

METHODOLOGY

Perceptions and Understanding of Games Creation: Teacher Candidates' Perspective

Sheri M. Treadwell, Mark A. Smith, Erica Pratt

Abstract

Games Creation (GC) is an instructional strategy that encourages students to develop problem-solving and critical thinking skills. Children who experience GC have the potential to construct knowledge and a deeper understanding of game play (Rovegno & Bandhauer, 1994) and positive outcomes in motor skill development (Dyson, 2001; LaFont, Proeres, & Vallet, 2007) through cooperation with others. Modeling and experiencing instructional strategies during an undergraduate teacher education program is one method that teacher educators have used to introduce instructional strategies. Physical education teacher education (PETE) teacher candidates (TC) are often asked to create games through pedagogical processes similar to those they will use as future teachers. Limited research has been conducted on participatory instructional units such as GC and its impact on the values, beliefs, and perceptions of PETE TCs and future implementation as an instructional strategy (Wright, McNeill, Fry, & Wang, 2005). Therefore, the purpose of this study was to examine undergraduate PETE students' perceptions, values, and beliefs of implementing GC instructional strategies in public school settings after experiencing a GC instruction unit during their PETE program.

Sheri M. Treadwell is an assistant professor, Department of Kinesiology, Sport Studies, and Physical Education, The College at Brockport. Mark A. Smith is an associate professor, Department of Sport and Exercise Science, University of Northern Colorado. Erica Pratt is an assistant clinical professor, Department of Health Sciences, Northern Arizona University. Please send author correspondence to streadwe@brockport.edu.

Games Creation (GC) has been known by several names over the years, including child-designed games, student-designed games, and games making. Rovegno and Bandhauer (1994) defined the process similarly used in GC as students developing, organizing, practicing, and implementing their own games while working within the teacher's set parameters. This definition will be used when discussing GC within the context of this article.

The idea of using GC as an instructional strategy to help students learn problem-solving and critical thinking skills has been around for decades. The constructivist learning opportunities that evolve through GC help students construct a deeper understanding of the skills and strategies needed to create their game (Rovegno & Bandhauer, 1994). Rovegno, Skonie, Charpenel, and Sievi (1995) believed that by having students develop, implement, and even instruct their games, the complexity of teaching tactics and critical thinking are more widely understood. Schwager and Labate (1993) determined that an emphasis on critical thinking in physical education can result in increased skill acquisition, fitness, and conceptual understanding. Hastie (2010) asserted that when anything is created (regardless of what it might be), those who learn the most from the creation are those who have invested personally and were a part of the planning, design, and craftsmanship, not those who enjoy the end product. The intention of GC is to facilitate the construction of knowledge, innovation, and reflection (Hastie, 2010).

Although incorporating GC into curriculum requires students to understand the rules, strategies, and boundaries, Curtner-Smith (1996) outlined a three-step model for teachers to follow to incorporate GC into the curriculum. The first step in this GC model is games selection. Teachers select a game from one of the four games classifications (invasion, net/wall, target, striking/fielding) and modify versions as needed. Step 2 immerses the students into game play and gives them autonomy to change equipment and/or modify the rules to improve games. The final step in Curtner-Smith's model is games invention. In this stage, teachers act as facilitator or observer (depending on the students' ability to work independently in small groups to solve problems) as the students work together to invent a new game that includes equipment, rules, and boundaries selection. Teachers need to recognize when students are ready to take on more responsibility of the decision-making process and be given more freedom to invent games.

The most recent research in the area of GC can be found within the sport education curriculum model (SECM; Hastie, 1998; Richarson & Oslin, 2003). Within the SECM, students work in small groups to create a game and then have an opportunity to experience an authentic sport experience through organized seasons of play, practice sessions, and student roles (Hastie, 1998). The authentic sporting experiences may focus on the strategies and tactics of various game forms such as invasion, target, net/wall, or striking/fielding (Hastie, 2010).

