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**What were you thinking?**

**A methodological approach for exploring decision-making and learning in physical education.**

Journal: Sport, Education and Society

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**Abstract**

The broad purpose of this paper is to consider the relationship between decision-making and learning. Specifically, our aim is to propose a methodology that provides a theoretical framing along with procedures for investigating this relationship in Physical Education (PE). By utilizing selected parts of John Dewey's educational theories, the paper presents a theoretical exposition of decision-making as an individual process containing both 'practical' and 'cognitive' aspects. By combining this theoretical conceptualization with a description of concrete research methods, the paper proposes a methodological approach enabling researchers to get empirically closer to the phenomenon of individual decision-making within PE learning. We argue that by doing so, researchers in the field of PE can study certain aspects of learning not explicitly emphasized within existing methodological approaches.

Keywords: Physical education, Decision-making, Learning, Methodology, Dewey

**Introduction**

Opportunities for students to participate in decision-making processes have been presented as a vital aspect of effective learning environments (Black & Wiliam, 2009; Boekaerts, Pintrich, & Zeidner, 2000; Dürr, 2005; Hattie, 2012). Decision-making is regarded as important for students to become independent learners, develop a sense of ownership of learning, and deal with novel situations (see e.g. Boekaerts et al., 2000; Hattie, 2012). Within Physical Education (PE) scholarship, opportunities for making decisions has for example been presented as an important condition for student engagement (Enright & O'Sullivan, 2010; Howley & Tannehill, 2014), a requirement for understanding games (Harvey & Jarrett, 2014; Light, Harvey, & Mouchet, 2014), and a defining characteristic of different teaching styles (Jaakkola & Watt, 2011; Mosston & Ashworth, 2002). At the same time, relatively little attention has been directed towards how individual students make decisions or why their decisions lead to learning within PE. The broad purpose of this paper is to consider the relationship between individual decision-making and learning. Specifically, our aim is to propose a methodology providing a theoretical framing along with procedures for investigating this relationship. The methodology is based on the work of American pragmatist John Dewey, and after providing a brief review of decision-making and learning literature, some space is dedicated to outlining key Deweyan concepts that relate to decision-making. We then turn to the procedural consequences of this framing and discuss the implications that Deweyan thinking has for researchers interested in producing empirical material on decision-making and learning. Here we propose specific research methods, and provide an example from an ongoing investigation to illustrate the types of data that can be generated. The paper concludes with a short discussion of the potential value of the methodological approach.

**Decision-making in Physical Education**

PE scholars focusing on a variety of issues have proclaimed student decision-making as important for student learning (Barker, Wallhead, Brock, Goodyear, & Amade-Escot, 2017; Goodyear & Dudley, 2015; López-Pastor, Kirk, Lorente-Catalán, MacPhail, & Macdonald, 2013; MacPhail, Kirk, & Griffin, 2008). A number of theorists have for example proposed that in order to be engaged in PE lessons, students need to be involved in the conceptualization, implementation and evaluation of PE curricula (Brooker & Macdonald, 1999; A. Smith, Green, & Thurston, 2009). A central claim is that by enabling students to make such decisions, PE teachers can help students feel more respected, listened to, and autonomous (Howley & Tannehill, 2014; Mitchell, Gray, & Inchley, 2015). Enright and O'Sullivan (2010) suggest that helping students to take ownership of their own learning is energizing and exciting and produces deep learning and insights.

Decision-making has also received attention in game sense literature (Butler, 2006; Miller, 2015). Indeed, Harvey and Jarrett (2014) propose that the development of decision-making skills is a "core concept" (p. 279) in game sense approaches and that it provides a key justification for the use of such teaching models. Within game sense scholarship, decision-making refers to the ways that learners think about and respond to certain stimuli in game situations (Light et al., 2014; Renshaw, Chow, Davids, & Hammond, 2010). A tennis player might decide on the kind of stroke she plays based on where her opponent is on the court, or a softball fielder might decide whether to throw to first or second base. These decisions will in turn determine how successful the players are in the games. Making decisions from this perspective, is seen as (1) an

integral part of playing games, and (2) inseparably connected with game-specific motor capabilities (Smith, 2016).

