Original Article

An evaluation of teachers' knowledge and use of physical education instructional models

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Abstract:

One of the factors that constitute qualified physical education (PE) teachers is the knowledge of pedagogical skills and different methods of instruction (Napper-Owen, Marston, Van Volkingburg, Afeman, & Brewer, 2008). Metzler (2005) identified eight instructional models (IM) that are used for teaching PE. The aim of this study was to investigate PE teachers', in the state of Tennessee, knowledge, usage, attitudes towards, and future intention to implement an IM. An electronic questionnaire designed to measure topics related to IMs, was delivered to all PE teachers in the state of Tennessee. A total of 51 surveys (female=29; male=22; average age=40.92 years) were collected. The majority of participants taught elementary (72%) followed by high school (16%) and middle (12%). Quantitative data was analyzed to provide statistical values (e.g. means, standards deviation, etc.) for responses provided. Results revealed that teachers were most knowledgeable with DI (DI) (M=4.32[.71]), Teaching Personal and Social Responsibility (TPSR) (M=4.02[.93]), and Cooperative Learning (M=4.00[.98]). Teachers were least knowledgeable with Personalized System of Instruction (PSI) (M=2.76[1.18]). Teachers identified their highest usage with DI (M=4.50[.69]) and lowest usage with PSI (M=3.11[1.2]). They also stated that they used DI 78% of the time when teaching PE. Managerial control and time management were the overwhelming reasons for using DI as their primary model of instruction. These same teachers believed using multiple IMs was important (M=4.00[.82]). Teachers who used more than one IM stated that it provided an opportunity to reach all learners. Finally, all participants believed it would be beneficial to learn more about how to implement other IMs (M=3.91[1.04]). This study provides evidence that PE teachers are knowledgeable of multiple IMs. However, many teachers choose to teach using the DI approach. Regardless, most teachers expressed an interest in learning more about IMs and future implementation.

Keywords: physical education, instructional models, instruction

Introduction

Facilitate learning. However, the processes underlying facilitation of the teaching-learning relationship can be complex. Therefore, the examination of teaching effectiveness within physical education (PE) remains an important focus. A goal of teachers is to develop competency in students so regular participation in physical activity may occur. PE has been recognized as a primary source for positively impacting children's physical activity behavior and promoting lifelong activity habits (Morgan, Beighle, & Pangrazi, 2007). However, learning styles, motivational levels, and abilities of students are varied (Sallis, Prochaska, & Taylor, 2000). To assist students towards becoming physically literate people, highly qualified PE teachers will be needed. One of the factors that constitute a qualified teacher is the knowledge of pedagogical skills to deliver a variety of teaching methods to help maximize the learning achievements of their students (Napper-Owen et al., 2008). Within the area of PE, Kulinna and Cothran (2003) suggested that an effective approach to pedagogical practice is to use a number of different teaching styles.

For the past two decades, model-based instruction has been used by PE teachers. Metzler (2005) identified eight IMs that at the present time are the most commonly used in PE. Each model was established and shaped by original authors of the model and early contributors. Some of these models include Sport Education (Siedentop, 1994), Teaching Personal and Social Responsibility (Hellison, 1984), and Tactical Games Approach (Griffin, Mitchell, & Oslin, 1997). Other models include Cooperative Learning (Grineski, 1996), Peer Teaching, Direct Instruction, and Inquiry Teaching. The intent of each model is to promote learning outcomes for students and to address the national standards for PE (Gurvitch & Metzler, 2013).

Teachers are likely to determine their own methods of teaching based on personal experience and the influence of other teachers. Certain methods may be more compatible for an individual and by consequence may be more preferred. PE teachers usually choose DI because it is more familiar to them; it is the way that they were taught (Gurvitch, Lund, & Metzler, 2008). Regardless, teachers have the opportunity to implement a variety of IMs in their PE programs. If implementation occurs, teachers will have more opportunity to develop the range of