A distinct benefit to GC as an instructional strategy is the opportunity to teach critical thinking skills to children while working in small group settings, thus creating a rich learning experience for all learners. GC is best taught in a cooperative small group environment where students can brainstorm, discuss, and try different ideas (Rovegno et al., 1995). Cooperative learning is a student-centered approach where the teacher surrenders much of the control of the class over to the students, whereas in other teaching styles, such as the command style, teachers are in total control and make all decisions affecting the learning environment (Mosston & Ashworth, 2002). In a GC unit, this shift of responsibility creates a more autonomy-supportive environment where students are allowed to make more decisions regarding the type of equipment that might be used, specific rules and strategies, as well as boundaries (Hastie, 2010). Autonomy-supportive instructional strategies have been found to be useful in promoting lasting student engagement as shown by increased intrinsic motivation, creativity, persistence, and participation (Hastie, 2010; Reeve, Jang, Carrell, Jeon, & Barch, 2004). During the GC process, teachers should be cautioned not to sit back and do nothing. Rather, they become facilitators and must actively engage students' critical thinking skills by asking clarifying questions of their games, giving feedback on strategies, or asking students to explain the purpose or rules of their games (Hastie, 2010).

As with any instructional approach, implementation is only as good as the knowledge and understanding of that approach by the teacher. This is especially true when introducing and modeling instructional strategies to preservice teachers. Wright, McNeill, Fry, and Wang (2005) concluded that prospective teachers should master and implement various approaches to teaching games so students have the opportunity to learn skills and strategies within the context of the game. Modeling and experiencing instructional

strategies during an undergraduate teacher education program is one method that teacher educators have used to introduce instructional strategies. Undergraduates in physical education teacher education (PETE) may have the occasion to experience cooperative learning instructional strategies in their programs to gain a deeper understanding of the significant skill essentials or tactical development that are an authentic representation of what their future students may experience (Dyson, Griffin, & Hastie, 2004). Rink (2001) discussed the importance of teachers having not only a firm foundation in knowing how to implement various teaching methodologies, but also an understanding of processes and strategies needed to promote student learning. In the case of GC, preservice teachers are often asked to create a game through pedagogical processes that are similar to those they may potentially use as teachers. Rovegno et al. (1995) examined these pedagogical processes with senior undergraduate PETE students participating in GC who had no prior experience with GC or teaching for critical thinking and found that teaching students to learn the cognitive processes of GC took time and effort to implement. Much of the existing literature regarding GC is geared toward implementation within the classroom by practicing teachers. Yet little research has been done on the impact a GC unit has on teaching candidates' (TC) values, beliefs, and perceptions of GC as an instructional strategy and its potential value and implementation in a public school setting. Therefore, the purpose of this study was to examine undergraduate PETE students' perceptions, values, and beliefs of implementing GC instructional strategies in public school settings after experiencing a GC instruction unit during their PETE program.

Methods

Participants

Participants for this study were recruited from an undergraduate Secondary Physical Education Content I class at a midsized university in the Rocky Mountain region. The course was one of the first taken by undergraduates in the physical education major. Approximately 30 to 35 students were recruited to participate on a volunteer basis varying in athletic and physical education experiences. The class was taught by an associate professor at the university and a secondary investigator of the research study.

The research team for this study consisted of the primary researcher, instructor/secondary researcher, and two graduate students to assist in the interview process. The primary researcher recruited the student participants, conducted individual interviews and field observations, and completed subsequent data transcription and analysis. The instructor/secondary researcher did not participate in the study until the end of the semester, at which time the primary responsibility was to help with data analysis. By defining these specific roles, the data collection process will be strengthened, thus minimizing instructor bias.

The primary researcher contacted students during class with a verbal invitation to participate in the study. The invitation included a brief explanation of the research question, the methods, and the opportunity to opt out of the study. The purpose of the study was fully explained at this time and subsequent expectations for participation and the opportunity to opt out of participation. It was made clear that participation was strictly voluntary and that the students' standing in the class would in no way be affected by their choice to participate or not.