Related to the first two areas, scholars have proposed that opportunities for decision-making can be used to differentiate teaching styles (Jaakkola & Watt, 2011; Mosston & Ashworth, 2002). Mosston and Ashworth (2002) put forward a spectrum of styles that differ with respect to the extent to which students and teachers can make decisions. Further, the authors point out that opportunities arise in different phases of teaching moments: before, during, and after lessons. Lessons in which teachers make most or all of the decisions in all three phases are deemed to be teacher-centered; lessons where students are able to make more decisions are deemed student-centered. In contrast to both engagement and game sense work, Mosston and Ashworth (2002) stress that no teaching style is inherently better than any other. They contend that teaching can be effective regardless of who is making decisions.

Although a number of PE scholars have highlighted the importance of decision-making, detailed descriptions or discussions of how decision-making operates during student learning are seldom the focus of attention. In the next section, we examine some methodological approaches that address the relationship between decision-making and learning. The argument developed is that although these methodologies have the potential to provide important insights, some questions and issues remain overlooked.

**Methodologies for investigating student learning in PE**

An existing methodology that connects decision-making and student learning in PE is found in the work of MacPhail et al. (2008). Utilizing a situated learning perspective, they investigate how students learn to throw and catch balls in gameplay. The concept

of decision-making is applied explicitly within the methodology and is on one hand conceptualized in line with previously mentioned game sense literature: as a skill inseparably connected with game-specific motor capabilities. On the other hand, within the context of investigating student learning, decision-making is also operationalized as an indicator of other forms of skill learning and knowledge. The argument presented is that one can study gameplay learning by observing and counting student decisions, and compare the number of appropriate decisions made against the total amount of decisions made.

Two other examples of methodologies in which decision-making is central are presented in the work of Amade-Escot and colleagues (2005, 2006; 2007), and more recently, in the work of Quennerstedt et al. (2014). In both these methodologies learning is presented as different forms of decisions and/or negotiations that occur through interactions and communication resulting in co-construction of knowledge (Amade-Escot, 2005; Quennerstedt et al., 2014). Here, decision-making is not a skill to be learned, but rather the very process through which students learn. The methodologies suggest that learning occurs as mutual decisions about how to do or understand something are made. This conceptualization to some degree reflects engagement literature, where decision-making is a process students should participate in to learn, rather than being a skill one needs to acquire (see e.g. Enright & O'Sullivan, 2010).

A detailed discussion of *how* individual students make decisions and how different forms of individual decision-making relate to learning is however lacking within these methodologies. Importantly, exploring such issues seems to be the aim of neither MacPhail et al. (2008), Amade-Escot and colleagues (2005, 2006; 2007) nor Quennerstedt et al. (2014). A detailed account would in our view complement existing

research and offer new insights. To develop such an account, we turn to the work of American Pragmatist John Dewey.

**Dewey and learning**

When working with the educational philosophy of John Dewey, it is important to keep in mind that (1) his scholarship is vast (see e.g. Fesmire, 2014, p. 10), and (2) throughout his career, several twists, turns and even contradictions[1] appeared within his work. At times Dewey describes aspects of learning as individual processes occurring within specific social and cultural contexts (see e.g. Dewey, 1916/1980, pp. 151-164). At other times, he treats learning as a set of social and negotiated processes (see e.g. Dewey, 1938/1997, pp. 71-72). As our aim for this paper is to conceptualise learning as an individual process in order to explore individual decision-making in relation to learning in PE, we mainly draw upon Dewey's theorisation of individual aspects of learning. Below we outline key Deweyan concepts related to how individuals learn, before moving on to conceptualise learning as different forms of individual decision-making.

Dewey's educational theories are deeply rooted in the concept of experience (Dewey, 1910/1997, 1916/1980, 1929, 1938/1997). He suggested that experience as a process contains two sides: one of acting in our environment and one of suffering or undergoing the consequences of our actions (Dewey, 1916/1980). What is special about this two way process is that experience always in some way modifies the one

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[1] One example could be the apparent contradiction between Dewey's description of experiential learning in the chapter 'Thinking and learning' in *Democracy and Education* (1916), where every experience does not necessarily lead to learning, and Dewey's writing about the experiential continuum in *Experience and Education* (1938 p. 33), where all experience is treated as transformative.

experiencing (Dewey, 1938/1997). As we live our lives there is therefore always some form of learning occurring, either in the way of habit affirmation, alteration or generation[2] (Dewey, 1916/1980, 1922/1983, 1938/1997), and/or in the way of knowledge production (Dewey, 1910/1997, 1916/1980).