student learning that is desired through our national standards (Gurvitch et al., 2008). Each IM has a theme that can be communicated to students, provides specifications of learning domain priorities within each unit and a student guide for decision making and responsibilities. The following paragraphs provide research support for evidence-based practice of each IM. DI is characterized by teacher-controlled decisions and teacher-directed engagement patterns for learners (Metzler, 2011). Edwards and Lee (1985) argued that DI has been widely promoted as an effective teaching approach in PE. The authors found that through DI and cuing, in learning a novel task students exhibited consistent improvement in a PE setting. School-based research has generally been supportive of DI for improving motor skills (Goldberger, Gerney, & Chamberlain, 1982) and for achieving fitness goals (Taggart, 1985). However, one must account for the lack of recent positive research findings for the DI approach. Hellison's (2003) TPSR model promotes multicultural perspectives in teaching PE, with one of its main objectives; helping students to understand and respect differences among people in physical activity settings. Sport Education (Siedentop, 1994) promotes student ownership, decision making opportunities, enhanced skill development, and positive social interactions that potentially increase students' levels of overall need satisfaction and promote physical self-concept. In their review of Sport Education research, Hastie, Martínez, and Calderón (2011) provide strong evidence of the benefits of the model in PE.

PSI offers an alternative approach to PE teaching and learning at the middle and high school level. The model allows students to progress through a sequence of tasks in a learning module at their own pace. The model is based on a unified plan, meaning that there are not daily lesson plans; instead, students pick up where they left off in the unit (Metzler, 2011). Because not all students learn at the same pace, this model offers students the chance to work at a pace that is more conducive to their individual needs (Hannon, Holt, & Hatten, 2008).

The Cooperative Learning model offers a set of teaching strategies centered on student learning teams. Teams stay together for an entire unit where they work to achieve a goal (Metzler, 2011). Dyson (2001) argued that by incorporating cooperative learning in PE, students and teachers gained many of the intended benefits of the model. The students worked together, learned together, and helped each other learn. Cooperative Learning can be a powerful IM for students to attain both motor skills and social goals in PE. In a peer teaching format, students analyze their partner's performance and give feedback based on what they observed. Peer Teaching takes the idea of students-teaching-students and applies it to a structured learning environment (Metzler, 2011). In this teaching style, objectives from the social (peer interaction), cognitive (analysis of movement), and motor (skill performance) domains are met (Byra, 2006).

The center of the Inquiry Teaching model is question-based learning; meaning that students are asked questions and must think for themselves, often expressing that answer in some form of movement. The Inquiry Teaching model is based on a number of recognizable cognitive learning theories. Question based teaching has emerged as a primary strategy in PE (Metzler, 2011). Inquiry Teaching is less teacher-centered and more learner-centered as the problem solver of questions framed by the teacher. Students arrive at their learning outcome via different routes where the teacher serves as a guide (Cothran & Kulinna, 2008). Griffin, Mitchell, and Oslin (1997) introduced the Tactical Games model as a way to improve student sport experiences in PE. The Tactical Games model uses student interest in the game structure to promote skill development and tactical knowledge needed for competent game performance. Instead of viewing games as a culminating event during a sports unit, the Tactical Games model prioritizes learning through small-sided games and encourages students to solve common tactical problems occurring during modified/conditioned game situations (Mitchell & Griffin, 1994).

Strand and Bender (2011) conducted a study of appropriate practices focused on the knowledge and usage of instructional strategies in K-12 PE programs. PE teachers participated by completing a survey addressing both knowledge and usage of appropriate and inappropriate practices in PE. Findings indicated that (1) teachers were knowledgeable of appropriate and inappropriate practices in PE, (2) there was a significant connection between PE teacher's knowledge responses and how often they used the instructional strategy, and (3) if a teacher believed that a strategy was appropriate, he or she would be more likely to use that instructional strategy. Cothran and Kulinna, (2008) found that teachers had some knowledge on how to use and implement different IMs. However, data revealed that DI was the model most used by PE teachers. The decision to use other models depended on three factors: control, time, and knowledge. Research suggests that PE teachers need to move from teacher centered methods of instruction and incorporate more indirect, student centered instructional strategies (Curtner-Smith, Todorovich, McCaughy, & Lacon, 2001).

In order to have appropriate knowledge with the eight different IMs, Physical Education Teacher Education (PETE) programs need to provide future teachers with knowledge and practice to achieve effective implementation due to the limited experience of many PE teachers (Jenkins, 2004). Findings have demonstrated that individuals with a high interest in a knowledge domain are likely to continue to acquire additional knowledge because they are naturally drawn to the subject and willing to spend more time and effort on knowing more about the subject (Tobias, 1994). Kirk (2002) suggests that, if quality PE is our goal, then teachers must scrutinize what currently goes on in the name of PE practices.