Data Collection Procedures

Data collection procedures for this study followed the steps outlined below to ensure that participants were fully informed prior to consenting to the study that their participation was fully voluntary and their standing in the class would not be affected at any time for opting out of the study. Methods of data collection consisted of individual interviews, as well as a researcher and instructor journals, field notes of researcher observations, and documents (exit slips, various assignments, and assessments) collected throughout the unit of study.

Process. First, informed consent forms were handed out and explained to the class. It was explained that the total time commitment would not extend beyond the regularly scheduled class and that any work that was to be completed outside of class would be in conjunction with the regular curriculum. Next, participants were grouped according to the conditions set by the professor of the class, and participants were given a questionnaire that asked open-ended questions about prior knowledge, invasion game experiences, and athletic ability. The sample population was divided into groups no larger than five students. Participants had the freedom to choose their own group unless they chose not to participate in the study, in

which case nonparticipants were grouped together to ensure they were not observed. At this point, the GC unit expectations were handed out and explained to the class as a whole by the professor so that all students understood the project guidelines and were given an opportunity to begin planning their activity.

The students were given three class periods to plan, practice, troubleshoot their game's design before turning in their final project. On the last two days of the unit, each group had the opportunity to practice and play each designed game. All students completed a rubric to assess each game, but only those of the participants were used in the data collection. Throughout this process, the primary researcher observed groups and took notes of significant behaviors, decision-making processes, and so forth. At the conclusion of each class session, all participants completed a short formative assessment asking each student to reflect on the significant decisions that were made both individually and collectively in the design of the game.

Students were given a final written evaluation that critiqued their own decision-making process throughout the planning process and the games they played at the end of the unit. Finally, students were asked to volunteer to participate in individual interviews with the primary researcher and two graduate assistants at the conclusion of the unit to gain an understanding of their perceptions of the GC process.

Methods of Data Collection

Qualitative research is often gauged by terms such as *trustworthiness*, *accuracy*, *consistency*, and *plausibility* (Blumenfeld-Jones, 1995). One method of addressing these criteria is to examine the research question from a variety of angles using different data collection tools. Therefore, this study used the following methods of data collection: (a) individual interviews, (b) observations, (c) documents, and (d) researcher and instructor journals.

Individual interviews. Participant interviews were 15 to 30 min in length at a predetermined location the participant and the researcher agreed upon. The purpose of the interview was to have each TC describe (a) their perceptions of the GC process, (b) the group dynamics and issues of the GC process, and (c) their beliefs and values of using GC instructional strategies in public school settings. All interviews were digitally recorded and transcribed verbatim. To allow for comments and the identification of errors, interviews were

returned to the students as a form of member checking (Creswell, 2007; Merriam, 1998).

Observations. During the instructional process, individual students and student groups were observed by the primary researcher. There were several purposes behind observing individuals and group interactions during the implementation phase of the study: (1) researcher observations provided evidence of the learning process in which the students have partaken and (2) researcher observations provided insights into the GC process and therefore guide the questions for individual interviews.

Documents. During the instructional process, students were asked to develop a series of formative assessments including game pamphlets, peer assessments, lesson plans, GC handbook, exit slips, and other instructional assessments. All instructional assessments were collected (electronically and in hard copy), and copies were made when original work needed to be returned to the student and/or group. There were several purposes behind the collecting and archiving of the GC documents: (1) The documents provided evidence of the learning process in which the students have partaken (2) analysis of the documents provided the researcher with insights into the process and therefore guided the questions for individual interviews, and (3) the documents showed students predisposed beliefs and values of GC instructional strategies.

Research and instructor journal. *Trustworthiness, reliability, and validity* are all terms that must be considered when conducting a qualitative research study. One method of establishing reliability or consistency was by having the researchers keep a journal, which was later used to establish an audit trail. Additionally, a journal is an ideal place for researchers to record their reflections and be reflexive regarding the research and instruction.