In relation to habit, Dewey suggested that habits are more than just fixed ways of doing things. Rather, habits refer to our predispositions to respond to our environment in particular ways (Dewey, 1922/1983). Responses are not just cognitive, or intellectual but can also be psychomotor and emotional (Dewey, 1910/1997, 1916/1980, 1922/1983). Where habits refer to predispositions, knowledge concerns itself with the relationship between specific acts and their consequences (Dewey, 1916/1980). Dewey suggested that the primary concern of knowledge is to discover the conditions and consequences of experience (Dewey, 1916/1980). Knowledge connects actions and consequences in such a way that causes become means and effects become consequences (Biesta & Burbules, 2003). Knowledge provides foresight of possible and/or likely consequences of our actions. It is 'the crux of our freedom' (Dewey, 1922/1983, p. 214) because it provides us with a means of control.

In relation to different conceptions of decision-making, both habits and knowledge are important. If we take participation in games as an example, our habits determine the possible ways we respond to contextual and environmental conditions. As such, a 'decision' to use a specific tactic within gameplay rests upon the player having developed a predisposition to use that tactic. Decision-making understood as the

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[2] For more insight into habits and their affirmation, alteration and/or generation see e.g. growth as *plasticity* and habits as expressions of growth (Dewey, 1916/1980, pp. 49-54), habits as social functions and habits and will (Dewey, 1922/1983, pp. 15-32) or the principle of continuity (Dewey, 1938/1997, pp. 35-39).

observable skill of choosing the right tactic can therefore be conceptualized as well formed habits. However, in situations where we find ourselves hesitating, where we do not know what to do, when there are conflicting habits, knowledge provides the only means of control (Dewey, 1910/1997). Making the right tactical choice, can therefore also be conceptualized as an observable skill that indicates preexisting knowledge (see e.g. MacPhail et al., 2008). Thinking about decision-making as the process by which we learn however, as presented in the methodologies of Quennerstedt et al. (2014) and Amade-Escot (2005), cannot rely on Dewey's conceptions of habit or knowledge alone. In order to conceptualize decision-making in such a way we suggest turning our attention towards Dewey's theories concerning how new habits and new knowledge are formed.

### *The process of learning as decision-making*

Dewey's work on the alteration or formation of habits and knowledge provide several insights that can illuminate decision-making and its connection to learning. Fundamentally, Dewey describes two distinct methods by which we learn something new. He called these the 'trial and error method' and 'reflective experience' (Dewey, 1916/1980, pp. 151-165). While these methods are described as two separate methods, Dewey stressed that we never truly use one method or the other (Dewey, 1916/1980). Rather, we can conceive them as opposed parts of a continuum, where the intervention of thinking in the process of 'learning' is the varying factor.

On one side of the continuum lies the method of trial and error. In essence, this method connects to Dewey's view on human *perception*. Dewey saw perception as an organism's active search and constitution of a *stimuli* through a tentative trial and error process of choosing an adequate *response* to *indeterminate situations* (see Dewey,

1896; Vanderstraeten, 2002). The use of the terms 'stimuli' and 'response' builds on Dewey's suggestion that what signifies an indeterminate situation (a situation where we do not know how to act), is the fact that we know neither the stimuli nor the appropriate response to such stimuli (Biesta & Burbules, 2003). As an example, to someone without some idea of basketball, a suspended hoop and a ball mean relatively little. In Deweyan terms, he or she would know neither the stimuli nor the appropriate response if asked to score. Dewey suggests that one way to deal with such situations is through a tentative process of trial and error (Dewey, 1916/1980). In the above example, someone familiar with basketball would shoot the ball through the hoop. For someone unfamiliar with basketball however, new habits and knowledge must be formed. Dewey's point was that through trial and error, one can apply existing habits related to other situations and contexts to try to solve the current situation. By acting out different options and subsequently undergoing the consequences produced in the environment, we can learn to act appropriately and even successfully.