Therefore, the purpose of this study was to investigate PE teachers', in the state of Tennessee, knowledge, usage, attitudes towards, and future intention to implement an IM. The results from this study can provide PETE faculty the opportunity to evaluate their programs and structure methodologies to better educate and create interest among future PE teachers about IMs and how to include them in a school program. Based on

the current PE national standards (SHAPE, 2014), the variety of learning outcomes in each learning domain suggests that the use of different IMs in PE can potentially foster student development which can lead to student learning. If a teacher is consistent in their choice of instruction, there is the potential that some of the standards, and consequently student learning, may not be achieved (Gurvitch, & Metzler, 2010).

Method

Participants

An electronic questionnaire designed to measure topics related to IMs, was delivered to all PE teachers in the state of Tennessee. A total of 51 surveys (female=29; male=22; average age=40.92 years) were collected. The majority of participants taught elementary (72%) followed by high school (16%) and middle school (12%). A total of 40 participants received their undergraduate degree in PE. A total of 28 participants had received an advanced college degree, with only 10 receiving a degree in the field of PE. Table I provides a description of the participant's demographic information.

Table 1. Participants demographic data

Age	Gender		Current Teaching			Physical Education Degree				
			K-5	6-8	9-12	Undergraduate	Master PE	Non	EdS/EdD/PhD PE	Non
20 - 30	Female	10	6	2	2	9		1		1
	Male	1	0	1	0	1				
31 - 40	Female	8	7	0	1	5	2	3		
	Male	9	8	1	0	6	1	2	1	1
41 - 50	Female	4	4	0	0	3	1	1		1
	Male	6	4	0	2	4	2	2		
51 - 63	Female	7	4	1	2	7	2	4		
	Male	5	3	1	1	5	1	2		
Total	Female	29	21	3	5	24	5	9	0	2
	Male	21	15	3	3	16	4	6	1	1

Instrumentation and Procedure

Each participant received an invitation to participate in the study. Those who elected to participate completed an electronic survey designed to measure topics related to IMs. Prior to the survey being delivered, three experts in the field of physical education examined the survey to help achieve face and content validity. A deadline was given and subsequent reminder email notifications were sent to all participants who failed to submit a completed questionnaire at that point in time. Demographic information was obtained from all participants to assist with the categorization of results.

Phase I consisted of questions about their content knowledge. A 5-point scale was used to categorize the participants' responses: (1) *poor*, (2) *fair*, (3) *average*, (4) *good*, and (5) *excellent*. Participants responded to questions about their current knowledge of each IM. A brief description was provided for each IM (Metzler, 2011). Following the procedures of Gurvitch and Blankenship (2008), participants were then asked to rate their usage of the IMs. A 5-point scale was used to categorize their responses: (1) *never*, (2) *rarely*, (3) *every once in a while*, (4) *sometimes*, or (5) *almost always*. A follow up question asked participants to describe how the model was used in their program for the IMs that they used 'sometimes' or 'almost always'. Once the use of IMs had been verified, participants were then directed to the next phase of the questionnaire.

Phase II consisted of two routes: (1) teachers that use DI most of the time and (2) teachers who currently were using more than one IM. Route one asked participants open ended questions to describe their reasons for using DI and whether they believed it to be important to implement different IMs. Route two asked participants to describe their reasons for using multiple IMs and whether they believed this approach led to improving student learning. All participants were asked if they would be interested in a workshop to learn more about implementing multiple IMs. The following scale was used for each quantitative question in route two (1) *strongly disagree*, (2) *disagree*, (3) *neither agree or disagree*, (4) *agree*, (5) *strongly agree*.

Protection of the Human Subject Approval was obtained from the Institutional Review Board (IRB) of the university from which the study was conducted and a consent form for each participant was required before starting the survey. All data were downloaded to the investigators computer for analysis. For individual data, participant name identification was not recorded. Thus, there is no way to link the data used for analysis to any participant.

Data Analysis Quantitative data was analyzed to provide statistical values (e.g. means, standard deviation, etc.) for responses provided. Qualitative data were analyzed using a constant comparison method (Lincoln & Guba, 1985). Key words were selected and common themes were generated based on the responses to the question.