Data Analysis Procedures

The primary data analyses for this study were the individual interviews. Documents produced by student participants and researcher journals were used to help triangulate the data and add validity and meaning to the interviews.

Step 1: Informal analysis of documents and observations—Joint researcher journal (captured thoughts and observations of the implementation phase of the project, based on field notes, observations, and researchers' perceptions).

Step 2: Individual Interviews Transcripts—Participants’ responses to individual interview questions were analyzed using two distinct yet overlapping processes of analysis derived from a grounded theoretical perspective: open and axial coding (Corbin & Strauss, 2008). Open coding is the process of developing categories of concepts and themes derived from the data. In this study, open coding was used to analyze interview transcripts and additional documents from the class by reviewing each multiple times and making notes in the margins of the documents about their possible meaning. Additionally, open coding involves the process of conceptualizing, defining categories, and developing categories of results in terms of their properties and dimensions.

Axial coding facilitates building connections within categories. In this phase, the goal was to systematically develop and relate categories. This step includes the process of sorting out the relationships between concepts and subconcepts with the ultimate goal to discover the ways that categories relate to each other. Through the axial coding process, a researcher’s goal is to answer questions of who, when, where, why, how, and with what consequences (Corbin & Strauss, 2008).

Findings

Three themes were ultimately extracted from the data: (a) instructional benefits and implications, (b) complexity, and (c) outlook. Each theme has two to four subthemes that were represented in the data. The three themes and subsequent subthemes will be defined and articulated in the following paragraphs.

Theme 1: Instructional Benefits and Implications

Within the context of this study, the research team defined the theme “instructional benefits” as the numerous ways TCs could use the instructional strategy to increase student learning. Students identified many benefits of GC as an instructional strategy, but four benefits seemed to hold the most value for TCs as they embarked on their teaching career. The four benefits of using GC in a public school setting that the participants identified were (a) indirect instruction, (b) student creativity, (c) group dynamics, and (d) constructivist learning opportunities.

Indirect instruction. The participants found the concept of indirect instruction an attractive component of GC. Most of the participants identified the value of allowing students the opportunity

to create their own game and make decisions a positive implication. The TCs appreciated the notion of the teacher taking on the role of facilitator for the unit. Bert indicated, “I like the whole idea of the kids designing the games and the teacher acting as the facilitator and observing and helping out where needed.” Johnny reported, “I learned that when you give people a little direction, it makes it more fun and it gets them more involved because you get a chance to create the game and that was fun for us for sure.”

Even TCs who had not experienced GC prior to the unit were able to identify the value of indirect instruction. Deborah stated,

I normally think of making up a game as something that kids would play at recess and not really an instructional strategy. It was interesting to see that you could actually build a game with tactics, and that it was actually possible.

Chevy recognized that students who experience GC can have a sense of ownership over their education:

I think the biggest thing for me is letting the kids create their own game and having more of a stake in what they are learning. I like the idea of game creations for the classroom, especially for secondary education, because it allows them to feel like they are a part of their education versus being dictated by their education.

Student creativity. Participants in this study realized that GC allowed students to use their imaginations and creativity in a way that is not generally encouraged in traditional physical education classes. Stephanie pointed out,

I think it is a great idea. I think it’s helpful for students that you’re going to be teaching later on as a teacher that to get them to kind of think outside all the normal sports that there are and like we’re just going to do soccer or hockey and to get their mind-set off that particular game and to come up with their own game is a great idea, even throughout high school.

Leo expressed,

I think games creation will be very effective because it would get them [students] to think outside the box because

they haven't been encouraged to do that for a while. I think that kids lose their creativity when they go to middle school, and when high school hits, it seems like creativity goes out the door; I know it did with me. You are used to not thinking outside the box because you are thinking logically and straightforward.

