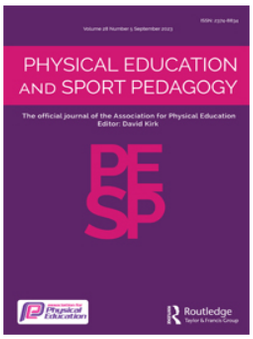

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Assessment *for* and *of* learning in nonlinear movement education practices

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ABSTRACT

Background: Principles such as instructional alignment and step-by-step progression are often seen as crucial features of good assessment practices in school physical education (PE). These features are problematic from nonlinear educational perspectives, which are based on the idea that movement learning cannot be expected to take place in the same manner for all students. Without some resolution of the contradiction between nonlinear pedagogies and principles of good assessment, the likelihood of physical educators fully embracing any kind of nonlinear approach to movement education remains doubtful.

Purpose and research question: Our purpose in this paper is to illustrate how assessment *for* and *of* learning (AfL and AoL) can look when implemented in nonlinear movement education practices.

Methods: Illustrations of AfL and AoL are drawn from an investigation in which one educator implements a nonlinear movement education module. The module focuses on juggling for students at high school (grade nine students aged approximately 15 years). The module provided students with 10 × 50-minute lessons to explore juggling. Data were generated through observations (film clips and field notes) and ethnographic-type interviews that were conducted with the students during the lessons.

Findings: In the context of the nonlinear movement education module, AfL became: *Interacting with students in joint exploration; Introducing learning strategies; Encouraging students to clarify and verbalise the object of learning; Helping students identify critical aspects of the movement activity, and; Inviting students to consider alternative learning trajectories*. The educator then evaluates the students' learning experiences in the context of a group performance at the end of the module. This performance can be seen as an instance of holistic assessment within a nonlinear movement education practice.

Conclusions: The suggested holistic perspective on PE assessment could help educators to: circumvent dichotomies such as mind-body and theory-practice; approach students as active meaning-makers; re-frame students' actions as emergent and context-dependent; and replace direct instruction with explorative teaching and learning methods. The major contribution of this study is that it shows how assessment *for* and *of* learning can be implemented in nonlinear movement education practices within a linear, goal-related and criterion-referenced, education system.

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Introduction

Traditional approaches to movement education in school physical education (PE) are based on the idea that learning occurs in a *linear* fashion (Kirk 2010). Learning is seen to involve the step-by-step acquisition of motor skills (Larsson, Nyberg, and Barker 2022) and teaching is understood as the provision of developmentally appropriate instruction and practice (Chen, Hammond-Bennett, and Hypnar 2017). This logic entails a view of education where learning outcomes can be determined prior to, and assessed on completion of, experiences in the classroom. Such logic underpins much PE policy, and hierarchically organised goals and objectives related to movement learning are a ubiquitous feature of PE curricula (see for example ACARA 2014; Department for Education 2013; SNAE 2022).

While curricular goals pertaining to movement learning have generally escaped critique, scholars have criticised traditional approaches to movement education (Kirk 2010; Larsson and Quennerstedt 2012). They have suggested that physical educators should be cautious of linear logic, postulating that such thinking (1) fails to capture how learning takes place in schools (Renshaw and Chow 2019), and (2) advances normative movement standards that privilege some students' experiences over others (Wright 2000). Advocates of what we will broadly refer to as nonlinear approaches suggest that physical educators can better serve students by adopting emergent views of learning, where a variety of learning outcomes are possible, and indeed desirable, in any one educational moment (Jess, Atencio, and Thorburn 2011; Light 2008).

We support nonlinear thinking and have ourselves trialled less linear pedagogies (Barker, Nyberg, and Larsson 2020; Nyberg, Barker, and Larsson 2021). At the same time, we recognise that calls for non-linearity contradict some current educational thinking. The contradiction becomes apparent when nonlinear approaches are placed vis-à-vis assessment principles, such as instructional alignment and step-by-step progression. Adhering to such principles is supposed to ensure transparent and equitable learning experiences (MacPhail et al. 2021) and the principles are often seen to underpin good assessment practices (AIESEP 2020). Without some resolution of the contradiction between nonlinear pedagogies and principles of good assessment, the likelihood of physical educators fully embracing nonlinear approaches remains doubtful (see Scanlon, MacPhail, and Calderón 2022 for a case in point). Drawing on data produced during nonlinear movement lessons, our purpose in this paper is to illustrate how assessment *for* and *of* learning (AfL and AoL) can look when implemented in nonlinear movement education practices. Such an illustration can, we believe, provide educators with ways to engage in nonlinear teaching while still adhering to accepted assessment principles. We start by giving an account for previous research on: (1) linear and nonlinear approaches to movement learning, before considering (2) the predominant PE assessment discourse.

Linear and nonlinear approaches to movement learning

Traditional movement pedagogies in PE rely on a linear logic. Learners first acquire movement patterns such as throwing and jumping in generalised, fundamental forms. Once learners have become secure with these patterns, they go on to perform advanced movement patterns in complex situations (Coker 2018), often related to sport. Along with moving more efficiently and being able to respond to increasing environmental influence, learners are expected to progress from slow, conscious control of movement to smooth, automated performances (Beilock and Carr 2001).

This linear logic is evident in PE research, policy, and practice on movement learning. Many research investigations measure the development of individuals' fundamental motor skills over time (e.g. Bedard, Bremer, and Cairney 2020; Chen, Hammond-Bennett, and Hypnar 2017). Physical education curricula too, frequently organise learning objectives in progressive steps, where students encounter increments of the same learning objective over successive years (DoE 2013; SNAE 2022). In general, students are expected to develop basic movement capabilities in accordance with

age and developmental maturity (Brian et al. 2017) and learn to use those capabilities in sports-related situations (Janemalm, Barker, and Quennerstedt 2020). In PE lessons, linear logic inheres in technique-oriented activities where teachers demonstrate ideal performances and expect pupils to approximate those same performances through a series of practice sessions (Tinning 2009).