Results

Quantitative results revealed that participants knowledge was strong for DI ($M=4.32[0.71]$), TPSR ($M=4.02[0.93]$), and cooperative learning ($M=4.00[0.98]$). Participants knowledge was weakest for inquiry teaching ($M=3.08[1.29]$) and PSI ($M=2.76[1.18]$). Participants usage of IMs was strong for DI ($M=4.50[0.69]$), cooperative learning ($M=4.28[0.81]$) and TPSR ($M=4.15[1.03]$). IMs used the least were Personalized System

for Instruction ($M=3.11[1.20]$) and Tactical Games ($M=3.13[1.26]$). Table II displays participants' knowledge of each IM while Table III exhibits participants' usage of each IM.

Table 2. Participants knowledge of instructional models

Instructional Model	Percentage of Responses				Mean	Standard Deviation
	Poor	Fair	Average	Good		
Direct Instruction	0	2	8	46	44	4.32
Personalized System for Instruction	14	31	31	14	10	2.76
Cooperative Learning	2	6	16	41	35	4.00
Sport Education	10	13	15	27	35	3.65
Peer Teaching	4	13	25	33	25	3.63
Inquiry Teaching	13	23	25	23	17	3.08
Tactical Games	4	8	17	44	27	3.81
Teaching Personal and Social Responsibility	0	8	17	40	35	4.02

Qualitative data provided some valuable results. An interesting finding was that teachers described using different IM's in small increments during a school year. For example, one teacher stated

'I always use Sport Education for volleyball, basketball, and soccer. Tactical Games are used so that they learn to play offense and defense and think about what might happen next. Early in the year I use Cooperative Learning to learn who works well together and who doesn't. This helps me see who emerges as a leader and who follows. I use DI every day when first introducing our topic for the day.'

Another teacher mentioned, *'for Cooperative Learning, each of my classes have their own team names and they work together to lead their warm-ups and cool downs'*. While using the model in small increments may be beneficial, most research has focused on the full implementation of the model.

The majority of teachers stated that they used DI as their primary IM for teaching PE (78%). Teachers identified three primary reasons for using DI as their preferred IM; Managerial control, time management, and previous experiences with teaching. One teacher stated *'This is what I am most comfortable with. It doesn't take much planning time and I feel I have lots of control over the class.'* Another teacher shared *'DI is a method that I am familiar with and a way that I feel confident in teaching. I think that presenting the information to the students up front will help minimize behavior issues, questions regarding game play, etc.'* These same teachers believed using multiple IMs was important ($M=4.00[.82]$).

Teachers who used more than one IM stated that it provided an opportunity to reach all learners due to the differences in learning styles. One teacher stated

'I use multiple IMs because not every child learns the same way... I try to reach each type of learner. I want to challenge those that are higher level students and bring up the ones that are lower level students. By hitting on more than one IM, I can reach and help more students develop.'

Finally, all participants believed it would be beneficial to implement multiple IMs to help with student learning ($M=4.11[0.76]$). They also expressed an interest in attending workshops to learn more about the implementation of IMs. ($M=3.91[1.04]$).

Discussion

The purpose of this study was to investigate PE teachers' knowledge and use of IMs. Metzler (2011) states that each IM:

'describes a unique way, or a "blueprint," for a teacher to follow to help PE students in the learning process. Each model also calls for its own set of decisions, plans, and actions by the teacher and students. The most effective teachers will know how to use a number of IMs and understand which model to use for each unit of instruction, depending on learning outcomes, domains, student readiness, and content' (p. 10).

Therefore, we can say that an IM is a method of instruction in PE that requires pedagogical and instructional skill to be implemented. Results from this study revealed that PE teachers have an above average knowledge of each IM with the exception of PSI. Participants also revealed that, on average, they use each IM 'every once in a while' during a typical year of instruction. Metzler (2011) argues that it has been recognized, at least since the publication of Muska Mosston's work on teaching styles in the mid-1960s (Mosston & Ashworth, 1990), that there is no one best way to teach PE. Metzler suggests that PE, with its broad-ranging and diverse content, presents complex challenges to teachers. This complexity suggests that there is a need for multiple models of practice. He argues that by using different models of instruction, a number of benefits accrue. For example, program planning and coherence can be improved, learning domain priorities (cognitive, physical, and affective) can be more clearly identified, and an instructional theme identified for each model. These benefits in turn assist the management of teachers' and students' expectations of a unit of work and because outcomes are primary considerations in planning, the use of a variety of IMs permits the valid assessment and verification of learning (Haerens, Kirk, Cardon, & De Bourdeaudhuij, 2011). For this to occur, high quality instruction of PE should be emphasized with future teachers. One of the factors that constitute qualified PE teachers is the knowledge of pedagogical skills and different methods of instruction (Napper-Owen et al., 2008). This study demonstrated that PE teachers have knowledge of all IMs presented by Metzler. However, there is an