Because the participants were instructed to create an invasion game using only the random pieces of assigned equipment, they had to be creative to find different uses for the equipment. For example, Jamie's group was assigned aerobic steps, hurdles, hockey sticks, and poly lines. She said,

It definitely took creativity and thinking of equipment not necessarily as what it is used for but using it for different purposes. We had hurdles for one of ours and we used it as a goal instead of a hurdle.

Kim reported, "Creativity plays a big part of games creation because the utilization of the equipment and using it in a different ways... so the goal is really getting kids to think creatively about it." Chevy added,

At first it was kind of daunting in a sense; there was a lot of equipment that assigned to us that had to be used out of its normal realm. Like we had kickboards for swimming, but we didn't have any water or pool that we were going to make our game in. So, yeah, that was a task figuring out how to utilize that particular piece of equipment and a new twist on certain things like the hula hoop, then incorporating other sports to fusion into this new one that we created.

Group dynamics. Most of the TCs agreed that group dynamics could be viewed as a limitation of GC and that depending on the age of the students, they may need to be taught how to interact with one another in a group setting. Participants identified possible solutions to teaching group interactions. For instance, Marti said,

I think making sure everyone has a role to fill in the group. I think the advantage is that you're going to get them to learn that they have to work with people and if they do put their brains together, they can come up with something really neat...As the students get older, you are kind of teaching

them more that they are going to have to work with people they don't like—that's the real world and you may not like your boss, you may not like your coworker, you may not like your neighbor, but you have to coexist with them and so I think that is a good way to teach them.

In some cases, teachers may need to take steps to separate the cliques that are common at the secondary level to increase productivity among the groups as Johnny asserted:

I think that sometimes with high school kids they get a little "cliquey" and they get a little quiet and might be a little standoffish, so I don't know how good it would benefit them, but I think it has the potential. I think there would just be a little more guiding from the instructor, but I think in the group dynamic you're going to get somebody that's going to take charge and go for it as long as you spread people out after you broke up those little cliques. At that age versus younger age, that seems to not be there. I think it has the potential to benefit the students as long as they break that up and you have people in the groups that are good moderators and can lead the group.

Many participants expressed concern whether the entire group could participate successfully in the activity and be fully engaged. For example, Amanda explained,

The group might not listen to you or even want to create a game. Or a kid can be in a group and two or three of the people in the group might do the work and one or two people just sit off to the side and not do it, and have others just sit around.

Bert also believed group dynamics could be a challenge: "If kids aren't very good at working in a group, it can be a challenge. Or if the one student always takes the lead and not everyone gets a say in the game creation that could be a challenge."

Constructivist learning opportunities. The TCs discussed the benefits of learning with and from one another in their small groups using traditional constructivist principles (i.e., brainstorm, trial and error, peer teaching, and communication). Brad's group

used brainstorming as a way to formulate their initial ideas for their game:

We brainstormed together, went home with our individual ideas, and then came together at a meeting where we sat down for about an hour and a half with all the equipment, and that's when we finalized it and compromised with this and that.

Jamie's group took a similar approach,

We literally sat on the floor in a group and talked about our idea, what we thought maybe we could do with the different pieces of equipment to incorporate them and really just shot around ideas and bounced off one another until we came up with what we thought was best. We wrote down the rules as we thought of them and then revised as we needed to. We actually changed quite a bit once we tried the game. Once we saw it in action, we saw what worked and what didn't.

Amanda liked the idea of using the constructivist approach for having students design a game because they were able to learn through teaching their games to other students:

I think having student design a game is great. It kind of teaches us; like we teach ourselves about it more and then having our peers around us and doing the same thing, it helps us to learn from one another.

Bert explained that GC is not a new concept for children as they make up games on the playground every day:

I like it because kids do it all the time at recess and they come up with these fun ways to be creative, and here they get to do that and show their knowledge of the concepts or strategies in nontraditional ways.

Theme 2: Complexity

Prior to experiencing GC, the TCs had a preconceived notion regarding the complexity of the instructional strategy. Most underestimated the amount of depth required to create their game.

