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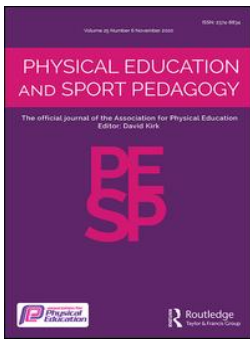**38** PUBLICATIONS   **417** CITATIONS

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Published online: 27 Jul 2021.

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Promoting instructional alignment in physical education teacher education

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ABSTRACT

Introduction: Effective teaching should demonstrate a match between what learners are intended to know and be able to do, the opportunities they receive to learn and practice, and how we assess for learning. In turn, this promotes more worthwhile and meaningful learning. The purpose of this paper is to add to the limited examples of practices that directly connect with the coherent alignment of learning outcomes, assessment and instructional practices in physical education teacher education (PETE) programmes. We do this by introducing instructional alignment as a practically plausible way in which to exemplify the coherent planning of learning outcomes, assessment and instruction.

Methods: Using the backward design process to design aligned learning opportunities, three examples of how instructional alignment can be embedded in PETE modules are shared. These examples are drawn from our own practice in teacher education and have been implemented within our various teacher education programmes to assist pre-service teachers in the design of instructionally aligned lessons.

Results and discussion: While we encourage using the backward design process to design aligned learning opportunities, the decisions made may be substantially different depending on the context and the learners. While each of the examples demonstrate instructional alignment, and are dependent on the context and the learners, three nuances within each are discussed – alignment should support learning progression, clarity of success criteria and enhancing learning by embedding assessment into the learning experience/activity.

Conclusion: Effectively embedding instructional alignment in PETE includes (i) buy-in from all programme faculty as to their understanding, and enactment, of instructional alignment as a central pillar of the module/programme, (ii) modelling good practice in supporting and delivering instructional alignment with pre-service teachers and (iii) encouraging pre-service teachers to embed instructional alignment in their planning, preparation and practices as beginning teachers.

Instructional alignment

Optimal learning environments are achieved through teaching that reflects an alignment between learning outcomes, assessments that provide evidence of learners reaching those outcomes, and the instructional practices employed to facilitate learners achieving success (Cohen 1987; Tannehill, van der Mars, and MacPhail 2015). In other words, effective teaching should demonstrate a match between

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what learners are intended to know and be able to do, the opportunities they receive to learn and practice, and how we assess for learning. In turn, this promotes effective and efficient learning.

The purpose of this paper is to add to the limited examples of practices that directly connect with the coherent alignment of learning outcomes, assessment and instructional practices and satisfaction of the conditions of assessment efficacy in physical education teacher education (PETE). That is, that assessment can work with learning outcomes and instructional practices to achieve desired educational ends. We do this by introducing instructional alignment as a practically plausible way in which to exemplify the coherent planning of learning outcomes, assessment and instruction in PETE programmes. Before sharing three worked examples of how instructional alignment can be embedded in PETE modules, we explore the related concepts of instructional alignment, backward design and assessment literacy.

It is worth remembering that, 'What the student does is actually more important in determining what is learned than what the teacher does' (Schuell 1986, 429). Biggs (2003) suggests that 'alignment' is what the teacher does when designing a learning environment to support learning experiences that allow learners to achieve the learning outcomes. In other words, 'The learner is "trapped", and cannot escape without learning what is intended' (Biggs 2003, 1). In introducing instructional alignment, Cohen (1984, 1987) made it clear that the concept of instructional alignment was informed by previous work such as behavioural research completed in the area of teaching strategies and instructional design (e.g. Carrol 1963; Gagné 1965). Combining the interest in the 1960s in task analysis, outcomes and the process of instruction with ecological perspectives in pedagogy, as well as new empirical evidence, Cohen (1984, 1987) positioned instructional alignment at the centre of the search for effective teaching and educational excellence. However, if the chosen curriculum is not one that is challenging, exciting, and meaningful to learners then, no matter how well aligned it is, and despite learning taking place, how much application it will have for young people and their lifestyles is questionable.

