Preparing pre-service teachers to design instructionally aligned lessons through constructivist pedagogical practices

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Abstract

Examining how teacher education influences preservice teachers’ (PSTs) application of content knowledge, decision making when planning for teaching, creation of innovative teaching practices and design of aligned instruction, has significant implications for understanding learning to teach. The purpose of this study was to explore the extent to which the constructivist pedagogies (e.g., interactive community discussions, problem-solving, group challenges) employed by teacher educators through the implementation of a rich task (Macdonald, Hunter & Tinning, 2007) assisted PSTs in their understanding and construction of knowledge about instructional alignment. Data collection employed rich tasks and focus group interviews with a sample of 31 physical education teacher education (PETE) PSTs enrolled on a one-year Graduate Diploma Physical Education programme. Data were analyzed inductively (Patton, 1990) using the constant comparative method (Rubin & Rubin, 1995). Results revealed that PSTs varied in their articulation of the various elements of instructional alignment that were captured in the rich task. Through the use of such constructivist strategies as problem-solving, group discussions, and critical friends, PSTs understood and valued the process of instructional alignment as they moved from feelings of fear and apprehension to being confident in their own development. Areas of strength and deficiency that were noted in the PSTs’ attempts to design instructionally aligned lessons will guide the teacher educators in revising programme components and their own practice.

Key Words

Constructivist pedagogy, learning to teach, instructional alignment
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1. Introduction

Teacher learning and learning how to teach is a major focus of most teacher education programmes worldwide. Avalos (2011) contends that teacher learning should ultimately be focused on student growth and represents a type of teacher professional development that begins within initial teacher education and continues throughout a teacher’s career. As a result of her literature review on teacher professional development, she encourages teacher educators to remember that learning to teach requires personal commitment, and a collective focus to cooperate and challenge one another’s beliefs and perspectives while considering options that might improve practice. Organization for Economic Co-operation and Development (OECD) recognises initial teacher learning as just one phase of the teacher learning continuum, albeit a complex and challenging phase (OECD, 2005).

This study examines the extent to which our pedagogical practices as teacher educators encouraged pre-service teachers’ (PSTs’) perspectives and dispositions towards learning to teach, appreciating that there is a strong association between the design of the learning environment and the quality of PSTs’ experiences and their learning (Darling-Hammond, 1997). More specifically, the purpose of this study was to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment. The study represents an effort to ground PST learning in a particular set of experiences that promote meaningful engagement with, and reflection on, the notion of instructional alignment as a practice of good teaching. In order to frame our intentions of working with PSTs in meaningful ways to support their learning as teachers, it is imperative that we engage with the complexity of learning to teach, constructivist
theory and associated pedagogies, and instructional alignment as a pre-requisite for worthwhile and meaningful learning.

1.1 Learning to teach

Whether at the preservice or beginning teacher level, learning to teach is complex and requires learning content, learning about learning, and learning about teaching. There is a wealth of international research in general education and across all subject areas that examines learning to teach and how a beginning teacher moves from a novice teacher to a competent, and even expert, teacher. Some of this literature is focused on the types of knowledge needed to teach (Loughran, 2006; Lowenberg-Ball, Hoover Thames, & Phelps, 2008; Rovegno, 1993; Shulman, 1986), the stages through which PSTs pass in their quest to become competent teachers (Furlong & Maynard, 1995), and the phases of teacher socialisation that impact a teacher’s development (Lawson, 1987; MacPhail, O’Sullivan & Tannehill, 2010). Teacher education is responsible for setting the stage for PSTs, and ultimately novice teachers, to work through these challenges using different pedagogies, at different times, and with different learners. These pedagogies take diverse forms and involve various learning theories and perspectives that guide learning including behaviourist, cognitive, constructivist, social learning, and more recently complexity theory, all of which offer diverse approaches for teaching practices.

When learning to teach, preservice and novice teachers are forced to negotiate the relationship between learning how to teach and practicing teaching with young people in varying contexts (Loughran, 2006). How teachers’ knowledge is developed is of critical concern to teacher education internationally. If teacher education is to educate teachers to design and deliver quality education programmes to impact student learning, they must recognise and acknowledge how teachers construct knowledge, the conditions under which this learning is most effective and the pedagogical strategies that might facilitate this knowledge development (Tsangaridou, 2006).
An abundance of research has examined the process by which these inexperienced and novice teachers learn to teach and the content considered essential for this teaching. This includes content knowledge (Graber, 1995; Herold & Waring, 2009), pedagogical content knowledge learned simultaneously with content knowledge (Shulman, 1986) and more recently the idea of PSTs appreciating the flexibility of content when teaching (Darling-Hammond & Snowdon, 2005; Loewenberg-Ball, 2000).

Recognising the importance of pedagogical content knowledge (PCK) in the design and teaching of quality physical education, Tsangaridou (2006) summarised much of the research on PCK in physical education. Findings that she reported as having important implications for teachers’ construction of PCK include: 1) PSTs’ PCK is insufficient in today’s school contexts (Rovegno, 1992, 1993, 1994, 1995), 2) PSTs’ content knowledge lacks developmental appropriateness (Rovegno, 1994, 1995), 3) PSTs’ use of PCK during teaching practice is linked to level being taught, prior experience in using these pedagogies, interactions with and support from cooperating teachers, and response received from pupils (Graber, 1995), 4) PCK may need to develop following acquisition of more in-depth knowledge about teaching (Sebrin, 1995), 5) PCK develops as a result of teachers willing to focus on analysing, adapting and revising their own teaching practices (Griffin et al, 1996), 6) PCK can have a significant impact a PSTs pedagogical practice (Tsangaridou, 2002), and 7) PSTs PCK develops as a result of what McCaughtry and Rovegno (2003) refer to as the reality of the teaching context e.g., moving from blaming students as opposed to recognising their own inadequacies and the complexity of motor development, or ignoring students feelings and emotions by coming to terms with how emotions can enhance student learning. Constructivist pedagogy emphasises the role of pedagogical content knowledge and the ability to engage learners in knowledge construction.

