valid tool to measure SCK defined in terms of knowledge of instructional tasks (Ward et al., 2017). Content courses focused on

content development for secondary school students through microteaching. We defined the following two research questions: (1) how does PST's content development in parkour and basketball differ as a function of a content knowledge course focusing on SCK? and (2) how does PST's depth of content knowledge in parkour and basketball differ as a function of the content knowledge course? We hypothesized that PST's content development as well as depth of content knowledge would meaningfully improve as a function of the content courses.

Material & methods

Participants

Participants were 18 PST's (5 females, 13 males, age range 19-22 years) in a Physical Education Teacher Education (PETE) program in Flanders, Belgium. At this university, students enter the 60 credit-hour PETE program after they completed their 180 credit-hour bachelor's degree (i.e., undergraduate) program. This Bachelor curriculum has a total of 40 credit hours devoted to content of which 2 devoted to a course teaching basketball focused on technical and tactical performance (i.e., CCK). Parkour was not previously taught in PST's Bachelor curriculum but was part of the PETE curriculum because of its focus on fundamental motor skill development. Parkour is an individual motor activity in which one tries to overcome various obstacles by means of swings, jumping, climbing and running, and has previously been used in research (Coolkens, Ward, Seghers, & Iserbyt, 2018). In addition, parkour is considered a lifestyle sport accessible for both sexes and matching children's leisure-sport tastes (Green, 2016). The study was conducted during a mandatory secondary methods class, which is part of the PETE program. Approval by the institution was given to publish the experimental data. Every week and for a total of 8 weeks, PST's took part in a content course on parkour (4 weeks) and basketball (4 weeks) focused on teaching basketball and parkour by means of appropriate task progressions (i.e., SCK). Every class had a duration of about 3 hours (range 2.5-3.0) so that the total duration of each content course was about 12 hours. During the content knowledge courses, PST's rotated as teachers in a microteaching setting whereby they taught the content based on scripted lesson plans developed by experts. Those experts developed an 8-day unit plan in parkour and basketball focusing on instructional tasks progressions (i.e., SCK). Every PST taught one parkour and one basketball lesson to his peers. Prior to each lesson, all PST's completed an online CCK quiz on the content that was to be covered that lesson and the appointed teachers for that lesson studied the lesson plans and content progressions (i.e., SCK). Every lesson taught by the PST's was followed by a group discussion led by the university supervisor.

Dependent variables and instruments

Content development categories on the content map. A content map is a graphic organizer that describes the SCK to be taught (i.e., from an initial task to more complex tasks) and its relationship to other SCK (i.e., when several skills are to be combined). It illustrates the complex thinking of a teacher and provides insight into how teachers structure their understanding of SCK (Ward, Lehwald & Lee, 2015). The instructional tasks reported in the content map were the dependent variable (see Table 1"). To analyze the content development, we used Rink's (1979) task categories. According to Rink (1979), tasks can be categorized according to their function, and the knowledge a teacher has of these tasks is directly related to his or her teaching effectiveness. Because of the use of a game-based approach in the basketball content course in this study, Rink's content development categories were extended with task categories considering this game-based approach (Ward et al., 2017). In this study, seven task categories were used: informing, extending, extending-applying, refining, refining-applying, applying game, and applying nongame.

For the instructional tasks listed in the content map it was determined whether their progression from the prior task was appropriate. For example, the instructional task of 'performing a backflip on the wall' was coded as sequentially inappropriate when the previous task was 'performing a backward roll on the floor'. The instructional task 'running from hoop to hoop alternately landing with left and right foot' which followed the instructional task 'running from hoop to hoop' was coded as sequentially appropriate.

Table 1. Content development variables

Informing task	The initial task in a skill progression. For example: "We start with running through hoops. Make sure you always have only one foot in a hoop."
Extending task	A task to increase or decrease the level of difficulty. For example: "Now you run through hoops alternating between left and right foot."
Refining task	A task to enhance the quality of the performance. For example: "While running through hoops, make sure you land on your forefoot."
Extending-applying task	A task to increase or decrease the level of difficulty in the game. For example: "As we have been playing 2v1 with a passive defender, the defender will now actively try to intercept the ball."
Refining-applying task	A task to enhance the quality of the performance. For example: "When performing the give and go, extend your arm to indicate where you want to receive the pass."
Applying game task	A task where the goal is to apply lesson content in a game but where no particular focus is added. For example: "We will now move to a 3v3 game."
Applying non-game task	A task where the goal is to increase the use of the skill or to assess the mastery of the skill. For example: "Try to run through as many hoops as you can in one minute."