The pervasiveness of linear logic in the 2020s is somewhat surprising when one considers the criticism it has sustained over the last four decades. Critique within PE has come from games scholars, who have proposed that teaching techniques through a linear progression of simple to more advanced drills has left learners with little understanding of the ways games work (Bunker and Thorpe 1982; Harvey and Jarrett 2014). The logic of games centred approaches could be described as at least partly nonlinear since the skills students learn are not decided in advance but are determined after playing the game (Harvey and Jarrett 2014). Rovegno (1995) pointed out some time ago that linear approaches had been typical not only in games instruction but also in dance, gymnastics, and aquatics. She claimed that in these areas too, technique-oriented teaching had failed to account for *why* people move. In a detailed consideration of movement education in PE, Wright (2000) suggested that approaches to movement education tended to define the learner narrowly as 'a biological object which can be studied, manipulated and its movements minutely measured' (35).

Alongside criticism, PE researchers have offered a wealth of alternatives to the linear approach to movement education (Jess, Atencio, and Thorburn 2011; Rovegno 1995). From yoga and Qi Gong (Standal and Bratten 2021) to awareness through body positioning (Wright 2000), there has been no shortage of practical suggestions for how to circumvent linear logic. Common across these proposals are efforts to (i) re-frame learners' actions as emergent and context-dependent (Renshaw et al. 2016; Renshaw and Chow 2019); (ii) collapse dichotomies such as *mind-body*, *movement-mover*, *individual-group*, and *person-culture* (Barker, Nyberg, and Larsson 2022; Larsson, Nyberg, and Barker 2021), (iii) acknowledge learners as meaning-makers whose perceptions affect their decision making (Correia et al. 2019; Roberts, Newcombe, and Davids 2019), and (iv) replace direct instruction with exploratory and experimental teaching and learning methods (Barker, Nyberg, and Larsson 2020; Chow et al. 2015). Indeed, a pertinent question is why, despite continuing criticism of linear logic and the presentation of nonlinear alternatives, does linear logic continue to be engrained in research, policy, and practice?

The answer to this question is complex and Wright (2000) rightly reminds us that movement education has been powerfully impacted by multiple discourses related to sport, education, and science. As we have suggested, there are apparent contradictions between linear and nonlinear conceptions of movement education that may prevent nonlinear pedagogies from being used in PE. In this paper, we consider just one discourse that influences movement education: an assessment discourse. This discourse, for reasons outlined in the next section, presents a challenge for nonlinear pedagogues.

The predominant PE assessment discourse

Today, assessment is widely regarded as important in most education, including school PE. Researchers recognise that PE assessment may have different purposes and functions. It can be used formatively to move learners forward, or summatively to gather evidence in the process of grading (Borghouts, Slingerland, and Haerens 2017; Chan, Hay, and Tinning 2011; Hay and Penney 2013). The International Association of Physical Education in Higher Education (AIESEP 2020) proposes that assessment *for* and *of* learning should be integrated in the teaching and learning process in any unit. Clusters of curricular goals, learning outcomes, learning tasks, and assessment *for* and *of* learning are expected to entail well-aligned PE practices that promote students' learning and ensure fair and equal grades.[1] (See Figure 1.)

This model reflects a predominant view of PE assessment in which PE teachers need to apply, interpret, and critically engage with assessment (DinanThompson and Penney 2015; Hay and

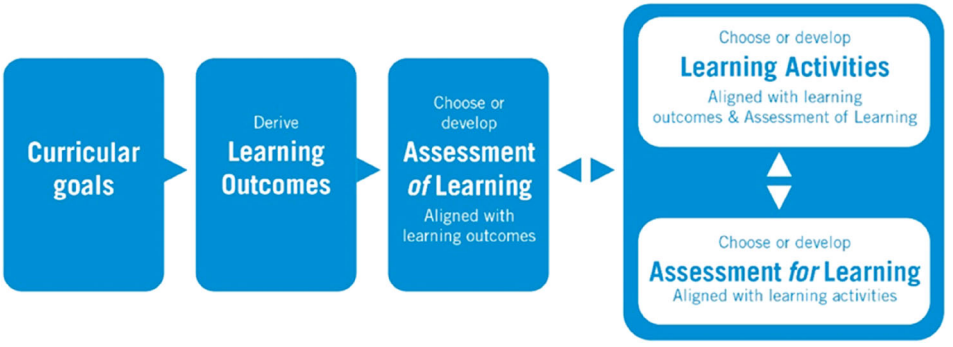

Figure 1. Instructional alignment (AIESEP 2020).

Penney 2013). The position statement suggests that teachers should share the learning intentions with students, a view that corresponds with Redelius, Quennerstedt, and Öhman's (2015) emphasis on the importance of communicating learning goals. Sharing goals is also the first of five widely accepted key strategies of AfL: (1) clarifying and sharing learning intentions with students; (2) engineering effective classroom discussions, tasks and activities that elicit evidence of learning; (3) providing feedback that moves the learner forward; (4) activating students as learning resources for one another; and (5) activating students as owners of their own learning (see for example Thompson and Wiliam 2007, 7; Tolgfors et al. 2021, 313). Importantly, Thompson and Wiliam (2007) note that these key strategies are 'tight but loose'. With this, they mean that although they are all indispensable parts of the pedagogical approach and that there are about a hundred AfL techniques to consider using, teachers are still free to apply strategies as they see fit. This condition enables researchers to, as in our case, empirically investigate how these strategies might be transformed in particular educational contexts.

The main thrust of AfL is to adapt teaching to students' needs. Within goal-related and criterion-referenced assessment systems though, there is a potential conflict between standardisation and the promotion of learners' unique trajectories:

> [B]oth comparability (the same for all students) and student-centeredness (unique to all students) can be presented as valuable characteristics of assessment in a text, and to omit one might invite critique. In practice however, the attainment of one presents significant challenges to the attainment of the other. (Tolgfors and Barker 2023, 12–13)

When learning outcomes and forms of AoL are predetermined, as the idea of instructional alignment suggests (AIESEP 2020), AfL is often carried out through self- and peer assessment, as well as forward looking feedback from the teacher, using checklists and rubrics. Considering the potential conflict mentioned in the quote above, however, feedback risks becoming 'corrections of shortcomings' in relation to movement norms (Tolgfors et al. 2021, 322). The tacit impetus for conformity through standardised feedback is problematic if the ambition is to promote nonlinear routes to goal attainment.