In suggesting a model for designing a physical education curriculum, Melograno (1996) conveys similar principles to those that are considered essential to instructional alignment. In determining where learners are going, Melograno (1996) suggests that teachers become curriculum designers rather than curriculum consumers. He suggests the focus of a curriculum to be regarded as the 'organizing centre' and conveys how teachers need to transform curricula into goals based on learners' abilities and interests, and subsequently, select content to support these goals. In determining *how to know when learners have gotten there*, he suggests developing evaluation procedures. In determining *how learners will get there*, he suggests devising learning experiences. Indeed, in a later text (Kelly and Melograno 2004), the term 'curriculum alignment' is used to capture the process to identify what is intended and what happens. The notion of teachers as curriculum designers is not to state that instructional alignment cannot be considered at the centre of the search for effective teaching and educational excellence in instances where no choice in curriculum is permitted, e.g. government mandated programmes of study with grade-level outcomes. Rather, in such instances, instructional alignment is feasible if the mandated curriculum is challenging, meaningful and exciting to learners.

Although research into instructional alignment in both PETE and physical education is scarce, its enactment and realisation in practice has been suggested by several authors to be suboptimal. In reporting on the relationship between instructional alignment and the ecology of physical education, James, Griffin, and Dodds (2008) showed that there was no instructional alignment between the teachers' espoused agenda, lesson tasks, and assessments. In examining how aims and learning goals are communicated in practice, Redelius, Quennerstedt, and Öhman (2015) report that if the goals are well articulated by teachers, K-12 students are more likely to both understand and be aware of the learning outcomes and what to learn in physical education. The opposite is also true. If the goals are not clarified, K-12 students find it difficult to state the learning outcomes and know what they are supposed to learn. In exploring the alignment within school physical education of assessment with learning goals, Borghouts, Slingerland, and Haerens (2017) reported a lack of alignment between intended learning outcomes and what is being valued and assessed.

Exploring constructivist pedagogies in PETE, MacPhail, Tannehill, and Goc Karp (2013) concluded that pre-service teachers' (PSTs) ability to design aligned physical education lessons was quite variable, even though they understood and valued the principles of instructional alignment.

To teach PSTs about alignment, physical education teacher educators should first of all be exemplary by aligning the PETE curriculum, and then be explicit about this to PSTs and engaging with them to acquire the skills needed to design aligned curricula. As teacher educators begin to consider how to design instructionally aligned curricula, units, or daily lesson plans, the idea of backward design proposed by Wiggins and McTighe (1998) can be both informative and helpful. Central to both instructional alignment and backward design is teaching what we assess or assessing what we teach. As Cohen (1987) stated:

> Teaching what we assess, or assessing what we teach seems embarrassingly obvious. The fundamental issue is: What's worth teaching? This is the same question as: What's worth assessing? We can either know what we are doing, or not know what we're doing, but, in either case, we'll be doing something to other people's children. Do we not have an ethical obligation to know what we're up to? (19)

Backward design

Backward design suggests starting with the end in mind, i.e. the intended learning outcomes, the goals that learners should aim for, the important 'stuff' (Tannehill, van der Mars, and MacPhail 2015). Once it has been determined what the outcomes at the end of the learning trajectory should be, the planning moves 'backwards' to determining the assessment, i.e. how will learners demonstrate or provide evidence of that learning. Proceeding backwards ensures that performance assessments are directly related to the intended learning (Wiggins and McTighe 1998). Finally, it must be determined what teaching strategies will be most effective and which learning experiences are the most powerful to facilitate learning and prepare learners for the assessment. Critical to this process of backward design is repeatedly asking how a proposed instructional element or assessment contributes to the learning outcome.

