Original Article

A different way of “Looking” at Physical Education Assessment: Utilization of mental imagery by physical education teachers

NATHAN HALL^{1*}, CLIVE HICKSON², NANCY MELNYCHUK², AND DANIELLE TOBIN³

¹ Faculty of Education, University of Winnipeg, Winnipeg, Manitoba, CANADA

^{2,3} Faculty of Education, University of Alberta, Edmonton, Alberta, CANADA

⁴ School of Kinesiology, Western University, London, Ontario, CANADA

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Abstract

Problem Statement The appropriate use of assessment is a major issue for both in-service and pre-service physical education (PE) teachers. Part of the issue that PE teachers face specific challenges that are unique to the discipline of PE, and to effectively assess students in PE takes careful consideration of many different variables. Consequently, it is important to develop a clear understanding of what skills a PE teacher can utilize to assist them when conducting student assessment. One skill that some PE teachers could use is mental imagery, but to date, there has been minimal research related to the use of mental imagery by PE teachers. **Approach** A purposive sample of highly experienced PE teachers (n=15) who presently taught PE at the middle or secondary school level was attained. Semi-structured one-on-one interviews were conducted with each participant to investigate their usage of mental imagery to assist with assessment practices. **Purpose** The purpose of this study was to establish whether or not physical education (PE) teachers use mental imagery to assist with their assessment practices, and if so, what does this mental imagery use look like. **Results** The results demonstrated that all of the PE teachers engaged in this study indicated use of mental imagery to assist with assessment practices. Specifically, the participants most commonly reported using mental imagery related to assessment as an aid for providing effective feedback and correction, as well as to help with grading. **Conclusions** Due to the findings in the present study that highly experienced PE teachers find beneficial uses for mental imagery in relation to many different facets of their assessment practices, it would be valuable to provide dedicated education to all PE teachers (especially pre-service or early career) around the potential uses of mental imagery and various strategies for that usage when it comes to assessment practices.

Keywords: Pedagogy; Teaching; Evaluation; Feedback

Introduction

Collier (2011) suggested that when it comes to PE, “assessment is an integral part of the teaching and learning process” (P. 39). As a central part of teaching and learning (Grout & Long, 2009; Hortigüela, 2016), physical education teacher education (PETE) programs consistently address the issue of assessment. The perceived importance of this behaviour by physical educators has been demonstrated by the fact that it is regularly the focus of entire chapters in PETE text books (e.g., Capel & Whitehead, 2015; Gledzie et al., 2018; Robinson & Randall, 2013), and there are entire text books dedicated to this specific behaviour and its use in teaching PE (e.g., Carroll, 1994; Hay & Penney, 2009; Lacy & Williams, 2018; Schiemer, 2000). However, it has been suggested that historically assessment in PE has, for the most part, not been done very effectively (Carroll, 1994) and that appropriate use of assessment is one of the great struggles for both in-service and pre-service PE teachers (Dinan-Thompson, 2013; Starck et al., 2018). Furthermore, there are those who would suggest that a lack of effective assessment in PE is one of the main limitations to PE being truly valued or supported as a school subject (Henninger & Carlson, 2011; MacPhail & Halbert, 2010). Part of the struggle is that there are many challenges that PE teachers face when it comes to assessment, and to effectively assess students in PE takes careful consideration of many different variables (Lund & Kirk, 2010; Starck et al., 2018). Consequently, it is important to develop a clear understanding of what skills a PE teacher can utilize to assist them when conducting student assessment. One skill that some PE teachers could be using is mental imagery.

Mental imagery has been defined as a volitional process where an individual uses any or all of the senses to create or re-create an experience in the mind (Vealey & Greenleaf, 2001). Mawer (1995) indicated that PE teachers could potentially use mental imagery to aid in assessment. Hall and Fishburne (2010) supported this belief when they suggested that mental imagery is a skill that PE teachers could be using to assist with various teaching related responsibilities, including assessment. However, unlike some easily recognizable skills that are related to assessment performed by PE teachers (e.g., communication skills when providing feedback), cognitive

skills such as mental imagery may be less obvious. Identifying these less obvious skills and increasing our knowledge of how they are used could prove very beneficial for PE teachers and researchers.