One alternative is that educators incorporate 'the spirit of AfL' (Marshall and Drummond 2006). This involves approaching assessment in a student-centred and collaborative way. Inspired by Torrance (2012), Tolgfors (2019) suggests further that 'responsibilization, subjectification and collaboration' should be considered in 'transformative assessment', which 'implies an assessment culture that is divergent, rather than convergent' (Tolgfors 2019, 1214). How these forms of alternative assessment might be integrated into nonlinear movement education practices is not clear. The purpose in this paper is thus to illustrate how assessment *for* and *of* learning (AfL and AoL) can look when implemented in nonlinear movement education practices.

Method

Illustrations of AfL and AoL in a nonlinear educational context are drawn from a project in which we investigated movement learning. As part of this project, we developed a nonlinear movement education module focusing on juggling for students at high school. Part of the development of the module involved considering how to assess student learning. Below, we describe the context in which the project took place and provide details of how we generate data.

Conceptualising movement capability

The project involved investigating movement learning in different contexts in Sweden. Physical education at compulsory school was of particular interest since movement learning is mandated in the Swedish national curriculum (SNAE 2022). The curriculum states that 'teaching in physical education and health should aim at pupils developing all-round movement capacity … teaching should give pupils the opportunity to develop knowledge in planning, applying, and evaluating different types of activities involving physical movement' (SNAE 2022, 48). In our view, phrases such as '*all-round* movement capability' and providing pupils opportunities to 'develop knowledge', support nonlinear approaches to teaching and assessment. Thus, we were concerned to define 'all-round movement capacity' in a nonlinear manner. This involved re-thinking not only movement capability but also creating a pedagogical approach that fitted our conceptualisation.

We drew theoretical inspiration from philosophers Gilbert Ryle (1949/2009) and Michael Polanyi (1958/2002, 1969). Both scholars stress the situated and subjective nature of knowledge, both emphasise multiple ways of knowing, and both attempt to reconcile the mind-body dichotomy. Ryle (1949/2009) suggests that skill should be seen as an embodied disposition. He proposes that when we watch an individual perform, we are not witnessing the performance of physical skills but the actualisation of a disposition (Nyberg 2015; see also Shilling 2008). A common element of skilful dispositions in all types of moving is a sensitivity to different qualities of movement. Polanyi (1958/2002) develops this idea, suggesting that 'actively muscular skills' are comparable to 'testing and tasting' and that in this respect, skill can be thought of as a kind of connoisseurship. Movement connoisseurs know where their bodies are in space and time, and how they will interact with the material and social environment.

Based on Ryle's and Polanyi's framing of skill, helping students to develop juggling capability became facilitating students' development of embodied juggling dispositions, and as part of these dispositions, cultivating a connoisseurship of juggling. To help students in this endeavour, we asked ourselves how Ryle and Polanyi might teach juggling. Ultimately, we developed an approach that we have termed 'kinesiocultural exploration' (Barker, Nyberg, and Larsson 2022). The approach has five distinctive features which we used to create the juggling module. First, the module provided students with a relatively extensive period to work with juggling – 10 × 50-minute lessons. This was longer than typical modules at the school and was based on the idea that 'dwelling' (Polanyi 1958/2002, 173) is necessary for appreciating a practice. Second, the module provided possibilities for students to select the learning activities with which they worked. This was done primarily in the first three and last three lessons of the module. In the first three lessons, students worked in groups at different stations, where each station involved a challenge and reflection questions (see Barker, Nyberg, and Larsson 2020 for further detail). In the last three lessons, students were asked to prepare a group performance that involved individual and collective juggling. Third, the module offered students multiple opportunities to experiment with juggling. The students trialled for example, using different equipment, juggling alone or with a partner, and juggling with one hand and two. Opportunities for experimentation were accompanied by reflection questions that drew students' attention to different aspects of juggling. Fourth, the module included various opportunities to consider juggling as a social practice. The students were invited to investigate where and when juggling had been done in history, discover famous jugglers, and predict new

forms of juggling that could appear in the future. Finally, the module encouraged the teacher to adopt a curious attitude towards students' previous movement experiences. Since learners' dispositions were central to our understanding of movement capability, it was necessary to consider how students' existing dispositions could affect their development of juggling dispositions.

Producing data for illustrations

In this subsection, we describe four aspects of data production: participants, data production procedures, data analysis, and the ethical principles adopted in the investigation.

Participants

Teachers from three schools near to the university where the project was based were invited to participate in the project. The voluntary nature of participation meant that teachers who were: (1) interested in the project, and; (2) felt that the project was in line with their school's syllabus and scheduling requirements, agreed to take part. In this respect, sampling could be termed a combination of convenience and purposive (Berg 2001). This paper draws examples from the lessons of one of these teachers, selected because he worked closely with us to implement the non-linear approach to movement education in the way that it had been conceived. The teacher had been working for three years, all of which were at the school where the research took place. The school was located in a middle- to upper-class, suburban area. He selected a grade nine, co-educational class (students aged approximately 15 years) to take part in the investigation. His selection was based on his appraisal of the appropriateness of the module in relation to the topics already covered by the class, and his evaluation of the class's capacity to work with juggling for a sustained period. Once the PE teacher had agreed to participate, he was invited to familiarise himself with the module and, in collaboration with the research team, decide how to adapt the module to his group. Before teaching started, we asked the PE teacher to take on a 'facilitator' role, which we described as stimulating exploration and reflection rather than instructing students directly.

Data production procedures

Data were produced using two methods: observations and interviews. During the sequence, observations were carried out by three members of the research team. Two researchers circulated in the learning environment with chest-mounted GoPro video cameras. These two researchers remained with individuals/groups for approximately five minutes at a time. This aspect of the empirical work is most accurately described as 'participant-observation' (Angrosino 2005) given that the researchers entered the situations as 'interested physical educators'. In addition, one researcher took field notes during the lessons. Notes focused on topics such as participants' engagement with the tasks and moments when students appeared to make progress. Notes were both descriptive and interpretive in nature and researcher impressions were recorded alongside accounts of events. Field notes were expanded in post-lesson discussions with the other two researchers and in most cases, the participating teacher. The notes were then typed up by the note-taking researcher and sent to the other researchers for additional commentary.