It is important to note here the centrality of decision-making in this process. As Vanderstraeten (2002, p. 236) suggests: '[perception] is not choice, accomplished all at once, but 'a process of choosing''. This form of decision-making involves thinking to the extent that reflection is necessary to connect action to consequence and for acknowledging when these consequences indicate an appropriate response (Dewey, 1916/1980). The quality of the learning process, especially in terms of quality of the knowledge that can be produced by the process, drastically alters however when thinking intervenes before we act (Dewey, 1916/1980).

Learning whereby thinking intervenes both before and after acting, is what Dewey called 'reflective experience' (Dewey, 1916/1980, p. 152). This method lies on

the opposing side of 'trial and error' on our proposed learning continuum. Dewey suggested that thinking turns overt action into internal action in imagination (Biesta & Burbules, 2003). This, contrary to the immediate action of trial and error, enables us to experiment with different lines of possible action in imagination before we act. This imaginary testing in turn lets us hypothesize about both the possibility and probability of different lines of actions and their consequences. Dewey argued that while thinking in no way guarantees that the chosen actions will be successful, it makes the process of choosing more intelligent (Biesta & Burbules, 2003). The process of learning as decision-making through reflective experience thereby becomes an intelligent and conscious process, where we are able to decide on which actions to test overtly as we learn.

Learning as decision-making through reflective experience has another advantage. While the method of trial and error as presented can produce new habits and knowledge, the knowledge produced through this form of decision-making is limited to connecting certain actions to certain consequences. Understanding *why* certain actions result in certain consequences however is not possible. Only through hypothesizing consequences of different actions and different alterations of actions, followed by overt testing and reflection, can such knowledge be produced (Dewey, 1916/1980). As such, learning through reflective experience is preferable to trial and error, not only because it makes the decision-making process intelligent and conscious, but because it increases the potential learning outcome of such decision-making. Importantly, to be able to take advantage of the possibilities of reflective experience, students require time to stop and think (Dewey, 1910/1997).

**Methodological principles and procedural steps**

Several methodological principles follow such a framing of decision-making. First, in relation to learning, Dewey suggests that all experience leads to some form of learning. Asking whether students learn or not in PE is therefore pointless within this perspective. The main concern is rather what and how students learn. Further, as the *what* and *how* of learning is interconnected within Dewey's theories, studies aiming at investigating one or the other, should be able to consider both. Second, in terms of decision-making and learning, it is not whether students or teachers make decisions or not that is of interest. Some form of decisions are always made when students learn. It is how and what kind of decisions that students make, are able to make, or are guided to make, that is essential. Third, since learning as a process of decision-making involves actions and a varying degree of thinking, it is crucial that investigations following a Deweyan perspective generate empirical material informing both aspects. However, information concerning the learning of the actor is still not enough. Information related to the specific context in which the thinking and acting occurs is also crucial, as all decision-making and learning is framed and influenced by the specific social, cultural and material contexts where they are formed (Dewey, 1938/1997). In order to follow the three principles outlined, we propose three methodological steps; participatory observations, video observations and stimulated recall interviews. In the following sections each of these methods are presented chronologically, and explicit explanations are made related to how each step builds on the knowledge developed in the previous step.

*Participatory observations*

Participant observation subsumes what we call fieldwork, and is a way of gaining an understanding of fundamental features of social life in specific contexts (DeWalt & DeWalt, 2011). Through enabling researchers to experience, reflect upon and pose questions about ongoing practice (Delamont, 2004), researchers learn about new social and cultural contexts (DeWalt & DeWalt, 2011). A key aspect of participatory observations is its ability to let researchers generate their own knowledge about the specific social, cultural and material contexts and the individuals acting within those contexts. Related to investigating decision-making in PE, this includes the ability to observe the actions of students and pose questions about their thinking related to the specific social and cultural contexts where they make their decisions.