Similar to other curriculum areas, the primary goal of assessment in PE is to enhance student learning (Dinan-Thompson & Penney, 2015). Assessment should be ongoing and integrated with instruction (Hay & Penney, 2009; Kniffin & Baert, 2015) so that we cannot “tell where instruction ends and assessment begins” (Lambert, 1999, p. 12). Assessment in PE has commonly been separated into two categories, formative assessment, and summative assessment. Formative assessments by PE teachers refers to assessments used during interaction with students to help assess if the students are progressing towards the lesson goals, and can include performance diagnosis, feedback, and confirmation or correction (Carroll, 1994; Fishburne, 2005; Robinson & Randall, 2014). This type of assessment is very useful when it comes to improving student performance, but it is also of particular value to teachers themselves (Ní Chróinín & Cosgrave, 2013). This is because formative assessment plays a major role in allowing teachers to modify their teaching and lesson objectives to meet the needs of the students (Rink, 2010). Alternatively, summative assessments by PE teachers refers to assessments that sum up a student’s performance(s) or individual level of achievement at the end of an instructional activity (Carroll, 1994; Fishburne, 2005; Robinson & Randall, 2014). The information collected as summative assessment is typically used to appraise achievement and to compare students to established standards or to other students. As PE teachers’ accountability for student success has increased, summative assessment has become an important part of establishing the degree to which PE programs are doing what they are intended to do for students (Rink, 2010) and meet curriculum goals and standards.

Collier (2011) argued that assessment provides critical support to the academic validity of PE, however, also acknowledged and questioned why assessments in PE aren’t prepared and completed effectively. Exposing PE teachers to various skills that can possibly help them complete assessments and do so more effectively or accurately is therefore of increasing interest. Although mental imagery has been suggested as a skill that could assist PE teachers with assessment (Hall & Fishburne, 2010; Mawer, 1995) to date no research has been conducted to confirm that this is the case. Therefore, the purpose of the present study was to establish whether or not PE teachers use mental imagery to assist with their assessment practices and if so for what specific aspects of assessment are they using mental imagery and what does this mental imagery look like.

Materials and Methods

Participants

A purposive sample was sought in which potential participants were identified by set criteria designed to obtain an information rich sample with the ability to provide data from which a great deal can be learned (Palinkas et al., 2015; Tong & Craig, 2019). The goal of this descriptive based research was not to make generalized statements about the experiences of all participants but to describe and illustrate to those unfamiliar with the setting what is typical among PE teachers with regards to using mental imagery to assist with assessment practices (Patton, 2002). The criteria for participants included: a) must be presently teaching PE or have taught it in their most recent term; b) must have experience teaching PE for at least one full year; and finally c) must teach PE to students in a grade between 7 and 12. In addition, as the sample grew participants were purposefully sought to provide diversity in the social and demographical contexts which are representative of teacher and school characteristics (i.e., participant gender, grades they were teaching, gender(s) of students taught, school districts, coaching responsibilities) (Mertens, 2014).

As qualitative methodology was utilized, there was no formal calculation for sample size. Guest et al. (2006) concluded that when investigating a relatively homogenous purposive sample, after twelve interviews 97% of the possible themes are attained. However, we continued to increase the sample until we felt that theoretical saturation was reached (Smith & Sparkes, 2016). To this end, the final sample was composed of fifteen PE teachers (7 male and 8 females). They ranged in years of experience from 2 – 32 and represented four different school districts across two different provinces in Canada. The sample varied in the gender they taught, with most teaching a combination of mixed and single gender classes. Seven of the participants were presently teaching PE to students in Grades 7 – 9, and the other eight participants were teaching PE to students in Grades 10 – 12. Of the fifteen participants 11 indicated that they were also coaching a school sport.

Procedures

A provincial PE teachers’ organization helped to identify potential participants that would fit the criteria. The primary source of data for this research came from the PE teachers’ perspectives shared with the researcher during one-on-one semi-structured interviews. One component of this interview was strictly focused on participants’ use of mental imagery to aid in assessment. In addition to the interview, all participants completed a short demographic questionnaire.

The interviews were conversational in nature and followed a general interview guide that had some specific key questions but was flexible in nature (Mason, 2017). Using semi-structured interviews not only allowed for flexibility during each interview, but also provided an opportunity for the addition of questions that arose from previous interviews or any ongoing data analysis (Ahlin, 2019). Interview questions were based on Paivio’s (1985) general analytic framework of mental imagery and a pilot study conducted with two PE teacher

specialists. Following some introductory and rapport building questions, the participants were provided a definition of mental imagery and asked more specific questions regarding their understanding of mental imagery and their use of mental imagery in teaching PE in general. Specific questions were then asked to examine participant's perceptions regarding their use of mental imagery to assist with common PE teacher behaviours, including assessment (e.g., "PE teachers are known to complete assessment and evaluation in their classes. Could you discuss when you might have used mental imagery in relation to your assessment and evaluation in PE?"). Probes (e.g., "Could you talk me through a situation in which you used mental imagery to help with your assessment or evaluation?") were posed to clarify and seek elaboration of participants' responses as suggested by Bhattacharya (2017). The specific probes were designed to help develop a deeper understanding of PE teachers' perceptions regarding why they used mental imagery to aid in assessment, and their specific experiences relating to what and who they image.