The two researchers filming held a number of ethnographic-type interviews (Spradley 1979) with the students during the lessons. The researchers asked questions about, for example, what the students were having difficulty with, what kind of learning strategies they were employing, and what they were noticing about juggling. They also engaged in discussion when the students had comments or posed questions. Since the researchers and the PE teacher interacted with the students in pedagogical ways, we refer to researchers and teacher as 'educators' in the illustrations below.

Data analysis

In line with the aim of the investigation, our analytic focus was on identifying interactions that could reasonably be considered instances of (1) AfL (namely, instances where the teacher: clarified and/or shared learning intentions; facilitated effective classroom discussions and activities; provided constructive feedback; enabled students to help one another; and positioned students as owners of their own learning), and (2) AoL, in the empirical material. Practically, the first step involved deliberation between the second, third and fourth authors, who had collected the data and the first author, who had greater assessment expertise. We began by recalling instances that might be considered examples of AfL and AoL. This step enabled us to form consensus around the type of interactions we were looking for in the data. The third and fourth authors then read the field notes for the lessons. The field notes provided a sense of how the lessons had proceeded and contained our reflections on learning. This step provided some insights on which lessons, and which parts of lessons, might contain instances of AfL. AoL was simpler to locate, occurring in the final lesson. The next step – completed by the second author – was to watch the film clips of each lesson and notate all filmed interactions on a minute-by-minute basis. The final step involved selecting instances from both field notes and film clips that could be used as illustrations. This step was completed by all authors. Multiple instances of the five AfL strategies could be identified in the data. We therefore selected what we felt were *typical* interactions (Suri 2011) as illustrations.

Ethical considerations

Ethical approval was granted by the Regional Research Ethical Review Committee. The research was conducted in accordance with the Swedish Research Council's (2017) ethical guidelines. Participants and their guardians were informed about the project, its purpose, and how collected material would be used. Informed, active consent was obtained from the participants. Participants had the possibility to cease participation in the project at any time. The use of video cameras raises issues of confidentiality, possibilities for anonymity, and privacy for all participants. The video-filmed material was used only for research purposes and was stored in a manner that prevents unauthorised use. Anonymity was not possible or desirable in the analysis of the data. Instead, we aimed for anonymity in the presentation/publication of the research results. This involves using fictitious names for schools, teachers and students and excluding information that could be used to identify participants.

Illustrations

In the illustrations below, we show how assessment *for* and *of* learning can be carried out in non-linear movement education practices. In the first three illustrations, explorative learning experiences are promoted through AfL in the following ways: *Interacting with students in joint exploration; Introducing learning strategies; Encouraging students to clarify and verbalise the object of learning; Helping students identify critical aspects of the movement activity,* and; *Inviting students to consider alternative learning trajectories.* The fourth illustration shows how the students' learning can be evaluated in terms of a holistic summative assessment, or AoL.

Illustration 1: interacting with students in joint exploration and introducing learning strategies

In the first illustration, Vilma is practising juggling on her own. She uses three bean bags of which one is placed on her head. One of the educators joins her and asks how she is going. She says: 'Well, I'm now trying with two instead [of three]'. The educator responds by saying that this is a strategy that he has used himself when practising juggling. He prompts Vilma to show him how she juggles. She starts juggling with the two bean bags in a circular pattern, but occasionally she tries to juggle in a cascade pattern. The educator now gets involved in Vilma's practising. He tries to help her

understand the cascade pattern by saying 'up, up'. Vilma manages some consecutive tosses in a cascade pattern. Now, Vilma wants to try juggling with three bean bags and the educator encourages her to take that challenge whilst also joining her in the challenge. They both laugh and seem to struggle without successfully completing three tosses in a cascade pattern. The educator then suggests another way of practicing. His assessment is that Vilma needs to know how to prepare for catching and throwing with one hand, so he invites her to try juggling with two bean bags using only one hand. Vilma accepts the suggestion and goes on to practice in that manner.

In the illustration, educator and student oscillate between collaborative and instructive forms of interaction. Thus, the educator *interacts with the student in joint exploration*. The illustration also demonstrates how teaching changes in line with the need of the learner, in accordance with 'the spirit of AfL'. For instance, as the educator recognises that Vilma's difficulty with the cascade method of juggling is related to her focus on catching the bean bags, rather than throwing while one is still in the air, he suggests another way of practicing. In our analysis, this is understood as the educator's way of *introducing learning strategies*. Accordingly, the educator provides *feedback* that moves the learner forward, which is a key AfL strategy. However, the feedback is not simply instructional, rather it is characterised by questions asked for the learner to discover new ways of throwing and catching in alternative patterns.

Illustration 2: encouraging students to clarify and verbalise the object of learning and helping students identify critical aspects of the movement activity

At one station, the challenge is to juggle while sitting on the floor. Alex is standing at the station juggling with three balls. The educator asks why Alex chooses to stand despite the challenge of sitting down. Alex replies that it is more 'natural' for him to stand. He refers to his experience as handball player, saying that standing gives him a sense of 'control'. After a few seconds, he adds: 'you can engage the whole body … you can sort of fend off … ' The educator asks if standing increases the chance of catching the balls and Alex nods. The next question involves whether Alex thinks there could be any advantage in sitting juggling. Alex responds: 'Well, maybe if you want to focus on getting the throws okay. The idea is that you shouldn't need to move around to catch them'. The educator then invites Alex to show his juggling. Alex starts to juggle with three balls cascade-style. He manages several cycles but needs to walk around to catch the balls. The educator praises Alex and asks if he has any ideas about how to develop his juggling. Alex pauses for a moment before replying: 'Ah, I would like to be able to stand on one spot, not walking around'.

The above interaction illustrates how the educator encourages the student to clarify and verbalise the present object of learning, in this case, being able to throw the balls in a way that allows him to remain in one spot. The conversation invites the student to consider what he currently knows and what he needs to know to develop his juggling capabilities in more complex ways. Importantly, the educator's attention is not only on the student's constraints. The focus is rather on *helping the student identify critical aspects of the movement activity*. In terms of the key strategies of AfL, the educator's ways of promoting learning involves *sharing the learning intentions with the student, activating the learner as owner of his own learning,* and providing *feedback that moves the learner forward.* Again, a common denominator is that these strategies are applied by asking questions that support further discovery.