Depth of content knowledge. The depth of content knowledge was measured by an SCK index score that was the ratio of all but the informing tasks (numerator) against the total of informing tasks (denominator). This

formula has been used in previous research (Ward et al., 2017) and is an indicator of a teacher's depth of SCK. For example, if a teacher uses on average one informing task, two extending and one refining tasks the ratio is 3.0 (i.e., 3/1). On the other hand, when a teacher uses on average three informing tasks and for each of these an extending task the ratio is 1.0 (i.e., 3/3). Previous work has put a ratio of 3.0 or more forward as a benchmark for sufficient depth in content knowledge (Ward, He, et al., 2018).

Data collection One week before and after the content classes, PST's were asked to construct a content map under standardized exam conditions in a classroom setting. To create the content map, PST's were asked to start with writing out skills and/or tactics they would teach during an 8-day unit of instruction. Next, they wrote out the sequence of instructional tasks to develop these skills and start combining them by means of arrows. The standardized instruction consisted of a Dutch translated version of an instructional video on how to construct a content map (Dervent, Tsuda, Devrilmez, & Ward, 2016). No further instructions were given beyond the instructional video. Time to construct the content map was unlimited and ranged between 6 and 21 minutes.

Coder training Two coders were involved in the data collection procedure in this study. Both coders were physical education teacher educators and parkour experts. Coder training consisted of five phases and was based on a previously developed manual (Dervent et al. 2016). First, coders studied a coding manual and completed a written test on the definition of codes. Second, they coded the description of all possible instructional tasks. The criterion to pass these two phases was set at 100%. Third, they coded exemplary lesson plans and achieved both >90%. Fourth, they coded exemplary content maps and achieved >90%. After this fifth phase, coders independently coded all content maps and a sample of 75% was used for coder reliability. Reliability was calculated for the type of instructional tasks and their sequentially appropriateness using the following formula: (total agreements + total disagreement)/total agreements.

Statistical analysis A pretest posttest intervention study was conducted. Statistical analysis was performed using SPSS, version 20 (SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp). Analysis of pre-test data showed no violations of the assumption of normality. Therefore, pre-post data were analyzed using related-samples T-test. An alpha of <.05 was set as a criterion for significance.

Results

Reliability between coders for type of instructional task and sequentially appropriateness was 86 %, which reaches the standard of 85% (Cooper, Heron, & Heward, 2007).

Changes in mean content development categories

Table 2 shows the content development as measured through the content maps. For parkour, the mean number of tasks, informing tasks, extending tasks, and sequentially appropriate tasks increased threefold from pre to post. The average total number of tasks increased from 13.5 to 36.3, $t=7.84$, $p<.001$. For informing tasks, the average of 4.7 increased significantly to 13.0, $t=12.21$, $p<.001$. The average number of extending tasks increased from 8.8 to 23.1, $t=5.65$, $p<.001$. Refining tasks were almost not used and extending-applying, refining-applying, applying-game and applying non-game tasks were not used. Both at pretest and posttest, about 35% of tasks were informing and 65% of tasks were extending tasks. The number of sequentially appropriate tasks increased from 8.4 to 23.4, $t=6.10$, $p<.001$. For basketball, the mean number of tasks did not significantly change from pre to post. A light decrease was observed from an average of 20.4 to 17.8. For informing tasks, no significant differences were found (5.6 vs 7.3). The mean number of extending tasks decreased significantly from 8.8 to 2.2, $t=4.13$, $p=.003$. Extending-applying tasks increased from .08 to 4.0, $t=3.36$, $p=.008$. The mean number of applying game tasks did not change significantly (2.6 vs 3.1). Refining tasks, refining-applying and applying non-game tasks were not used. Average sequentially appropriate tasks increased from 6.1 to 7.6, $t=1.04$, $p=.325$. Although this is not significant nor meaningful, the proportion of sequentially appropriate tasks improved from 57% to 85%.