opportunity for this knowledge to be expanded to assist with PE instruction. If we want highly qualified PE teachers and hence assist students towards becoming physically literate people, a vast knowledge of a variety of IMs would be necessary. These results indicate that there is a connection between PE teacher's knowledge and usage of the IMs and the need to incorporate and implement a variety of IMs in PE classes. If PE teachers incorporate variety in their instructional methods they will have more opportunity to develop the range of student learning that is desired through our national standards (Gurvitch et al., 2008). The challenge for PETE faculty will be to determine how to best incorporate the learning of IMs into their already full curriculum. Furthermore, more research is needed to determine if it is advantageous to devote large amounts of time preparing teachers to incorporate each model, compared to focusing on just a few. When asked about the use of the DI model (e.g. option 1: 50% of the time or more, option 2: less than 50% of the time), data showed that 78% of the participants used DI model most of the time. Surprisingly, most of these participants believed that it would be beneficial to implement different IMs in their PE program ($M=4.00[0.82]$). PE teachers usually choose DI model because it is more familiar to them (Gurvitch, Lund, & Metzler, 2008). The current study shows that factors such as managerial control, time management, and previous experiences with teaching are the reasons for PE teachers to use DI the majority of the time. These data suggest that university PETE faculty evaluate and structure their program to provide future and current PE teachers broad knowledge about IMs and how to include them in a school program. Additionally, focus should be placed on highlighting the benefits of each model and how it can enhance student learning. Participants also expressed an interest in attending a workshop to learn more about IMs ($M=3.91[1.04]$). Any number of reasons may explain this interest. Tobias (1994) argued that people with a high interest in a knowledge domain are likely to pursue additional knowledge and that they are willing to spend more time and effort acquiring knowledge about the subject. Workshops have the potential to provide knowledge, develop effective instructional strategies, and help teachers to implement different methods of instruction. Ko (2006) stated that the greatest difficulty in implementing an IM occurred between planning and the actual implementation of the model. Although knowledge of the IM could be strong, encountering problems during the implementation process may encourage teachers to revert back to previous methods. Sinelnikov (2009) discovered that professional development was effective if teachers had an opportunity to observe a sample lesson, received continuous feedback, and was mentored through the implementation process. This triggers the question of what administrators (e.g. principals) in schools and PETE faculty can do towards providing training for teachers that will cultivate teaching skills. Finding a solution has the potential to impact teacher effectiveness and thus, student learning. This study was not without limitations. Although the survey was delivered to school districts throughout the state, only 50 current PE teachers completed the survey. This number represents a small percentage of PE teachers in the state of Tennessee. The study found that PSI was used 'every once in a while' ($M=3.11[1.20]$) by the participants. This result is controversial because previous research have found that descriptions of the use of PSI in PE are limited (Hannon, Holt, & Hatten, 2008). Additionally, this model is recommended for middle school and high school levels (Metzler, 2011) and 72% of the participants of this current study were elementary PE teachers. For future studies, a more detailed description, along with a video example of the model should be provided since the interpretation of IMs can be misunderstood. After viewing the video, key benchmarks would appear for each model chosen for participants to verify their implementation in their program. In addition, a brief example of how the model can be implemented in PE will be provided to assist with understanding. Although the current study provided a good description of each IM, this approach will only strengthen their understanding of each model. Finally, 72% of the participants taught elementary PE. Future studies should focus on providing a better understanding of instructional practices implemented by PE teachers from all grade levels.

Conclusion/Practical Application

This study provides evidence that PE teachers are knowledgeable of multiple IMs. Teachers use DI the majority of the time in their PE classes despite literature that supports the use of multiple IMs. The future direction of research should emphasize determining how all teachers teach PE. Currently, there is a lack of research on teacher's use of IMs for teaching PE. PETE faculties are limited in their available instructional time to provide future teachers with an in-depth understanding of each model and its full implementation. Examining quality PE programs and understanding the instructional approach used to maximize student learning can provide a template for PETE programs to improve teacher preparation. Finally, based on participant's interest in learning about and implementing multiple IMs, PETE faculty can offer workshops to educate teachers on IMs, thus expanding their pedagogical capacity. In addition, mentoring relationships can be established so that the learning goes beyond the classroom and student learning can be reinforced as they enter the workforce.

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