For the sake of this article, the research team defined complexity as (a) depth of understanding and (b) depth of application.

Depth of understanding. The TCs clearly misjudged the amount of understanding that was necessary to design, implement, and carry out an invasion game. Most of the TCs expressed surprise that creating the game was harder than it appeared and did not stop to consider all of the steps that contribute to the development of a successful game, whether it was determining rules, using the assigned equipment, or discussing scoring strategies. Kimberly summed up her group's planning experience by noting they had relied on previously learned knowledge to assist their group:

It was a lot more difficult to create than a lot of people think. Because I know what from the game that my group did and from what other groups did when the games are played, you just like pulled all different kinds of tactics from other games we already knew to make it. I guess it wasn't actually a novel, new game. It was a new game but it incorporated a lot of what we already knew.

Some students realized that critical thinking was at the center of the process if they were to truly develop a game that was novel and not an incarnation of a game already in existence. Chevy stated,

I think the biggest forethought that came to me was that the most difficult part, for me at least and what stuck most in my head, was the critical thought process behind every little step that you do with the game creation itself.

Depth of application. As a result of the TCs' lack of conceptual understanding of the game form, they initially felt frustrated when first attempting to implement their games. The participants had difficulty transitioning their designed games into a practice situation where tactics and strategies made sense. Bert compared her early experiences of playing soccer with her GC experience and realized how complicated the whole process is for learners. She explained,

My biggest thing, I was brought up playing invasion games like soccer and all those other games, so it was kind of instilled in me, like the rules and whenever you come up with the game, you don't realize how complicated the games are. I guess, it's hard to teach strategy or explain strategy,

and you just can't get it on paper. I guess that was the hardest part—getting the point of the game across was the hardest part to put into words.

Bob shared his insight on his group's attempt to implement their game:

I learned that there is a lot more to the rules and the stuff behind it; like it's a lot more complex than just initially playing it; just because you know how to play the game, doesn't mean you know all of the rules and tactics involved, but when you're creating a game you have to think about that stuff more, and I guess that brought it more to my attention.

Some participants recognized that the GC process helped them learn more about the tactics and strategies of invasion games as they practiced each of the games that were created by the class because each game used different tactics to score. For example, Jamie explained,

I would say that it definitely teaches more of the tactics and strategies involved with the sports. Being able to use them in a different setting or in combination with different equipment and different strategies from other games definitely teach the component of sports first.

Theme 3: Outlook

The students in the class brought different experiences that either helped or hindered their understanding of GC, and as a result, two perspectives emerged as participants discussed implementation of GC in their future classrooms: (a) teacher's perspective and (b) student's perspective.

Teachers' perspective. The participants enrolled in the class who had prior experience working with children, either in coaching or previous field experience, seemed to have a greater ability to think about the implementation of GC in their future classrooms in terms of instructional benefits, increased student learning, inclusion, and opportunities to problem solve within their small groups than the participants who did not have those same experiences. These students were able to think more like a practicing teacher and make connections from their GC experience to how it might work with

students in their future teaching. For instance, Chevy discussed the awareness he gained through the experience to balance his approach when dealing with students: “When I finally get into the gym and having a conscious effort not to interject my ideas too much and allowing the kids to have the problem-solving ability and creating that problem-solving and peer working environment.”

Allison was sure to highlight her educational background and previous experience teaching students and connected this GC experience to a previous class she taught:

I think that since I have my master’s degree, I have had more experience than most of my group actually having students do things kind of by themselves...I used to teach a beginning weight training class and I did something like this, not create a game, but they created their own workout program, and in groups, I had them come up with different exercises using like Thera-bands or medicine balls or whatever. They had to come up with their own exercises to work different muscle groups. It worked very well.

Bob recognized that GC also promotes inclusion because the students will create games that are at their developmental level:

I think an advantage would be to get the students to create a game at their own skill level because a lot of time when we’re just doing preexisting games, even if we’re trying to adapt it, we’re not going to be able to reach every student, so this way in their group they will get more say on what skill level the game should be at and how it should be played so it might fit their needs a little better and so they will be more engaged. They will enjoy it more.