Changes in the SCK index score Depth of SCK was as measured by dividing all non-informing tasks with the total number of informing tasks. No significant changes were observed from pretest to posttest for parkour (1.86 vs 1.77) as well as basketball (2.10 vs 1.36) SCK index scores (see Figure 1).

Table 2. Preservice teachers' means and proportions of instructional tasks for Parkour and Basketball

	Parkour				Basketball			
	Pre	Post	t	P	Pre	Post	t	P
Total instructional tasks	13.5	36.3	7.8	< .001	20.4	17.8	.20	.849
Informing tasks	4.7 (35%)	13.0 (36%)	12.21	< .001	5.6 (33%)	7.3 (44%)	2.20	.055
Extending tasks	8.8 (65%)	23.1 (64%)	5.65	< .001	8.8 (51%)	2.2 (13%)	4.13	.003
Refining tasks	0.0 (0%)	0.1 (0%)	1.00	.336	0.0 (0%)	0.0 (0%)		
Extending-applying tasks	0.0 (0%)	0.0 (0%)			0.1 (1%)	4.0 (24%)	3.36	.008
Refining-applying tasks	0.0 (0%)	0.0 (0%)			0.0 (0%)	0.0 (0%)		
Applying game tasks	0.0 (0%)	0.0 (0%)			2.6 (15%)	3.1 (19%)	1.30	.226
Applying nongame tasks	0.0 (0%)	0.0 (0%)			0.0 (0%)	0.0 (0%)		
Sequentially appropriate tasks	8.4 (90%)	23.4 (100%)	6.10	< .001	6.1 (57%)	7.6 (85%)	1.04	.325

Df parkour = 13, df basket = 10

Figure 1. Mean SCK index scores for parkour and basketball at pretest and posttest. Dashed line indicates the 3.0 SCK benchmark.

Discussion & conclusion

First, we sought to investigate the changes in PST's content development as a function of content knowledge classes in parkour and basketball. Results in this study show significant changes for both parkour and basketball resulting from a 4-week training in each content domain. For parkour, the total number of instructional tasks increased significantly from 13.5 to 36.3, especially due to a threefold increase in informing and extending tasks. For basketball, no significant changes in the total number of tasks were observed. Kim and Ko's (2017) study on PST's content development for manipulative skills in elementary schools reported a non-meaningful increase in skill relevant tasks from 13 to 15. These numbers are aligned with our data for basketball and the data for parkour at pretest. Perhaps in the case of basketball, the content course was too short for PST's to learn how to teach basketball using a game-based approach they were not yet familiar with. Although refining and refining-applying tasks are strongly related to student learning, they were not represented in the PST's content maps which confirms previous work with beginning teachers or teachers with low content knowledge (Ayvazo & Ward, 2011; Gusthart & Rink, 1983). For the present study it means that the content courses in parkour and basketball did not help PST's to acquire refining tasks. Also, refining tasks and refining-applying tasks are more likely to be observed in lesson plans or actual teaching (Ward et al., 2017). When teaching, teachers are more likely to encounter problems in terms of the quality of skill execution which they counter by providing refining tasks. Ward and colleagues' (2017) validation of content maps study showed that for PST's, refining tasks accounted for 0.4% of all tasks whereas with expert teachers refining tasks accounted for 21% of all tasks. It was hypothesized that PST's might not plan for refining tasks but still use them when teaching (Ward et al., 2017). For parkour, extending tasks increased threefold and for basketball a significant decrease from pre to post was observed in favor of an increase in extending-applying tasks. This shift from extending tasks to extending-applying tasks reflects the use of small-sided games in the basketball content course and demonstrates the development of content through game play. Applying game tasks accounted for 15% of all tasks at pretest and 19% at posttest. Research has generally shown that teaching games without a connection to content development is negatively related to student learning (Rink, 2009). At best, the delivery of games without specific instruction might reflect an effort to have students learn to play the game using previously taught skills, or at worst a case of rolling out the ball (Ward et al., 2017).