In terms of how such a period of participatory observations can be carried out so that researchers can gain access to student experiences, while also generating knowledge about the context, we propose that researchers move in and out of different roles within the context. Instead of participating in one role, e.g. as an assistant teacher, as a student, or as a researcher asking questions, researchers move in and out of these different roles throughout the observation period. This moving helps to avoid limiting the researcher's possible experiences and interactions, and thereby extends the knowledge that the researcher can develop about student experiences and the specific context.

Before moving on, one comment is warranted. So far, we have suggested that participatory observations enable investigations into all crucial aspects of decision-making and learning from a Deweyan perspective. Arguably the method of participatory observations has the potential to enable investigations of decision-making and learning

in PE on its own. One disadvantage however, with using participatory observation is that researchers can only observe one situation at a time. This means that all other situations are missed. This creates the possibility of overlooking central situations within the context that frame following experiences, decisions and learning. Another downside of using participatory observations is that events occurring can only be observed once. This leaves little room for researchers to question their own observations, or for other researchers to contribute to the analysis. To circumvent these problems, we suggest that a period of participatory observations is followed by video observations.

### *Video observations*

Using video observations to investigate student learning in PE is not unprecedented (Barker, Quennerstedt, & Annerstedt, 2015). In fact, all the methodologies previously presented in this paper utilize video observations (Amade-Escot, 2005; MacPhail et al., 2008; Quennerstedt et al., 2014). In particular, the potential of observing several situations occurring at the same time, seeing the same situations over and over again (Quennerstedt et al., 2014) and enabling multiple viewers to 'reach agreement on major events, transitions, and themes' (Derry et al., 2010, p. 9) have been presented as strengths with video observation.

Selecting which situations to focus on is however a prerequisite for utilizing the potential that video observations hold (Derry et al., 2010). Not only is selection important in order to capture the situations that are of interest, but it is also important when researchers are identifying segments from the video material for further analysis (Derry et al., 2010). Related to a Deweyan perspective on decision-making and learning, one such focus could be situations where students do not know how to act. As

presented, such situations are the starting point of new learning. To recognize such situations in advance, is however a challenge. As Dewey suggested, the indeterminateness of a situation is individual and contextual (Dewey, 1938/1997). Different individuals and groups, because of their different experiential backgrounds and knowledge will experience and thereby behave differently when they do not know what to do. One way to address this challenge is to generate knowledge about the specific context and the individuals acting within it. By getting to know the individuals and the context, we propose researchers can anticipate how different students will act and when they will hesitate. As such, we propose that researchers generate knowledge that enables them to target indeterminate situations when conducting and analyzing video observations.

A further task researchers must engage in during participatory observations related to the video observations, is choosing how many and where to place cameras and microphones. We suggest that capturing all actions taking place within a context, both in terms of audio and video data, is important. This is likely to involve using at least two cameras with good microphones on tripods in diagonally opposite corners of a gym, while having a third portable camera with a directional microphone to zoom in on selected situations. An additional microphone can be placed on the teacher. If the PE lesson observed takes place in a small gym, this setup can ensure that all the actions of students and teachers are captured, while also enabling researchers to focus in on specific events. General recommendations for how to capture the entire context of a PE lesson is however hard to make and will vary depending on the specific contexts.

### Stimulated recall interviews

The third methodological step that we propose in order to investigate decision-making

and learning in PE is stimulated recall interviews (SRI's). SRI's refer to interviewing individuals by either playing them audio or audiovisual recordings of their own behavior in social situations, and discussing aspects of those recorded situations (Dempsey, 2010). As presented earlier, generating empirical material only about student actions, as is the case with video observations, is insufficient if we want to investigate decision-making and learning through a Deweyan perspective. We also need material about thinking that occurs within the specific situations. In line with Amade-Escot (2005) and Quennerstedt et al. (2014)[3], we suggest that using SRI's provides a way to get empirically close to such thinking. We suggest that by showing audiovisual clips of students acting in different situations, and subsequently asking them to explain what they were thinking in the same situations, we can produce empirical material about student thinking related to specific situations.