Although we advocate backward design, we acknowledge that the relationship between the three aspects of instructional alignment is bidirectional (Chen and McNamee 2006). In practice, assessment activities are used to both enhance learning and to evaluate the effectiveness of our instruction. Subsequently, this directs the nature of (revisiting) future curriculum activities with the result being that the pattern is no longer a linear sequence with assessment preceding curriculum development. In contrasting backward design with other approaches to curriculum design, Richards (2013) stated that backward design presupposes (i) a certain degree of autonomy in the design and enactment of the curriculum, (ii) that sufficient resources can be committed to the development of learning goals and assessment tasks and, (iii) that well-trained and skilful teachers or curriculum designers are required. Assuming these requirements are met, backward curricular design is considered as superior with respect to capturing the complexities of curriculum design to 'traditional' approaches that tend to prioritise content or pedagogy (Kelting-Gibson 2005).

You might think of the instructional alignment triad and the relationship to backward design as a three-legged stool (Lambert 1996). If any one of the three legs are too short the stool will be wobbly and if any leg is missing the stool will fall over. This suggests that all three legs must be stable to create balance. This supports the concept of instructional alignment that learning outcomes, assessment of learning and instruction must all match (Penney 2013).

The three-legged stool

The first leg

The first leg of the triad is reflected in learning goals for student achievement, i.e. what it is that students will learn. Regardless of the context and the country in which you teach, most countries

have (to some extent) identified what they want students to know and be able to do as a result of participating in a PETE programme (Hardman et al. 2014; MacPhail, Tannehill, and Avsar 2019). Irrespective of the term used to identify these learning goals, the intent is to focus on desired student learning outcomes by designing learning experiences that might allow students to reach the intended outcomes (MacPhail 2015). Learning outcomes should therefore be phrased in such a way that they are intelligible for students as well as curriculum designers (Redelius, Quennerstedt, and Öhman 2015), and contain enough information to allow decision making about assessment, teaching and learning activities.

The second leg

The second leg of the triad is assessment, and specifically assessments that match the learning outcome. Once we have identified what students are to achieve (outcome), we must determine how they might demonstrate success (Wiggins and McTighe 1998). All learning does not have to be demonstrated in the same way. Just as all students learn differently, so do they demonstrate learning in various ways. It is up to the teacher to provide opportunities for students to demonstrate their success, their mastery, their competence, and their level of achievement (Slingerland et al. 2017). In other words, assessments are responsive to individual students and to university contexts. This suggests that we interact with young people to determine the types of challenges that would hold the most educational value to them or how assessment results might inform students of their strengths and areas needing improvement. We concur with Wiggins (2011) that assessment is central to instruction, it is not an add-on. If the assessment is a quality challenging measure of what students were taught and what they have been striving to master, then teachers should 'teach to the test' (AIESEP 2020).

The third leg

The third leg of the triad is instruction and how instruction is designed to facilitate learning. It must be done intentionally, thoughtfully, creatively, and in an inviting and individually motivating way (Silverman and Mercier 2015; Aelterman et al. 2019). We are fortunate in PETE that our content allows us choice and that all movement forms may be used to reach various psychomotor outcomes. Greene (1995) reminds us that if we want to engage young people in our content, it is imperative we focus on students' lifestyle interests and preferences taught through a wide range of experiences in which they have a voice in designing.

While the analogy of the three-legged stool captures that learning outcomes, assessment of learning and instruction must all match, the extent to which this can be enacted is dependent on teachers' and students' understanding of the fundamental assessment concepts and procedures that effectively influence learning.

Assessment literacy of teachers and learners

Relatively low assessment literacy of teachers and learners is a challenge to the effective organisation, implementation, and alignment of assessment tasks (Carless 2017; Hay and Penney 2013). From the perspective of the teacher, this includes (i) the teachers' understanding of assessment processes as well as their capacities to design assessment tasks, (ii) developing adequate criteria for making fair and valid judgements on the quality of students' performances, and (iii) understanding and acting upon the information that is collected through assessment. From the learners' perspective, assessment literacy includes (i) understanding how assessment contributes to their own learning, and (ii) engaging with the assessment process. As such, the students' involvement in PETE can be enhanced through 'assessment as learning' (Earl 2003). This directs students away from conceiving assessment primarily as a source of information for reporting achievement outcomes and/or

receiving certification. The idea that involving students in assessment and the assessment experience itself can support students' intended learning, as well as valued learning, represents a step towards empowering them as responsible for their own learning. Such assessment becomes central to teaching and learning practices and is thus best understood as situated in instructional activities and goals.