Illustration 3: inviting students to consider alternative learning trajectories

Three students, Hanna, Ellen, and Linda are practicing juggling with bean bags. They explore different ways of catching and throwing two and three bags while at the same time asking each other 'this way … or that way?' They laugh when the educator joins them. When the students ask how to juggle, the educator responds by saying that it seems that they are all juggling already, just in different ways. 'So, you can juggle in different ways?' asks Linda. Ellen is concentrating on her own practising

with two bean bags in a circular pattern while addressing the educator: 'But how do you juggle? Isn't it supposed to be like this?' The educator answers that Ellen's way of juggling is one way of doing it. The students go on practicing, sometimes with two bean bags, sometimes with three, sometimes in a cascade pattern and sometimes in a circular pattern. Rather than 'correcting' the students, the educator's focus is on trying to help the students recognise the difference between juggling in a cascade or a circular pattern.

In this example, the students initiate a discussion about what juggling 'is' and the educator offers a different ontological starting point: juggling can be different things. This discussion represents a crucial point in the students' explorative learning journeys when they are *invited to consider alternative learning trajectories*. The interaction results in a different understanding of juggling where learning is not necessarily about 'hitting a target' or 'getting it right', but is about expanding one's knowing. In terms of the key strategies of AfL, this illustration relates to *engineering effective classroom discussions, tasks and activities that elicit evidence of learning,* and *activating pupils as learning resources for one another*.

Illustration 4: summative assessment

In the final lesson of the unit, the students had the opportunity to display their juggling capabilities in the form of a group performance. Criteria for the performance were open: students were asked to design a juggling composition involving interaction to display their individual as well as group juggling capabilities in a group of four to five. 'Capabilities' could be demonstrated physically but the students were also asked to talk the audience through the composition while performing it. For example, they were asked to describe why they chose certain juggling exercises and why they chose a certain order to display their individual juggling; what they felt was difficult and what strategies they used to overcome those difficulties; and what they believed they could still improve on if the practise had continued. While the group performances were not assessed officially and did not contribute to the students' grades in PE, they can be used as illustrations of how summative assessments can be arranged in a nonlinear movement learning context.

The performances were diverse. Some students showed how they discovered the cascade pattern after initially having juggled in circles. Others showed how they had improved their juggling through exploring the characteristics of various juggling implements. In some groups, students displayed their juggling capabilities one after the other, in other groups, the students juggled together in intricate patterns.

A legitimate attempt to assess the students' juggling capabilities would be based on the overall assessment criteria of the national physical education syllabus (SNAE 2022). Regarding movement capability, the grading criteria stipulate that:

- 'The student performs movement activities which involve complex movements in different physical contexts and adapts his/her movements **to some extent (E) / relatively well (C) / well (A)** to the purpose of the activities'.

Regarding the ability to reflect on learning experiences, the national syllabus states that:

- 'The student evaluates in a **simple (E) / developed (C) / well-developed (A)** way how different activities and other factors affect his/her own and other people's physical capability and health'.

To conduct summative assessment, it would be necessary for the educator to make the criteria for E, C and A concrete for the students' movement qualities in the context of juggling. Based on the filmed material, we suggest that the students' group performances provide opportunities for the educator to assess both: (a) the complexity of the students' performances in this particular movement activity and physical context, and (b) the students' oral evaluation of their learning.[2] These

opportunities became visible, for example, when they reflected on problems they experienced and overcame, and described their views of their continued development. Information gained from this module could then be considered in relation to the students' movement capabilities in different movement cultures.

Discussion

The aim of the paper is to illustrate how assessment *for* and *of* learning can look when implemented in nonlinear movement education practices. From the video sequences, we presented how assessment took the form of: *Interacting with students in joint exploration; Introducing learning strategies; Encouraging students to clarify and verbalise the object of learning; Helping students identify critical aspects of the movement activity, and; Inviting students to consider alternative learning trajectories.* At the end of the module, a group performance provided opportunities for the educator to conduct holistic AoL in relation to the assessment criteria of the national PE syllabus (SNAE 2022). Although our analysis suggests that assessment can work within a nonlinear approach, educators employing AfL and AoL in nonlinear contexts are likely to face challenges. Below we discuss issues related to time, learning objectives, and equity.

Limited time

A nonlinear approach to teaching, learning and assessment that creates conditions for dwelling (Polanyi 1958/2002) is necessarily time-consuming compared with modules based on a limited number of curricular goals, learning outcomes, learning tasks, and assessment forms (cf. AIESEP 2020). AfL strategies such as joint exploration and developing learning strategies may be experienced as inefficient when compared with more linear strategies (see also the case of 'Chloe' in Scanlon et al.'s (2022) investigation). Two points can be made here. First, if an educator embraces a nonlinear educational approach, they should recognise that it may take considerable time for students to develop knowledge, if they develop it at all. Nonlinear approaches may have advantages over linear approaches, but pace and certainty of learning are not amongst those advantages (Chow 2013). Second, a number of national curricula direct educators and students to movement *cultures* with broad designations, such as outdoor education, games, and movement to music and dance, rather than specific movement *activities* (see for example, ACARA 2014; SNAE 2022). In other words, many curricula offer educators some freedom to work with movement cultures for prolonged periods. There is often no formal requirement to focus on isolated and de-contextualised skills (Penney et al. 2009) or assess students frequently on multiple criteria. In terms of adopting assessment strategies in nonlinear contexts then, time may be experienced as a constraining factor but only if the educator expects learning to take place in traditional, linear ways.

Understanding learning objectives

According to predominant assessment discourse, there will be a poor alignment and lack of transparency if learning outcomes are not clarified at the beginning of a learning sequence (AIESEP 2020; MacPhail et al. 2021). As seen in the illustrations above, it is not always possible to declare clear outcomes at the outset of a sequence. Univocal outcomes are probably more in line with a convergent assessment culture. We are aiming for a divergent assessment culture (Tolgfors 2019, 1214), where learning outcomes are difficult to predict with precision (Biesta 2010). Such a culture shifts the view of juggling capability from capability to juggle in *one* particular way ('this is how you should do it'), to capability to juggle *in diverse ways*, or capability to explore, discover and appraise the challenges and important features of juggling. Viewing juggling capability in this way, including the associated learning outcomes, opens up for continuous dialogue between educator and students. Moreover, if aspects of AfL guide students towards goals that have been agreed upon during the

exploratory learning process, both curricular and individual intentions can be integrated in nonlinear PE practice. However, we also contend that when learning *intentions* are shared with students at the beginning of teaching sequences (Redelius, Quennerstedt, and Öhman 2015), and adapted during the learning process, there is a greater likelihood that teachers and students can focus on learning rather than grading because the criteria cannot tightly frame the activity.