Using SRI's relies on having audio or audiovisual material to show the informants. It makes sense to use material that has been generated in the previous video observation period. A central task within the video observation period is however, to select the video clips that one wants to use and to develop the questions to ask during the SRI's. Here the individual and contextual knowledge produced through participatory observations becomes vital. In relation to these tasks, it is important to keep the audiovisual material manageable. While SRI's use audio or audiovisual recordings in order to 'jog memories' of participants (Dempsey, 2010, p. 350), they nonetheless rely on participants' recall. The ability to choose situations to use as audiovisual stimuli from the material gathered within a short timeframe is therefore important in order to

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[3] While Amade-Escot (2005) and Quennerstedt et al. (2014) refer to their method as didactic moments interviews, these are conducted as stimulated recall interviews.

minimize the chance of participants forgetting what they were thinking within the audiovisual situations we select.

A central point is therefore that the data produced in the previous steps are vital for producing empirical material concerning student thinking through SRI's. Further, it is first when the material concerning student thinking is analyzed in conjunction with the material generated, both through video observations and through participant observations, that insights into all the aspects of decision-making and learning suggested by Dewey become possible. It is thus not the cumulative insights produced in each step that provides our methodology's potential value, but rather the specific combination of steps and the insights produced when all the generated material is analyzed together.

**Example from an ongoing investigation**

A central question following such a presentation of method steps is: what kind of empirical material and understandings such a methodology can produce? In this section, we present an example from an ongoing empirical study investigating decision-making in PE in order to illustrate the usefulness of the methodology.

*Example*

The empirical material presented in this example stems from all steps presented in our methodology. Contextual information was developed during a period of participatory observations, while the following interview data come from an SRI utilizing material gathered by video observations conducted during one PE lesson in a Norwegian junior high school class.

*Contextual information*

In the observed lesson, students practiced different sport techniques related to floorball before moving on to gameplay. The practice-gameplay lesson structure was common during the four-week period of participatory observations and the teaching was mostly teacher-centered. The student interviewed in the following example is a student who excelled in terms of sport skills during the whole observation period. He uses his skill and tries hard to win the small contests initiated by the teacher. Winning these small contests is something he expresses as important to him.

*Stimulated recall interview data*

**Video:** A teacher stands in front of a class lined up in two lines, each student facing a peer and ready to pass a ball in floorball. The teacher explains: 'the task is to pass the ball to a peer in floorball as many times as possible, but still keeping control.' Then he starts the students off by saying; 'ready, set, go!'

*As this is showed on a computer screen the student in the interview starts to talk:*

**Student:** I see that we are standing much closer than the rest of the group, (laughs).

**Researcher:** yeah... But you weren't told not to, right?

**Student:** No, (laughs).

**Video:** The student is standing with his legs far apart, holding the floorball between his legs, hitting the ball by pulling the top of the stick towards himself while simultaneously pushing the bottom away, passing the ball quickly to his peer. The teacher approaches asking: 'Do you feel that is the best way to hold the stick?' The student answers: 'Yeah or, I get better control.' Teacher: 'Ok so you think you get better control that way. Ok.' The teacher laughs a little and walks away.

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**Student:** What happens here is that the teacher asked me about the way I held the stick. Because it is not a normal way to hold the stick, you know.

**Researcher:** Yeah.

**Student:** Because I thought that to get it back fast, I needed to do it in one movement. So I tried to make my pass more effective, but it didn't work that well. You know I tried to get the most passes possible and fast.

*During this conversation, in the video segment:*

**Video:** The student changes his grip and goes back to passing the ball with what must be considered a normal grip in floorball, and continues passing to his peer.

**Researcher:** Yeah I saw you changed your grip shortly after...

**Student:** Yeah I changed because it occurred to me that what I was doing is not exactly how we are meant to hold the stick.

**Researcher:** Ok?

**Student:** Yeah, or, well I started thinking about the assessment, you know when the teacher came over, you know. I always have the assessment in the back of my mind.

**Researcher:** Ok... But let me ask you, what are you trying to do here, what is your aim?

**Student:** Well my aim is to get the pass quick, along the floor, so that it is possible for my partner to send it back to me just as quickly.