Assessment literacy for pre-service teachers (PSTs) requires them being cognizant of, and able to improve, both their own assessment literacy as a future teacher as well as the assessment literacy of their own students (Hay and Penney 2013; Menter 2016). In a bid to increase PSTs' appreciation of improving their own assessment literacy through the instructional alignment triad, we share three PETE teaching practice examples that introduce 'backward design' as a way in which to plan for and enact instructional alignment in physical education teacher education.

Examples of embedding alignment in PETE

We now introduce the reader to three examples of how instructional alignment can be embedded in PETE modules. These examples are drawn from our own practice in teacher education and have been implemented with PSTs in our various teacher education programmes to assist PSTs in the design of instructionally aligned lessons. The authors' work and research in the area of instructional alignment, and other concepts linked to teaching and learning, served as the basis for the selection of these examples (Borghouts, Slingerland, and Haerens 2017; Leirhaug and Annerstedt 2016; MacPhail, Tannehill, and Goc Karp 2013; Tannehill 2017). Each of the authors first selected an example that had been used in their teacher education programme. These examples were initially developed by studying the research literature on instructional alignment, reflecting on our own teaching experiences, considering the learning outcomes specified in curriculum documents, and consulting with colleagues in our own institutions. Each example was then shared with the group of authors for discussion on the extent to which they clearly reflected appropriate alignment of learning goals, assessment, and instruction and to ensure they reflected a lesson that could be transferred across learning contexts. In other words, we attempted to choose examples that fit within a physical education curriculum model, a commonly used physical activity in physical education and PETE, and/or were based on a learning goal that would be appropriate in most PETE settings internationally. Our intention is to add to the limited examples of practices that directly connect with the coherent alignment of the triad and satisfaction of the conditions of assessment efficacy (Figures 1–3).

Three nuances of instructional alignment

Learning that is instructionally aligned need not be prescriptive. While we encourage using the backward design process to design aligned learning opportunities (across a programme and associated modules and lessons), the decisions made may be substantially different depending on the context and the learners. The authors spent considerable time studying each of the examples, sharing with one another how they were used with our PSTs and their success in learning from them, reflecting on how each example could be employed in other contexts, and ensuring they reflected alignment across the triad. While each of the examples demonstrate instructional alignment visually, our discussion revealed that the experiences of our PSTs showed the examples to be a successful way of introducing the concept of instructional alignment and facilitating skill in designing similar examples. Following this initial discussion, the first two authors reviewed notes taken during our discourse, read and re-read the instructional alignment examples, and engaged in in-depth review of the similarities among them that might have influenced pre-service teacher learning. Notes we took and key points we discussed were then shared with all authors as we debated whether they reflected the key nuances that allowed learners to appreciate the distinction among the various examples. We debated, we challenged, and we added to and deleted others until we came to agreement that these were those we believe allowed our pre-service teachers to gain understanding of

Learning Outcome
During a Sport Education season, pre-service teachers will be able to undertake different playing and non-playing roles in the selected physical activity (in this case, basketball).

Assessment
The overall assessment for this module is for PSTs to submit a performance portfolio demonstrating their achievement of each learning outcome. In this example, one of the choices for outcome 1 is for the PSTs to provide a video clip demonstrating their ability to undertake a non-playing role successfully with their team. In this example, coaches are to design a 15-minute practice session (with practice task) they designed, supervised, and provided feedback on to their peers.

Success Criteria
(1) Goal for practice task
(2) Conditions for practice task
(3) Expectations for practice task
(4) Demonstration of practice task
(5) Feedback to players during practice task

Learning Experiences
In order to achieve learning outcome 1 and demonstrate doing so successfully students must learn what the different roles are (non-playing roles in this case) and role responsibilities

 Learning experience 1: PSTs read about the various roles (e.g., captain, coach, trainer, official, score keeper) for invasion games in a pre-assigned reading. Students will split into five groups each assigned to a different role. Each group will brainstorm the responsibilities of the (coach) role, share these with the rest of the class, and a class decision made which will guide this role throughout the basketball season.