Sequentially appropriate tasks in parkour increased about threefold as a result of the content course. This was due to the large increase in knowledge of instructional tasks. For basketball, the number of sequentially appropriate tasks remained relatively stable (6.1 vs 7.6) but their proportion improved meaningfully. Whereas at pretest only 57% of tasks were sequentially appropriate, about 85% of tasks were sequentially appropriate at posttest. The study by Kim and Ko (2017) with PST's showed that about 65% of tasks were sequentially appropriate and this proportion did not differ from entrance to exit of the PETE program.

Second, we sought to investigate the change in depth of SCK as a function of content knowledge classes in parkour and basketball. For both content domains, depth of SCK did not differ significantly from pretest to posttest. Except for basketball at pretest (index of 2.0), the depth of content knowledge was between 1 and 2. These data are higher than the ratios reported by Ward, Tsuda, Dervent and Devrilmez (2018) with university students. They found pretreatment SCK ratios below 0.75 for badminton, tennis, basketball and volleyball. In their CCK group, those ratios did not improve whereas in the SCK group ratios for all content domains improved to 3.0 or higher. Ratios between 0 and 1 are to be expected of beginning teachers whereas teachers with expertise have ratios of 2.0 or higher. 3.0 was set as the benchmark for sufficient depth (Ward et al., 2017). The content courses in this study were not effective in increasing the depth of PST's content knowledge. Perhaps the duration of the content classes, which was about 12 hours per content domain as

opposed to 26 hours in the study by Ward and colleagues (2017) was too short to gain sufficient depth of SCK. In addition, students in this study only taught one parkour and one basketball lesson. Although every teaching session was followed by a group discussion led by the university supervisor on content development, actual teaching was limited and might have limited PST's learning.

In general, this study confirms previous research and raises new questions. Data from the content maps at pretest confirm that knowledge of instructional tasks is not acquired through engagement in PE lessons nor through content courses at university – in the case of basketball – where the focus of instruction lies on skill improvement (i.e., CCK). Indeed, the rationale for teaching the subject matter in PE has always been: 'in order to teach the content, you need to perform the content' (Siedentop, 2002; Ward, Tsuda et al., 2018). We suggest abandoning this rationale in teacher education. Next, our data show that content development can be significantly altered as a function of content courses. For parkour, the increase in instructional tasks was meaningful, and for basketball we saw a change as a function of the game-based approach. The depth of PST's content knowledge expressed in the SCK indexes however confirm Rink's assertion that beginning teachers do not really teach beyond the informing tasks. Appropriate selection and sequencing of content is a critical skill for effective teaching, and research has shown that limited content knowledge leads to a lack of teaching confidence and has a negative impact on enacted teaching knowledge (i.e., pedagogical content knowledge) (Herold & Waring, 2017). Based on the SCK indexes in this study, this study supports the argument that PST's exit their program with a lack of knowledge for teaching (Kim & Ko, 2017; Siedentop, 2002). There are some limitations that deserve being discussed regarding the use of content maps. First, content maps do not directly address the quality of a task. Although a task can be mentioned on a content map, it does not necessarily mean that this task is of good quality. Researchers have tried to solve this issue by coding tasks on a content maps as being either developmentally, sequentially, and/or principle appropriate (Kim, 2011; Kim & Ko, 2017; Ward, Kim et al. 2015). A principle appropriate task is more often used following intervention where the goals was to implement a certain instructional model such as Play Practice. A second criticism is that a content map only reflects one part of a teachers' content knowledge for teaching, namely knowledge of instructional tasks. Two other domains consist of knowledge of task representations and knowledge of errors and how to correct these. These two domains are not measured by means of content maps and therefore interpretation of content maps should be done with caution. Future research could investigate ways to measure the two other domains of teachers' specialized content knowledge and how the interrelationship between knowledge of content development, knowledge of task representations and knowledge of errors and how to correct these looks like.

This study adds to the literature by investigating how PST's acquire content knowledge for teaching. Siedentop has argued in 2002 that teachers aren't proficient enough to teach beyond an introductory level, and that their PETE program is to blame. In this study, PST's received content courses in basketball and parkour focusing on content development (i.e., SCK) in those domains. During these courses, they engaged in microteaching and group discussions on content development. Despite the fact that PST's only taught one parkour and one basketball course to peers, their content development was significantly affected. Future research should explore how the training of PST's can be intensified to prepare them as effective teachers.

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