Students’ perspective. The participants who had less previous experience working with children or who were not as far along in the teaching program as some of the others seemed to have a harder time relating the GC process to a real-world application. Instead, these individuals thought more like students instead of teachers and failed to see many of the instructional benefits of GC as an instructional strategy. Many of those who viewed GC from the student perspective believed that school-aged students would not buy in to the concept of GC and would ultimately refuse to participate. Another common response was that had they been assigned a GC project when they

were in school, they would not have enjoyed it and would have rather played traditional games. For example, David shared, “I like it and I don’t... When I was in middle school, I didn’t want to make up a game. I wanted to play. I can already tell that kids would start getting a little bored.”

Some participants believed that the teacher would have to have the “right” students to make the unit work. In other words, the students would have to be motivated and want to participate. The students did not understand the teacher’s role is to create the learning environment that fosters exploration and discovery. Ben reported,

I think you have to have kids that really want to be there and really want to have fun in class for it to work. Because if you get kids that don’t want to be there, then you are automatically not going to get a good game out of them and they’re just going to sit around and do nothing. But if you get a group of kids that want to have fun and really like being active, you could probably do games creation for an entire semester and you could probably find the funnest games ever, and they’ll have a bunch of fun with it.

Discussion

Wright et al. (2005) found that TCs should have opportunities to practice various instructional strategies so they will be more likely to be able to carry over the desired teaching behavior into their future classrooms. GC is one such instructional strategy that if used properly can encourage students to use constructivist principles to learn tactics and strategies of different game forms. The purpose of this study was to examine undergraduate PETE students’ perceptions, values, and beliefs of implementing GC instructional strategies in public school settings after experiencing a GC instruction unit during their PETE program. The discussion will focus on two aspects of the findings: (a) the impact on TCs and (b) implications for teacher education.

Impact on Teacher Candidates

The major findings of this study illustrate the impact that GC, as an instructional strategy, has on TCs’ overall pedagogical development. Specifically, four points of significance were identified. First, the TCs identified the potential for student learning through this approach.

The participants recognized that GC promoted social construction of knowledge based on constructivist learning principles, such as hands-on learning, trial and error, using previous knowledge to solve current problems, critical thinking, and peer learning opportunities. Critical thinking has been shown to enable students to develop a deeper understanding of the content, tactics, and strategies when put in situations to design and implement their own games (Curtner-Smith, 1996; Hastie, 2010; Rovegno & Bandhauer, 1994).

Second, the TCs were able to see the advantages of using indirect instruction to facilitate the learning process with students. They were able to relate their experience of the GC process and understand they were the primary contributors to their own learning and understanding because their professor took on the role of facilitator. Because direct instruction was not the primary instructional strategy, the TCs were encouraged to look to one another for answers and solve problems. The teacher's primary role is to facilitate questions that might spur a discussion toward the solution. Mosston and Ashworth (2002) determined that teachers who are able to relinquish some aspect of the decision-making process in turn promote the production of knowledge because students must search for answers on their own. In most cases, that search results in a more meaningful connection to the lesson because they discovered the answers on their own in a way that made sense to them.

Third, the TCs came to understand their own need for a deeper understanding of game form knowledge. Some of the difficulty they experienced during their creation process was due to their own lack of game form knowledge, and as a result, many relied on their previous knowledge of other games that ultimately framed the design of their own game. When they made the connection to a game that was already in existence, they were then able to develop their own necessary rules, tactics, and scoring guidelines. Through this process, they gained a deeper appreciation of the importance of teaching these aspects of the game forms to their future students because they understood how difficult it was for them to grasp the concepts with preexisting knowledge. Rovegno et al. (1995) found similar results with their undergraduates' attempts to implement critical thinking and GC process with fourth grade students. In that study, journal entries revealed the frustrations of the TCs' efforts to teach the students how to design and modify games because they did not have the content knowledge of the game forms in the first place.