Learning Experience 2: The class will be working in teams that remain together for the entire basketball season. Teams will meet, review the role responsibilities and determine who on their team is best chosen for each role. If there are extra players, they will serve in an assistant capacity to the various roles. Each day, the instructor will model one aspect from one of the roles during class and discuss how the demonstration covered all success criteria (or, lets students assess this) (feedup). Then teams go to their home court and the role designee will take responsibility for their own team. In the case of the coach, the instructor will introduce a practice task, share the goal of the task, the conditions and expectations for practice, give a demonstration (using the team coaches as the models) before sending them to their home court. Each team coach will then observe their peers, checking to ensure they are following directions and performing the task as presented, and give feedback to assist them in improving.

Learning Experience 3: The student-coaches will be given links to a basketball website that has examples of practice tasks for various aspects of the game. Coaches, will identify the area for which they feel their team needs practice, draw from the website examples, and design a practice task for the next class session using the structure of the five success criteria.

Learning Experience 4: Student-coaches will video tape their team as they lead them in the designed practice task and provide feedback. Viewing the video, student-coaches will reflect on how it went, if it was an appropriate task, and how their team responded. This reflection and self assessment (feedback) will be guided by the success criteria (scoring rubric) and together with a peer or the instructor will consider how to further improve their coaching performance in another session (feedforward).

Figure 1. Example 1.

instructional alignment. We will address each of these nuances for each example that reflect key points that were revealed as a result of our PSTs' experiences with the examples and our discussion.

Alignment should support learning progression

As we have discussed, teachers begin with the learning outcome and then design an appropriate assessment for students to demonstrate learning. Each assessment has success criteria that describe what success looks like and assists both the teacher and the student to make judgements about the quality of learning. As students all start at different skill and ability levels for each outcome, there must be room for progression within the success criteria as students progress through various

Learning outcome
PSTs will be able to play invasion games in both an offensive and defensive role.

Assessment
Summative assessment takes place by teacher observation of the PSTs' game play, during the last three lessons of the nine-week unit, using a scoring rubric. As additional evidence, the teacher also uses the rubrics that were filled out by PSTs during the unit, for self- and peer-assessment. Pre-service teachers can choose which invasion game (football, Ultimate 'frisbee', or field-hockey) they wish to play in the last three lessons, and therefore be assessed on.

Success criteria
The offensive and defensive roles are broken down into three success criteria:
1. Keeping ball possession and passing (offense);
    a. Shielding the ball from the opponent
    b. Scanning the field
    c. Playing a receivable pass
2. Moving to open space and receiving the ball (offense);
    a. Creating a triangular formation with teammates
    b. Moving out of the defender's space
    c. Catching effectively
3. Preventing a pass (defence)
    a. Defending space
    b. Defending teammates
    c. Intercepting the ball

Students are made aware that there are additional success criteria for game play (such as "approaching the goal and attempting to score"), but that the emphasis in the unit is not on those. The rubric consists of further specification of the success criteria as shown in the breakdown above.

Learning experiences
During every lesson, the emphasis is on just one of the success criteria. Adapted (small sided) forms are played of the invasion games football, Ultimate, and field-hockey. Each lesson starts with an explanation of the part of the rubric specific for the success criteria central to that lesson. An example of a lesson would be:

Learning Experience 1: In a lesson around 'moving to open space and receiving the ball', 3x3 Ultimate is played with points scored by catching the disc in the end zone. Per team, one student observes from the side of the field, using the parts of the rubric specific to 'moving to open space and receiving the ball' (i.e. formative peer-assessment). Regularly, time outs are announced by the teacher to use for peer feedback by the observer.