Data Analysis Process

In a basic qualitative study of this nature, analysis of the data involves identification of recurring patterns that characterize the data and are supported by the data from which they are derived (Merriam & Tisdell, 2016). Early data analysis and generation of themes was performed even before all the data was collected (Bogdan & Biklen, 2007; Mertens, 2014; Smith & Sparkes, 2016). Writing research notes and reflecting on each interview, as well as transcribing the interviews helped to build up an overall sense of the data and the potential themes that were emerging. The coding categorization process was conducted independently by two different researchers to increase credibility of the research (Patton, 2002). Open coding (Corbin & Strauss, 2014) and constant comparative analysis (Mertens, 2014) was used to help assign themes or sub-themes, at differing levels of abstraction, to the meaning units identified in the transcripts. This process was continued until no new themes or sub-themes were emerging, thus indicating that theoretical data saturation had been reached (Miles & Huberman, 1990; Smith & Sparkes, 2016). Following completion of the independent coding, the two researchers met with each other to compare identified themes, sub-themes, and specific meaning units. Through comparative analysis (Creswell, 2009) the two researchers ensured a more accurate interpretation of the data by discussing and reaching agreement upon identified themes, and sub-themes, and the specific meaning units that fit into these.

Results

Analysis of the data collected in this study suggested that there was an overall theme of using mental imagery to assist in assessment. Specifically, it was found that all fifteen of the participants in the study indicated some use of mental imagery to aid in their assessment. The specific sub-themes that the participants focused their dialogue on were using mental imagery to help with feedback and correction, employing mental imagery to help with grading, and who they specifically imaged to aid in their assessment behavior.

Feedback and Correction

Suggestions were made by 10 of the participants that when they are watching a student perform a skill they "... make comparisons..." in their head of how the student does the skill and how the skill should be done. Case in point, Participant 3 stated, that when watching students perform a skill "I am comparing them to what I look like in my head doing it and I have seen other people do. It either matches that or it doesn't". This was also illustrated in the following comments made by Participant 12 while talking about how they correct students' technique in volleyball:

You have to have imagery because you have to imagine what the perfect set or perfect underhand pass or bump looks like. So when I am looking at my students do it and say what is wrong, I can look and tell right away, you have your elbows pulled back when you are hitting on your hands. In my head that is wrong. It clicks right away because I know what it is supposed to look like.

In a similar line of thinking, 8 of the participants described using mental imagery to identify specific parts of a skill that a student may be performing wrong and using that image to help correct the skill performance. For example, Participant 10 made the following comment about the use of mental imagery to help provide performance feedback and correction:

I think the times where it gets me the most is if someone is doing something that is just kind of off and you can't quite put your finger on it. You think what are they doing in my head, what should they be doing, and trying to pick out that one small thing they have to change. If you don't know a skill too well it is like, how do I describe this? What does it have to look like?

Grading and Evaluating

Of the fifteen participants, 7 mentioned that they used mental imagery to help them grade a student or evaluate the quality of a student's performance. Participants 15 and 5 specified that they used mental imagery to help remember a student's performance after the fact as a means of establishing a grade (i.e., at the end of the week or unit). Participant 15 illustrated this use of mental imagery when providing the following insight:

For sure, yeah. I guess it comes in two ways. The first one is that skill mark. As I'm giving them their skill mark it's usually at the end of the week or sometimes, unfortunately, even a week later you go back and fill in those marks. So I'm visualizing in my head, ok what were this kid's skills like. Again, I'm trying to make it as objective as possible. I've got the criteria written out, so now it's kind of trying to match what this kid has shown me and try to fit them in there.

Participant 5 provided this perception regarding the use of imagery when establishing student's grades for reporting purposes:

I find when you are doing progress reports, writing comments, now the grade is done and you are writing comments about this individual, imagery is happening all the time. I am imagining how often can I remember him helping set up equipment, take down equipment, what is his attitude usually like, what is his approach, is he really positive, or just in the game in the moment. I try to imagine things to communicate to the parents. "This is what he is like, this is what we want to see improvement in".

There is really a lot. Each individual, the imagery starts happening and I really think about it.