**Researcher:** Ok.

**Student:** So that we get the most passes, and win.

**Researcher:** Ok... So to win that's...

**Student:** That's the most important thing (laughs).

**Researcher:** So winning is your main focus?

**Student:** Yes.

**Researcher:** Ok, but let me ask you in this way then. Was it a conscious choice to try this new way of holding the stick?

**Student:** I don't know really, well, or... I wanted to test something new so that I could get the upper hand on the other teams...

**Researcher:** When you change back again, was that a conscious choice?

**Student:** Hem...

**Researcher:** Well you say that you are always concerned with your grade. Did that influence your choice, or did you switch without knowing why, or...

**Student:** I think it's a bit of both actually. You know, nobody else held the stick the way I did either so, I thought that it might not be such a good method after all...

**Analysis**

Several understandings of the decision-making and learning occurring within the specific situation emerge when analyzing the empirical material. In the following section, we present one possible way to understand the situation. Importantly, this understanding is claimed to be neither the only nor the right understanding, but rather presented as an example to illustrate some of the potential value that the presented

methodology holds for researchers interested in investigating decision-making and learning in PE.

The situation described in the example starts with the student responding to a teacher initiated contest. The student's response in the interview indicates that winning is his focus during this task and a habit of 'trying to win' is triggered by the context. The fact that the student decides to test a new technique can as such be seen as a result of this habit, where the 'trying something new' is done 'in order to get the upper hand on the other teams'. By stating that he is trying something new, the student's actions can be seen as an attempt at solving an 'indeterminate situation.' To resolve the indeterminateness, a decision-making process arises. The thinking involved when selecting the 'new' technique however seems restricted to thoughts concerning the speed of the stroke, represented in the interview data by the statement: 'Because I thought that to get it back fast, I needed to do it in one movement.' This lack of elaborate explanation however seems to have its origin in this specific context. As evident from the video material, there is very little time to think before the contest starts. The student has little chance to go into a reflexive decision-making process regarding the chosen technique if he wants to stand a chance of winning. This is not to say that there is no room for student decision-making, as the student does decide upon a new technique. Limited time does however seem to close the opportunity for this student to utilize reflective experience as a means of decision-making. The combination of a desire to win, and the idea of trying a new technique results in the student entering into a decision-making process that resembles more 'trial and error' than 'reflective experience.'

As the situation progresses, the student initially appears to have accepted this new technique as useful in the context of 'winning'. This is substantiated by the fact that

the student initially continues using the new technique, along with the student's initial response to the teacher's question, where he claims that the 'new technique' provides 'better control'. If the situation had stopped here, a possible learning outcome following such an experience could be the formation of a new habit and knowledge related to this technique being appropriate in relation to this specific context. However, the situation precedes with the teacher approaching and asking questions which are interpreted by the student as a form of disapproval. As the student states in the interview data: 'the teacher asked me about the way I held the stick. Because it is not a normal way to hold the stick, you know'. Followed by 'what I was doing is not exactly how we are meant to hold the stick'. It seems that the question from the teacher furthermore triggers a new habit within the student, a habit of acting in ways that will secure him a high grade. This results in the student thinking about the appropriateness of the new technique in relation to what he is supposed to do, thinking that in turn leads to a search of the environment of what everybody else is doing. Faced with the realization that he is the only one trying something new, together with his feeling of not doing what he is supposed to do, he switches back to what he describes as a 'normal' technique. The entire decision-making process occurring here resembles a process of trial and error, where a new technique is tested, found useful, but due to several consequences detected in the environment, is ultimately disregarded in favor of the normal technique.

**Results**

The example above highlights insights that can be gained by using our proposed methodology. By investigating specific situations such as this one, and by combining and analyzing empirical material concerning individual actions and thinking, we can develop a picture of the decision-making processes of students. We want to draw

attention to three ways that these insights complement or extend existing research.