Learning Experience 2: Then, a game called '3x3 space ball' is introduced, in which teams can score points after completing at least three correct passes with a foam ball, and then passing to a player on one of four mats, placed in the corners of the field. Depending on the progression of the students, scoring is made more difficult by the teacher introducing new rules, such as 'a point does not count if a defender also has at least one foot on the mat', or 'a point only counts if a player receives the ball whilst jumping onto the mat'. This helps players to improve the skills needed for 'moving to open space and receiving the ball'.

Learning Experience 3: The students then have a choice to adapt this game form to either football, Ultimate, or field-hockey using the same success criteria to guide performance.

Learning Experience 4: The teacher concludes the lesson by inviting the students to reflect on what they have learned and would like to improve with regards to the success criteria central to this lesson. Students fill out the scoring rubric for themselves (i.e. formative self-assessment).

Figure 2. Example 2.

learning experiences/activities in their effort to reach the ultimate goal, i.e. demonstration of learning. In example 1, the aligned plans focus on specific content (playing and non-playing roles), a portion of a complete lesson with the learning experiences (a 15 min PST-led segment), and reflect a progression over a number of days (from reading, discussion, mirroring the teacher, and research to application and assessment). So, in this case learning is reflected in a developmental way. In example 2, planning focuses on an entire (2-hour) lesson, a specific success criterium (in

Learning Outcome
Pre-service teachers will be able to demonstrate self-awareness and ability to develop their own skills and personal attributes of experiential learning, the demands required by group dynamics, natural landscapes and friluftsliv practice (environmental awareness and joy of nature).

Assessment
The assessment is primarily formative based on self-assessment of *friluftsliv* competence and peer assessment of both preparation and achievement of the PSTs development plan.

Success Criteria
1. Realistic goal and plan for own development through 25 hours of individual study/homework

2. Discussion of the plan and how to assess the level of achievement with the peer students

3. Demonstration of achievement (for peer students)

4. Giving feedback to two peer students after their demonstrations

5. Writing two assessment documents and giving them to the two peer students

Learning Experiences
Learning Experience 1: During an exploration of what *friluftsliv* can look like with only a few hours to spend in natural settings close to school or campus, PSTs will split into groups of four to six to discuss the competences and more concrete skills that are needed to become a good *friluftsliv* teacher. (Which skills are necessary and which would be beneficial but not critical?)

Learning Experience 2: All PSTs will complete a 'capacity analysis', in which they assess their own competencies to experiential learning in *friluftsliv*. On the basis of this analysis, the PSTs choose a skill or competence and make a plan for a total of 25 hours of individual study/homework aiming to enhance and develop the chosen competence. The plan must include concrete goals for their own development, a description of how to assess progress and the expected level of achievement.

Learning Experience 3: Pre-service teachers reform into groups of three. Each PST presents his or her plans to the other two, discussing how realistic the plans are and demonstrating how he or she will be able to show that the skill or competence has been developed.

Learning Experience 4: Pre-service teachers' revise their plans and deliver them to the teacher-educator responsible for *friluftsliv*.

Learning Experience 5: Pre-service teachers spend 25 hours of individual study/homework following the plan. Each must engage in a minimum of one dialog about their progress with each of their two peer partners during this period.

Learning Experience 6: At a planned time, each PST invites their peers to a suitable setting and demonstrates their achievements according to earlier discussions on how to show and assess progress and the learning outcome. After the demonstration, the group discusses what they have learned and how they can learn more.

Learning Experience 7: All PSTs develop an assessment for his or her peers on how well they achieved success criteria 1, 2, and 3. A short description of the demonstration (Activity 6) and suggestions for further development should be included. This written assessment is delivered to the teacher-educator responsible for *friluftsliv* as well as to the concerned student.

Learning Experience 8: Each PST will develop a reflective analysis of their personal development on each of the five success criteria noting strengths, areas in need of improvement, and how they will further develop their skill and knowledge. Finally, PST will discuss what they learned about their own learning and development of *friluftsliv* that has implications for their teaching.