However, this was only one way in which the participants reported using mental imagery in their grading and evaluating of students' performance.

Three of the PE teachers in the study described using mental imagery during the lesson to evaluate how good a students' performance was. For example, Participant 11 suggested that when watching a student complete a skill "I will have an image in my head of what it should look like. I will hold their image up to the image that I have in my mind". Additionally, Participant 1 provided the following insight about the use of mental imagery to help evaluate students' performance:

In terms of what my expectations are. You see what it should look like in your head and are they at that point. Are they excellent, proficient, adequate? Where are they in reference to my scale of what the skill should look like. That would be visualization because I know what it should look like. A kid here may be excellent and a kid here may be adequate.

Finally, 1 of the participants in the study (Participant 6) indicated the use of mental imagery to help plan for grading. This is demonstrated through the following description:

When I am starting something new, the hardest part is me thinking it through. Before I write anything down I work it all out in my head as to what I want, then even my assessment things when I change the percents to letters, thinking about what to include in each of the categories and how that is going to look when I mark it and what is actually going to come out.

Who Was Imaged?

When it comes to using mental imagery for assessment purposes it should come as no surprise that the participants all cited imagining their actual students. This was illustrated best by Participant 8 in the statement:

I am imagining how often I can remember him helping set up equipment, take down equipment, what is his attitude usually like, what is his approach, is he really positive, or just in the game in the moment. I try to imagine things to communicate to the parents.

On the other hand, for those participants that described using mental imagery to make comparisons to help provide feedback to students, they all indicated that they imagined someone who was good at the skill (not the student). This could be an expert or professional athlete as suggested by 4 of the participants, or it could be a mental image of themselves performing the skill as suggested by Participant 6 and Participant 9.

Discussion

Assessment is a central part of teaching and learning in general (Grout & Long, 2009), and is one of the most important behaviours of a PE teacher (Schiemer, 2000). Recently researchers have encouraged the development of assessment literacy among PE teachers (Leirhaug et al., 2016), and thus identifying skills that will aid PE teachers in assessment holds considerable value. The results from the present study appear to suggest that one of the skills PE teachers can use in various ways to assist with assessment is mental imagery. It was found that every one of the PE teachers who participated in the current research (independent of grade taught, gender, or years of teaching experience) indicated using mental imagery to aid in their assessment. Rink (2010) suggested there was an increasing focus on the importance of teachers' assessment in PE and the need for teachers to use all the skills available to them to be effective in their assessment of student achievement. This may have been one of the contributing factors behind the high frequency of imagery use among study participants when it came to assessment.

The participants focused their assessment related comments to using mental imagery as an aid for providing effective feedback and correction, as well as to help with grading. Furthermore, the participants provided interesting information regarding who it was that they mentally imaged when assessing students.

Feedback and Correction

Several of the study participants cited the use of mental imagery to help provide feedback and make corrections to students' performance. More specifically, several participants made suggestions like this one from Participant 11, "...for me to correct a kid, I think it is always the picture in my mind and then you compare it to

what they are doing...”. When it comes to providing effective feedback within a lesson, PE teachers rely heavily on visual observation (Barrett, 1983). However, it would seem likely in many cases that if a teacher wants to provide effective feedback and suggestions for corrections, just observing a student completing a physical skill is not enough. They would also need to be able to compare that visual of how the student is performing the skill to a visual of how the skill looks when performed correctly. Thus, it is not hard to see why imagery would be useful for PE teachers when it comes to providing feedback. This finding complements similar research on sport coaches and how they personally use mental imagery. Short et al., (2005) found that coaches most commonly reported using mental imagery to assist with performance and correction of physical skills. Mental imagery is ideal because it allows for immediate comparison between desired performance and actual performance, and consequently, can be used to develop feedback extremely quickly. It appears that for many of the physical educators in the present study this was exactly what they were doing. Hastie et al. (2012) suggested that “often, providing timely and individual feedback can be a challenge for physical educators due to teaching constraints” (p. 430). Mental imagery appears to be one tool some PE teachers use to help address this challenge.

Grading Student Performance

In the grading of student performance, some of the PE teachers in the study reported using mental imagery in a similar fashion (i.e., using mental imagery to make comparisons) to the way some participants used mental imagery to help provide feedback. For example, when grading a student performance during lessons, Participant 14 “... sees what it should look like in his head and are they at that point. Are they excellent, proficient, adequate?” As with the findings related to feedback and correction, using mental imagery as a means for making comparisons when grading is a logical use of this skill (i.e., mental imagery) when teaching PE. However, this was not the only reason for using mental imagery in grading that was cited by the participants in the present research.