In a similar vein, assessment in PE has been seen as a message system (Chan, Hay, and Tinning 2011; Penney et al. 2009), where 'you get what you assess; you don't get what you don't assess' (Torrance 2012, 325).[3] The group performance in our fourth illustration exemplifies a *holistic* summative assessment that includes both skills *in* and reflections *on* the movement activity. Exploration of movements, evaluation of experiences, and reflection on learning are all relevant aspects of knowledge according to the national curriculum (SNAE 2022). If these aspects are all part of AoL, students may have greater possibilities to understand valid knowledge in PE.

Equity issues

Scholars have raised issues of equity and comparability in educational systems with high stakes assessment (Annerstedt and Larsson 2010; Svennberg, Meckbach, and Redelius 2018). Indeed, these issues must also be considered when adapting the teaching to the needs of the learners. Equity and equality are, however, somewhat fluid concepts. In recent decades, educational consensus has shifted from the idea that all students should be treated the same to the idea that all students should be treated differently (Tolgfors 2019). Based on this development, standards-based school PE could be seen as inequitable, since standards tend to privilege some students while marginalising others (Wright 2000).

The strategies illustrated here may help teachers to avoid standardised, corrective feedback (Tolgfors et al. 2021). AfL and AoL within nonlinear approaches may be more inclusive than assessment in linear educational contexts, in that students are not expected to learn the same things in the same way. The group performance in our fourth illustration created conditions for students to show what they had learned and reflect on their learning. This form of examination opened possibilities for a range of responses. The group performance also provided opportunities for collaboration, which is an important aspect of transformative assessment (Tolgfors 2019). A shift of focus from having students reproduce established movement patterns to solving movement tasks still requires teachers to develop assessment proficiency (AIESEP 2020). But assessment proficiency in nonlinear movement education may mean that a teacher can discern critical aspects of the students' participation in movement practices, even when students do not perform exactly the same movements.

Concluding thoughts

Assessment within linear approaches to PE often involve standardised feedback based on prescribed learning outcomes with narrow frameworks for what is 'right'. Such assessment is frequently facilitated by rubrics designed for promoting step-by-step progression. In the current study, our purpose has been to illustrate how assessment *for* and *of* learning can look when implemented in nonlinear movement education practices where the learning outcomes are opened up to allow for multiple ways of 'doing it right'.

The major contribution of this study is that it shows how assessment *for* and *of* learning can be implemented in nonlinear movement education practices within a goal-related and criterion-referenced education system. One takeaway message for practitioners is that to 'learn to juggle' (or to know juggling) does not automatically mean 'learn to juggle in one particular way' (or to know one particular way of juggling). More generally, this approach is expedient if learning is not to be seen as 'hitting a target' or 'getting it right', but about expanding one's knowing. Expanding one's knowing, for example, in terms of knowing how to juggle in diverse ways, or knowing how to explore, discover and appraise the challenges and important features of juggling, also relates

to the discussion about a shift of focus from having students reproduce established movement patterns to solving movement tasks (AIESEP 2020). A second takeaway message for practitioners is that an interlinked process of AfL and AoL does not necessarily imply an instrumental use of AfL techniques and standardised forms of summative assessment. In nonlinear movement education practices, the 'spirit of AfL' (Marshall and Drummond 2006) is rather to adapt teaching to students' needs. This is facilitated by the educator seeing the explorative learning context as an arena for his or her own learning. Under such circumstances, the suggested approach to assessment *for* and *of* movement learning can help educators to: circumvent dichotomies such as mind-body and theory-practice (Larsson, Nyberg, and Barker 2021); approach students as active meaning-makers (Correia et al. 2019; Roberts, Newcombe, and Davids 2019); re-frame students' actions as emergent and context-dependent (Renshaw et al. 2016; Renshaw and Chow 2019); and replace direct instruction with explorative teaching and learning methods (Barker, Nyberg, and Larsson 2020; Chow et al. 2015).

Notes

1. AIESEP's recommendations are based on previous problems with PE assessments, such as the focus on isolated and de-contextualised skills (Penney et al. 2009) and the lack of assessment validity, reliability, and transparency (see for example Annerstedt and Larsson 2010; Svennberg, Meckbach, and Redelius 2018).
2. Some aspects that might be considered are:

   > the element of attention, that is the ability to discern critical elements of the movement practice, as well as the ability to judge, or weight, to use a more bodily expression, critical features of the kinescape to allow for appropriate action. (Larsson, Nyberg, and Barker 2021, 6)

3. This has been referred to as the 'backwash effect' (Chan, Hay, and Tinning 2011). According to Chan, Hay, and Tinning (2011), the backwash effect means that assessment both influences the teaching and learning process and defines its product. This tendency often entails 'narrowing the curriculum', but if relevant aspects are assessed, we argue that the phenomenon could be viewed as something positive.

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References

ACARA (Australian Curriculum, Assessment & Reporting Authority). 2014. "Health and Physical Education Curriculum." http://www.australiancurriculum.edu.au/health-and-physical-education/curriculum/f-10?layou=1.

AIESEP Position Statement on Physical Education Assessment. 2020. Accessed January 27, 2022. https://aiesep.org/scientific-meetings/position-statements/.

Angrosino, M. V. 2005. "Recontextualizing Observation: Ethnography, Pedagogy, and the Prospects for a Progressive Political Agenda." In *Sage Handbook of Qualitative Research*, edited by N. Denzin, and Y. Lincoln, 729–745. Thousand Oaks, CA: Sage.

Annerstedt, C., and S. Larsson. 2010. "'I Have My Own Picture of What the Demands are … ': Grading in Swedish PEH—Problems of Validity, Comparability and Fairness." *European Physical Education Review* 16 (2): 97–115. https://doi.org/10.1177/1356336X10381299.