First, the methodology provides insights into what motivates or engages students during participation, and how this can change over time (in the above example, the student's reason for engagement changes from winning to achieving a good grade). This insight suggests that teachers may have to provide students with opportunities to conceptualize, implement and evaluate programs (Smith et al., 2009), in other words, provide students with choice (see e.g. Mitchell et al., 2015), but they also need to be sensitive to micro-level interactions and how these can change the way students make sense of tasks. Teachers may enable students to make sense of experiences in engaging ways without necessarily increasing students' autonomy. In a related vein, the methodology can also illustrate discrepancies between how teachers and how students make sense of activities and content. This may also be useful for educators interested in student engagement (Howley & Tannehill, 2014). In the example above, we might expect students to understand the task as being about practicing and learning how to pass the ball accurately to a peer. These ideas were in fact, absent in the student's reflections. The methodology can then alert teachers to situations where their pedagogical intentions are not being fulfilled.

Second, the methodology provides a useful way for scholars to understand student thinking and their responses to certain stimuli. This is a key aspect of Teaching Games for Understanding (Light et al., 2014; Renshaw et al., 2010), and accordingly, the methodology could be a useful tool for those interested in games sense. Useful orienting questions that can be addressed with the approach include: When do learners hesitate during observed games? What options do learners identify, in real time and through reflection? What kinds of logic do learners' explanations of tactical choices

contain? In the video data presented earlier, the student appears to make a 'wrong' choice of technique. The following interview data however reveals that the choice comes from a desire to try something new in order to win. Such insights could help illuminate conclusions about whether or not observed 'choices' are actually indicative of students game play knowledge, or of alternative aims and intentions (see e.g. MacPhail et al., 2008)

Third, the methodology has implications for discussions of teaching styles (Mosston & Ashworth, 2002). Indeed, the insights produced by our methodology, with its focus on individual decision-making, challenge the idea that teachers can ever make all the decisions. If we look at decision-making from a social perspective with decision-making being understood as different forms of social negotiation, a teacher may appear to make most of the decisions. From a methodological perspective that focuses on the individual however, students are often involved in decision-making. This is because indeterminate situations emerge whether the teacher wants them to or not. In any given learning activity then, one would expect to see many different decisions being made by students depending on their own experiential backgrounds. Labelling a teaching-learning sequence as either teacher-centered or learner-centered from our perspective thereby runs the risk of missing the point that decisions are being made throughout lessons.

In sum, we would argue that some of the potential inherent within our proposed methodology lies in its ability to provide insights into (1) the learner's understanding of the task and context; (2) identifying when learner's hesitate, what choice options they recognize, and what logics and rationales they apply when choosing within game play, and (3) the myriad of decisions that are being made in any given situation.

**Concluding remarks**

In response to a growing recognition to the importance of decision-making in student learning, and at the same time, a relative dearth in PE scholarship that thoroughly conceptualizes how decision-making operates within student learning, we have proposed a theoretical framing of how different forms of individual decision-making relates to learning. Following such a framing, three central methodological principles emerged as important. These imply that what and how students learn should be investigated in combination, a process that in turn must include investigating both student actions and student thinking within specific contexts and situations. Furthermore, in terms of decision-making, the central point is not whether students get to make decisions when they learn, but rather how and what kind of decisions they are able to make within the PE context. To enable such investigations we have proposed three procedural steps: a period of participatory observations, video observations, and stimulated recall interviews. To illustrate the kind of insights the methodology holds, we have further presented an example to illustrate some ways in which investigating decision-making by applying our proposed methodology provides insight into three different research areas within PE scholarship.

We recognize that the theoretical exposition presented focuses on student decision-making, paying little attention to the role of the teacher. We therefore suggest that developing a conceptual and methodological framework that captures the ways teachers can facilitate different forms of decision-making is necessary. This could involve a consideration of how to guide student reflections in order to optimize student learning, and/or how to investigate teacher decision-making and its impact on student learning. We also recognize that by focusing on student learning conceptualized as different forms of individual decision-making, other collinear forms of student learning

that exist (see e.g. Amade-Escot & O'Sullivan, 2007; Quennerstedt et al., 2014) is less emphasized. What this paper does however, by focusing on the connection between student learning and decision-making is enable researchers to produce specific knowledge about the decision-making processes in which students participate when learning in PE. We believe such knowledge can provide valuable and needed contributions to current discussions related to issues such as student choice and voice, engagement, the need for students to develop different decision-making skills, and discussions about student- and teacher-centered teaching within PE.

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