A few of the physical educators in the current study indicated that they used mental imagery to help recall a student’s performance after the fact (i.e., at the end of the week or unit), as a means of establishing a grade. Researchers have demonstrated that using mental imagery to help remember something can be beneficial (Palladino & DeBeni, 2003; Pressley, 1976; Willis et al., 2006). This would seem particularly important if an individual (i.e., a PE teacher) is using their memory to grade student’s performance of a physical skill/task, such as the participants in the present study suggested. How could someone come up with a proper grade of a physical performance that happened in the past if their memory of that performance does not include a mental image of what it looked like? Hence, the fact that some participants in the present study discussed using mental imagery to help recall a student’s performance for the purpose of providing a grade was logical. In both of these cases, whether using mental imagery to help grade during a performance or to help prescribe a grade sometime after the performance, the ability of the PE teacher to develop a vivid and accurate image is likely vital to the accuracy of the grade. This is because the literature indicates that an individual’s imagery ability is positively associated with improved memory (Valentin & Wilding, 2013).

Who Participants Mentally Imaged When Assessing Students

One final interesting result had to do with who the PE teachers were mentally imaging when doing assessment. When the participants were describing using mental imagery to make comparisons to help provide feedback or establish a grade, they all suggested that they imagined someone who was good at the skill, such as an expert, professional athlete, or themselves if they were good at the skill being taught. This finding would appear to make logical sense considering the beneficial use of expert modelling to help with teaching physical skills is well documented in PE literature (Barzouka et al., 2015), and because, in the majority of situations, if a physical educator wants to compare performances of a physical skill they need a correct or high-quality performance to make the comparison against. This seems to agree with other mental imagery related literature that indicates when athletes and coaches use mental imagery they typically image those who are highly skilled (Munroe et al., 2000; Overby et al., 1998). Consequently, this finding supports the idea that when using mental imagery to make a comparison, the preference would be for a mental image of someone who performs the skill properly. This would suggest that it is valuable for PE teachers to attain visual images of highly skilled and effective skill performers so that when the time comes to assess student skill performance they have a quality mental image to compare to.

As for the PE teachers who were using mental imagery when grading to help recall a student’s performance of a specific skill, these individuals were all imaging the student. This was not surprising since the grading of a student’s performance after the fact would obviously require the teacher to mentally image that specific student. However, this does lead to the question of “how effective is the PE teacher at recreating an accurate image of specific student performances?” In recent years research with athletes has focused more closely on imagery ability (Cumming et al., 2017; Mendes et al., 2015; Rymal & Ste-Marie, 2017; Watt et al., 2018) and it would seem that this would also be important for PE teachers. If these teachers are relying on mental imagery to help assess student performances, sometimes well after the actual performances have occurred, the ability of those teachers to accurately recreate images could have a drastic influence on the precision of such assessments.

Conclusion

It has been found that mental imagery is employed by coaches (Overby et al., 1998), musicians (Gregg, Clark, & Hall, 2008), surgeons (Edwards et al., 2005) and other professionals (e.g., Dahl et al., 1999; Mendes et al., 2015; Whetstone, 1996) to help with the performance of the specific tasks that are part of their day-to-day professional responsibilities. It has been suggested that PE teachers could also use mental imagery (Hall & Fishburne, 2010) and specifically as a skill to assist PE teachers with assessment of motor skill performance (Mawer, 1995). The results from the present study demonstrated that in-service PE teachers are already using mental imagery to help with assessment, and for many of them it is not only for assessment of motor skill performance but for several facets of their assessment practices. This would suggest that it would be beneficial when teaching pre-service PE teachers about assessment to discuss the potential uses of mental imagery and various strategies for that usage (e.g., imaging experts for performance comparison purposes). Furthermore, because research and applied work on mental imagery training indicates that imagery skills are something that can be improved (Morris et al., 2005), and because the results of the present study indicated that many PE teachers are not using mental imagery in as many ways as they could to assist with their assessment practices, professional development opportunities that focus on using mental imagery to assist with various aspects of assessment could be valuable for PE teachers.

Because the present study only looked at a small sample of PE teachers, future quantitative research should be conducted to not only examine the extent of mental imagery use for assessment among a more generalizable sample of PE teachers but also to help examine how various teacher characteristics (e.g., years of experience; grade taught) might be associated with the use of mental imagery to aid assessment. Additionally, to help establish the value of mental imagery as an aid to assessment practices, the effectiveness of mental imagery to assist PE teachers with completing various assessment practices should be examined through intervention studies.

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