Barker, D., G. Nyberg, and H. Larsson. 2020. "Exploring Movement Learning in Physical Education using a Threshold Approach." *Journal of Teaching in Physical Education* 39 (3): 415–423. https://doi.org/10.1123/jtpe.2019-0130.
Barker, D., G. Nyberg, and H. Larsson. 2022. "Coaching for Skill Development in Sport: A Kinesio-Cultural Approach." *Sports Coaching Review* 11 (1): 23–40. https://doi.org/10.1080/21640629.2021.1952811.
Bedard, C., E. Bremer, and J. Cairney. 2020. "Evaluation of the Move 2 Learn Program, a Community-Based Movement and Pre-Literacy Intervention for Young Children." *Physical Education and Sport Pedagogy* 25 (1): 101–117. https://doi.org/10.1080/17408989.2019.1690645.
Beilock, S., and T. Carr. 2001. "On the Fragility of Skilled Performance: What Governs Choking under Pressure?" *Journal of Experimental Psychology: General* 130 (4): 701. https://doi.org/10.1037/0096-3445.130.4.701.
Berg, B. 2001. *Qualitative Research Methods for the Social Sciences*. 4th ed. Boston, MA: Allyn & Bacon.
Biesta, G. J. 2010. "Why 'What Works' Still Won't Work: From Evidence-Based Education to Value-Based Education." *Studies in Philosophy and Education* 29 (5): 491–503. https://doi.org/10.1007/s11217-010-9191-x.
Borghouts, L. B., M. Slingerland, and L. Haerens. 2017. "Assessment Quality and Practices in Secondary PE in the Netherlands." *Physical Education and Sport Pedagogy* 22 (5): 473–489. https://doi.org/10.1080/17408989.2016.1241226.
Brian, A., J. D. Goodway, J. A. Logan, and S. Sutherland. 2017. "SKIPing with Teachers: An Early Years Motor Skill Intervention." *Physical Education and Sport Pedagogy* 22 (3): 270–282. https://doi.org/10.1080/17408989.2016.1176133.
Bunker, D., and R. Thorpe. 1982. "A Model for the Teaching of Games in the Secondary School." *Bulletin of Physical Education* 10: 9–16.
Chan, K., P. J. Hay, and R. Tinning. 2011. "Understanding the Pedagogic Discourse of Assessment in Physical Education." *Asia-Pacific Journal of Health, Sport and Physical Education* 2 (1): 3–18. https://doi.org/10.1080/18377122.2011.9730340.
Chen, W., A. Hammond-Bennett, and A. Hypnar. 2017. "Examination of Motor Skill Competency in Students: Evidence-Based Physical Education Curriculum." *BMC Public Health* 17 (1): 222–230. https://doi.org/10.1186/s12889-017-4105-2.
Chow, J. Y. 2013. "Nonlinear Learning Underpinning Pedagogy: Evidence, Challenges, and Implications." *Quest* 64 (4): 469–484. https://doi.org/10.1080/00336297.2013.807746.
Chow, J. Y., K. Davids, C. Button, and I. Renshaw. 2015. *Nonlinear Pedagogy in Skill Acquisition: An Introduction*. London: Routledge.
Coker, C. A. 2018. "Improving Functional Movement Proficiency in Middle School Physical Education." *Research Quarterly for Exercise and Sport* 89 (3): 367–372. https://doi.org/10.1080/02701367.2018.1484066.
Correia, V., J. Carvalho, D. Araújo, E. Pereira, and K. Davids. 2019. "Principles of Nonlinear Pedagogy in Sport Practice." *Physical Education and Sport Pedagogy* 24 (2): 117–132. https://doi.org/10.1080/17408989.2018.1552673.
Department for Education. 2013. "National Curriculum in England: Physical Education Programmes of Study." Accessed January 18, 2022. https://www.gov.uk/government/publications/national-curriculum-in-england-physical-education-programmes-of-study/national-curriculum-in-england-physical-education-programmes-of-study.
DinanThompson, M., and D. Penney. 2015. "Assessment Literacy in Primary Physical Education." *European Physical Education Review* 21 (4): 485–503. https://doi.org/10.1177/1356336X15584087.
Harvey, S., and K. Jarret. 2014. "A Review of the Game-Centred Approaches to Teaching and Coaching Literature Since 2006." *Physical Education and Sport Pedagogy* 19 (3): 278–300.
Hay, P., and D. Penney. 2013. *Assessment in Physical Education: A Sociocultural Perspective*. New York: Routledge.
Janemalm, L., D. Barker, and M. Quennerstedt. 2020. "Transformation of Complex Movements from Policy to Practice – A Discourse Analysis of Swedish Physical Education Teachers' Concepts of Moving." *Physical Education and Sport Pedagogy* 25 (4): 410–422. https://doi.org/10.1080/17408989.2020.1727869.
Jess, M., M. Atencio, and M. Thorburn. 2011. "Complexity Theory: Supporting Curriculum and Pedagogy Developments in Scottish Physical Education." *Sport, Education and Society* 16 (2): 179–199. https://doi.org/10.1080/13573322.2011.540424.
Kirk, D. 2010. *Physical Education Futures*. London: Routledge.
Larsson, H., G. Nyberg, and D. Barker. 2021. "Genuine Movement Learning through a Deleuzian Approach." *Frontiers in Sports and Active Living* 3. https://doi.org/10.3389/fspor.2021.771101.
Larsson, H., G. Nyberg, and D. Barker. 2022. "Journeying into the Kinescape of Unicycling: A Deleuzian Perspective." *European Physical Education Review* 28 (3): 651–667. https://doi.org/10.1177/1356336X211065965.
Larsson, H., and M. Quennerstedt. 2012. "Understanding Movement: A Sociocultural Approach to Exploring Moving Humans." *Quest* 64 (4): 283–298. https://doi.org/10.1080/00336297.2012.706884.
Light, R. 2008. "Complex Learning Theory—its Epistemology and its Assumptions about Learning: Implications for Physical Education." *Journal of Teaching in Physical Education* 27 (1): 21–37. https://doi.org/10.1123/jtpe.27.1.21.
MacPhail, A., D. Tannehill, P. E. Leirhaug, and L. Borghouts. 2021. "Promoting Instructional Alignment in Physical Education Teacher Education." *Physical Education and Sport Pedagogy*, 1–12. https://doi.org/10.1080/17408989.2021.1958177.