Figure 3. Example 3.

this case moving to open space and receiving the ball), with learning progression and transfer to another game the expectation within a single lesson. At the end of the lesson, students reflect on their aspired learning progression with regards to the success criteria, for the next lesson(s). Example 3 goes a step further than the first two by focusing on what we might consider, a 'big

picture goal' for PST achievement by the end of the module (demonstrate friluftsliv practice) with the formative assessment designed in a progressive way that reflects both self and peer assessment. In this case, the final task invites the PST to extend and apply their learning to their role as a teacher.

Clarity of success criteria

Considering the explicitness of success criteria and the extent to which they are broken down is a critical consideration. We argue that clarity in all aspects of success criteria is key. If we want students to know what they are expected to learn and what it looks like when achieved, then specifying those criteria for students is essential. It is important to keep in mind that students' understanding of success criteria is important for their learning and allowing them to engage in their development will enhance this understanding. This engagement by students brings in the concept of relevance and what they view as important for their own success. With this in mind, teacher designed success criteria might not always be the best choice if learning is to be authentic for the student. In example 1, success criteria are identified for the PSTs and in the third learning experience/activity student-coaches have the opportunity to plan a portion of the lesson using the success criteria to guide them. In the fourth learning experience/activity they self-assess their own role performance during a lesson. In each instance, the specificity of success criteria is critical to PST success. In example 2, PSTs have the opportunity to brainstorm the more specific success criteria necessary for successful achievement of the lesson's expectation. This gives them a voice in the lesson and directs their focus prior to using self-assessment. They then perform in a game setting of their choice, with teacher observation of their performance being informed by the success criteria to provide feedback. In example 3, PSTs have the opportunity to work individually and collectively as part of a small group using the success criteria to both guide their learning as well as guide their assessment of that learning. This enables PSTs to develop skills that they might transfer beyond their role as a student to that of a teacher.

Enhancing learning by embedding assessment into the learning experience/activity

While not necessary, or an expectation for planning instructionally aligned lessons, embedding assessment within a learning experience/activity can certainly aid in achieving alignment, while at the same time enhancing student learning. In other words, if we consider embedding assessment as a form of educative assessment, we are highlighting instances where a student is learning while participating in a learning experience and having the opportunity to recognise that learning simultaneously. If we look at example 1, learning experience three, student-coaches are provided success criteria to guide their practice planning, allowing them to determine as they plan if they have focused on all required aspects of the lesson. They can then go back and make corrections prior to moving to the next step of leading the practice session. Similarly, in example 2 in learning experience three, PSTs have the opportunity to transfer their skill from Ultimate to either football or field-hockey, determining how well they are able to demonstrate the success criteria during this transfer. Embedded assessment in example 3 is different in that we might view learning taking place by peers as they observe other PSTs demonstrating what they believe is evidence of their achievement. Confirmation and understanding of this learning takes place through group discussion where all PSTs have the opportunity to process what they learned and what it means to their own practice.

In the above examples, backward design is key to development of instructionally aligned learning experiences. Each example moves from identifying intended learning (learning outcomes), determining how best learners can demonstrate/achieve success of those outcomes (assessment), and then designing backward from there. In other words, once we know what success looks like, we can then continually ask what students need to know/do at each step until we get back to their current level of knowledge/skill. Learning experiences can then be designed for each step along the way

to facilitate students' success. Some students will need more time at different steps than others which is where skill as a teacher plays a huge role in facilitating learning.

Embedding instructional alignment in PETE

Having spent considerable time studying each of the examples provided in this paper and sharing with one another how they were used with our PSTs and their success in learning from them, we conclude with agreed suggestions, regardless of jurisdiction, on how PETE programmes can embed instructional alignment not only in individual modules but as a programmatic philosophy. In turn, it is anticipated that such practices would provide the skill set necessary for novice teachers to facilitate learning through the enactment of instructional alignment. Many of these suggestions are reinforcing points that we have previously described in this article.