Finally, the TCs realized the need to teach their future secondary students how to communicate appropriately and solve conflict in a small group setting. The TCs who viewed the instructional strategy from the teacher's perspective positively identified the importance of not assuming that secondary students understand how to interact with one another in a small group setting. They explicitly suggested that if they were to implement this instructional strategy in their own practices, then they would need to take the time to not only outline the expectations, but also teach students what those expectations might look like. Only a couple of groups identified communication problems within their own group, but all of them could view communication problems as a possible barrier to the success of the unit. Dyson and Rubin (2003) suggested that when teachers first introduce the idea of cooperative learning, they need to clarify the expectations, purpose, procedures, and roles involved in the lesson. If fostered properly, cooperative learning environments could yield gains in not only psychomotor skills but also affective learning (Dyson, 2001). Students must be taught how to work cooperatively and cautioned that just because students are assigned roles does not necessarily mean they understand how to work together. Teachers should directly intervene if a disagreement becomes disrespectful or digresses to a point where productivity ceases (Hastie, 2010).

Implications for Teacher Education

This study revealed three significant implications that should be considered for practitioners of PETE. The first issue raised as a result of this study was program timing. Higher education faculty should examine when to introduce students to the instructional strategy to maximize impact for learning from the teacher's perspective. Student enrollment in the course took place early in their plan of study, and as a result, the TCs who did not have prior experience working with children had trouble viewing the GC process from the teacher's perspective. Instead, they thought about implementation of the unit from the student's perspective, identifying only barriers that might occur (e.g., boredom) and failed to understand the teacher's responsibility in creating a learning environment that would be conducive to student learning. If TCs were introduced to this instructional strategy later in their plan of study after they have had an opportunity to increase their pedagogical content knowledge, they might be more likely to view the benefits of GC from the teacher's perspective.

Second, PETE faculty should provide opportunities to learn and experience the instructional strategy through developmentally appropriate decision-making processes (e.g., articles, quizzes, guidelines). By using various approaches to teach the content, PETE faculty allow the TCs to receive a blend of the theory (through the use of articles) and practice (hands-on experience using set guidelines). This blend may provide the TCs the opportunity to put theory into practice and formulate a deeper cognitive understanding of not only their self-designed game but also the pedagogical content knowledge that is needed to implement the instructional strategy. The TCs' understanding may ultimately be developed by putting the theory to practice and discussing issues that might arise as a result. Formative assessments (quizzes) enable the teacher to identify students who are struggling to understand the concepts and content.

Third, effective modeling of GC instructional strategy can impact the TCs' decisions to use the strategy in the future. The majority of the TCs in this study expressed their intention to use this instructional strategy in their future teachings. By experiencing GC in an authentic situation, as student learners, the TCs were able to observe their professor's teaching behaviors while constructing a deeper understanding of the tactics and strategies through designing and implementing their game. They also gained valuable experience communicating their opinions, solving conflict, and working together in a small group environment, which gave them additional insight into the importance of teaching their future students how to interact appropriately in a small group setting.

Conclusion

In conclusion, the findings of this study show that TCs consider GC to be an effective instructional strategy that may provide secondary physical education students with opportunities to socially construct their own knowledge through practicing constructivist learning. TCs recognize that GC requires a depth of understanding in both understanding and application of a variety of game forms prior to assigning students to undertake GC. Furthermore, this study gives higher education PETE faculty valuable insight on when to introduce various instructional strategies to maximize the potential for the TCs to view the strategies from the teacher's perspective. In this study, because the course occurred toward the beginning of the TCs' plan of study, some TCs failed to obtain that critical outlook. Future studies could be conducted with undergraduate TCs who are

further along in their program of study to examine whether they have adopted the teacher's perspective with regard to the instructional strategies that are introduced later in the program or whether they still possess the student's outlook.

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