Marshall, B., and J. M. Drummond. 2006. "How Teachers Engage with Assessment for Learning: Lessons from the Classroom." *Research Papers in Education* 21 (2): 133–149. https://doi.org/10.1080/02671520600615638.
Nyberg, G. 2015. "Developing a 'Somatic Velocimeter' – The Practical Knowledge of Freeskiers." *Qualitative Research in Sport, Exercise and Health* 7 (1): 109–124. https://doi.org/10.1080/2159676X.2013.857709.
Nyberg, G., D. Barker, and H. Larsson. 2021. "Learning in the Educational Landscapes of Juggling, Unicycling, and Dancing." *Physical Education and Sport Pedagogy* 26 (3): 279–292. https://doi.org/10.1080/17408989.2021.1886265.
Penney, D., R. Brooker, P. Hay, and L. Gillespie. 2009. "Curriculum, Pedagogy and Assessment: Three Message Systems of Schooling and Dimensions of Quality Physical Education." *Sport, Education and Society* 14 (4): 421–442. https://doi.org/10.1080/13573320903217125.
Polanyi, M. 1958/2002. *Personal Knowledge: Towards a Post-Critical Philosophy*. London: Routledge.
Polanyi, M. 1969. "The Logic of Tacit Inference." In *Knowing and Being Essays by Michael Polanyi*, edited by M. Green, 138–158. Chicago: The University of Chicago Press.
Redelius, K., M. Quennerstedt, and M. Öhman. 2015. "Communicating Aims and Learning Goals in Physical Education: Part of a Subject for Learning?" *Sport, Education and Society* 20 (5): 641–655. https://doi.org/10.1080/13573322.2014.987745.
Renshaw, I., D. Araújo, C. Button, J. Y. Chow, K. W. Davids, and B. Moy. 2016. "Why the Constraints-Led Approach is not Teaching Games for Understanding: A Clarification." *Physical Education and Sport Pedagogy* 21 (5): 459–480. https://doi.org/10.1080/17408989.2015.1095870.
Renshaw, I., and J. Y. Chow. 2019. "A Constraint-Led Approach to Sport and Physical Education Pedagogy." *Physical Education and Sport Pedagogy* 24 (2): 103–116. https://doi.org/10.1080/17408989.2018.1552676.
Roberts, W. M., D. J. Newcombe, and K. Davids. 2019. "Application of a Constraints-Led Approach to Pedagogy in Schools: Embarking on a Journey to Nurture Physical Literacy in Primary Physical Education." *Physical Education and Sport Pedagogy* 24 (2): 162–175. https://doi.org/10.1080/17408989.2018.1552675.
Rovegno, I. 1995. "Theoretical Perspectives on Knowledge and Learning and a Student Teacher's Pedagogical Content Knowledge of Dividing and Sequencing Subject Matter." *Journal of Teaching in Physical Education* 14 (3): 284–304. https://doi.org/10.1123/jtpe.14.3.284.
Ryle, G. 1949/2009. *The Concept of Mind*. New York: Routledge.
Scanlon, D., A. MacPhail, and A. Calderón. 2022. "A Rhizomatic Exploration of a Professional Development Non-Linear Approach to Learning and Teaching: Two Teachers' Learning Journeys in 'Becoming Different'." *Teaching and Teacher Education* 115: 103730. https://doi.org/10.1016/j.tate.2022.103730.
Shilling, C. 2008. *Changing Bodies: Habit, Crisis, Creativity*. London: Sage.
SNAE (Swedish National Agency for Education). 2022. *Curriculum for the Compulsory School, Preschool Class and Leisure-Time Centre*. Stockholm: Skolverket.
Spradley, J. P. 1979. *The Ethnographic Interview*. New York: Holt, Rinehart & Winston.
Standal, Ø. F, and J. H. Bratten. 2021. "'Feeling Better': Embodied Self-Knowledge as an Aspect of Movement Capability." *Physical Education and Sport Pedagogy* 26 (3): 307–316. https://doi.org/10.1080/17408989.2021.1886268.
Suri, H. 2011. "Purposeful Sampling in Qualitative Research Synthesis." *Qualitative Research Journal* 11 (2): 63–75. https://doi.org/10.3316/QRJ1102063.
Svennberg, L., J. Meckbach, and K. Redelius. 2018. "Swedish PE Teachers Struggle with Assessment in a Criterion-Referenced Grading System." *Sport, Education and Society* 23 (4): 381–393. https://doi.org/10.1080/13573322.2016.1200025.
Swedish Research Council. 2017. *God sed i forskningen* [Good Research Practice] Ny upplaga. Stockholm: Vetenskapsrådet. www.vr.se.
Thompson, M., and D. Wiliam. 2007. "Tight but Loose: A Conceptual Framework for Scaling Up School Reforms." In Annual Meeting of the American Educational Research Association, Chicago, IL.
Tinning, R. 2009. *Pedagogy and Human Movement: Theory, Practice, Research*. London: Routledge.
Tolgfors, B. 2019. "Transformative Assessment in Physical Education." *European Physical Education Review* 25 (4): 1211–1225. https://doi.org/10.1177/1356336X18814863.
Tolgfors, B., E. Backman, G. Nyberg, and M. Quennerstedt. 2021. "Between Ideal Teaching and 'What Works': The Transmission and Transformation of a Content Area from University to School Placements within Physical Education Teacher Education." *European Physical Education Review* 27 (2): 312–327. https://doi.org/10.1177/1356336X20949575.
Tolgfors, B., and D. Barker. 2023. "The Glocalization of Physical Education Assessment Discourse." *Sport, Education and Society*, 28 (1): 1–16. https://doi.org/10.1080/13573322.2021.1967923.
Torrance, H. 2012. "Formative Assessment at the Crossroads: Conformative, Deformative and Transformative Assessment." *Oxford Review of Education* 38 (3): 323–342. https://doi.org/10.1080/03054985.2012.689693.
Wright, J. 2000. "Bodies, Meanings and Movement: A Comparison of the Language of a Physical Education Lesson and a Feldenkrais Movement Class." *Sport, Education and Society* 5 (1): 35–49. https://doi.org/10.1080/135733200114424.