To successfully embed instructional alignment within a programme philosophy there needs to be buy-in from all programme faculty as to their understanding, and enactment, of instructional alignment as a central pillar of the programme. This is not to suggest that programme coherence is easy to achieve, but rather to support the evidence that when a group of physical education teacher educators are at their strongest in terms of connectedness of a PETE programme, PSTs easily identify the threads of the programme curriculum and how modules fit together (MacPhail et al. 2014). Enhancing such connectedness means that there is a focus on PETE faculty to lead by example:

> We must be willing to practice what we preach if we expect to foster [related capacities] in our teacher candidates … If we are serious about fostering an environment that encourages our teacher candidates to take action and teach for change in the roles as teachers, we must not only facilitate environments that encourage such practice, but also model what we envision in our own daily practice as teacher educators. (Gillette and Schultz 2008, 236)

Relating this to instructional alignment, we need to be consistent across the PETE programme in (i) sharing with PSTs what they are going to learn and why it is important, fostering motivation to engage in the learning process, (ii) teaching PSTs what we told them they would learn, doing so in exciting and challenging ways encouraging them to persevere, and (iii) assessing PSTs on what they have been practising, providing opportunities for them to demonstrate learning and apply it in authentic contexts (Tannehill, van der Mars, and MacPhail 2015).

This brings us to consider Loughran's (2006) quest for a pedagogy of teacher education, and how best to embed instructional alignment in individual modules, ' … it is not sufficient just to model effective practice. You must also emphasise what you are teaching and how and why you are teaching it' (Oslin, Collier, and Mitchell 2001, 51). We champion the view that PSTs be engaged in instructional alignment designed and taught by teacher educators with the potential to simultaneously learn to design and teach their own lessons using the principles of instructional alignment (MacPhail, Tannehill, and Goc Karp 2013; Menter 2016). It is imperative that the PETE community engage with, and co-construct with PSTs, physical education environments that are enhanced by the conception of learning outcomes, assessment and instruction to be inclusive of each other. Indeed, in doing so, the reciprocal discussions between physical education teacher educators, physical education teachers and PSTs allow each population to learn from, and educate, each other with respect to the extent to which instructional alignment is transferable to the different contexts each population find themselves in regarding who they are teaching and what the main learning intentions are. In doing so, it is anticipated that, over time, and in continuing to share experiences, a consistent message evolves with respect to how to most effectively consider, support and enact instructional alignment.

In modelling good practice, we should be expected to continually share and revisit with PSTs the goals and objectives of the PETE programme, and be held accountable for sharing our experiences and the evolution of our beliefs as a course progresses (MacPhail and Tannehill 2012). This encourages us to reflect on the extent to which our beliefs and values as a teacher educator inform

our dispositions to, and subsequent enactment of, instructional alignment practices. One might surmise that a teacher educator who has a firmly established core of instructional alignment beliefs and practices, and has a clear vision of the goals of education, is more likely to be successful in provoking PSTs to consider the effect of instructional alignment experiences on their beliefs about effective teaching and learning in physical education. It is important that PETE faculty continually reflect on their own practice in enacting instructional alignment and the extent to which this is being successful in encouraging PSTs to embed instructional alignment in their planning, preparation and practices as beginning teachers. Loughran (2006) has urged teacher educators to 'unpack teaching in ways that gives students access to the pedagogical reasoning, uncertainties, and dilemmas of practice' (6). Once PETE faculty have had an opportunity to create a space to accommodate such reflections over time, a logical progression would be to undertake evidence-based research on practices and subsequent experiences of introducing and enacting instructional alignment with PSTs as an element of the PETE programme (MacPhail, Tannehill, and Goc Karp 2013). There is a definite need for more practice-referenced PETE research to add to the limited examples of practices that directly connects with the concerted and coherent alignment of the instructional alignment triad. Such studies could be further extended to self-studies that forefront the extent to which our beliefs and values as a teacher educator inform our dispositions to, and subsequent enactment of, instructional alignment practices.

We believe that a concerted effort to consider instructional alignment as central to PETE programmes truly forefronts the process of implementing meaningful, educative curricula and assessments. In turn, it is likely that such considerations enhance the meaningful and educative process that we envision for physical education.

Disclosure statement

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