Constructivist pedagogies influence on learning to teach
A constructivist approach to the teaching of teachers, prominent in teacher education is based on the notion of using current knowledge and past experiences as the framework for constructing new knowledge and new meaning (Behets & Vergauwen, 2006; Richardson, 1997; Tinning, 2006). Use of constructivist pedagogies requires teacher education programmes to redesign and reformat many of their practices to invite and utilize the individual and collective voice of the PST (Rovegno, 2003; Winitzky & Kauchak, 1997). Kirk and Macdonald (1998) encourage the use of constructivist approaches to teacher education suggesting that they provide opportunities for critical, in-depth and important thinking about teaching and learning.

Constructivism suggests learning is experiential in that people create knowledge and draw meaning from that knowledge through their own experiences and ideas (Dewey, 1933, 1998; Kolb, 1975). From a constructivist perspective, learning is both cultural and social involving social interaction and collaboration with learning peers, as well as interaction with more knowledgeable individuals within society (Biggs, 1996; Kuiper, Volman & Terwel, 2009; Pontecorvo, 2007). For this experiential learning process to be sustained and developed, Vygotsky (1978) argues that learners will progress from one educational task to more challenging tasks only through improved self confidence in their ability to be successful in various problem solving experiences. Brooks et al (1993), similarly, suggested that constructivist pedagogies include 1) inspiring student initiative, 2) accepting student autonomy, 3) employing cognitive language to challenge critical thinking, 4) fostering independent thinking and innovation by building on student responses, 5) developing knowledge construction by challenging students to recognise prior learning, 6) provide interactive opportunities among students, 7) encourage critical thinking and problem solving individually and collectively, and 8) provide time, prompts, redirected questions and probing to push students to develop and integrate new knowledge and construct their own meaning. Fosnot (1996) recommends five principles of constructivism with implications for educational practice with which teachers and
teacher educators engage as they design learning experiences. He suggests that (i) learning is developmental, (ii) learning requires cognitive dissonance where questioning facilitates learning, (iii) reflexivity drives learning, (iv) community dialogue promotes thinking, and (v) through the process of learning new conceptions of knowledge are often developed.

In their review of physical education research from a constructivist perspective, Rovegno and Dolly (2009) stress that, ‘constructivism is a theory of learning and not a set of instructional strategies’ (p. 243). As their education colleagues have done, they highlight the widely accepted principles on which constructivism is based, i.e., learning is active, knowledge is socially constructed, and learners create knowledge in relation to what they already know (Holt-Reynolds, 2000). Constructivist pedagogy encourages knowledge fashioned by learners, taking place in classrooms created as learning communities where learning occurs through peer interaction, collaboration and student ownership of educational experiences (Azzarito & Ennis, 1996; Kirk and Macdonald, 1998). When referring to previous work, Hastie and Curtner-Smith (2006) encourage teacher educators that, when using a constructivist approach to teaching physical education, ‘students must be active learners, in that they perform tasks which involve solving problems and making decisions; social learners, in that they formulate knowledge by interacting with their peers; and creative learners, in that they discover and understand knowledge by experimenting with the subject matter’ [authors’ emphasis] (p. 22).

An increased interest in constructivist theory and practices in physical education has made an impact on teacher education programmes as they assist PSTs in developing their teaching skills and knowledge. Brock, Rovegno and Oliver (2009) propose that two physical education curriculum models, Sport Education and Teaching Games for Understanding, utilize constructivist pedagogies that foster students making sense of their own learning. Examples of these pedagogies include small group work (often in teams), responsibility (for self and team), leadership (in the form of roles beyond player), problem solving (what skills to use when), and
Moreover, both of these curriculum models require students to construct their own knowledge through social interaction with classmates (Rovegno & Dolly, 2009). Light (2008) also encourages recognition that Teaching Games for Understanding and Sport Education can be best understood through Lave and Wenger’s (1991) situated learning framework as reflected in a student centered team approach, critical thinking and group problem solving. As with Light (2008), Rovegno (1998) argues that physical education teachers need a strong understanding of constructivist principles if they are to implement physical education effectively and allow students to achieve success.

Light (2008) highlights that constructivism has become a mainstay in the physical education literature. He encourages physical educators to consider what has been termed ‘complex learning theory’ to convey what all constructivist approaches have in common, that is, learning is a process, is student-centered, contextual, develops from experience, involves interaction between the mind and the body, and is complex and unpredictable. Light (2008) notes the prominent role of the body in complex learning theory and argues that this provides physical educators the opportunity for ‘reconceptualizing the teaching of physical education and its place in the curriculum’ (p. 28) to extend beyond acquisition of skills and to view learning content more holistically and seldom linear.

Internationally, discussion of complex learning theory in physical education and education is evident. In 2006, the Asia-Pacific Educational Research Association (APERA) International Conference focused on the application of complex learning theory in curricular reforms in Hong Kong, with Fong (2006a) suggesting implications of complex learning theory for pedagogy and student learning. Perhaps the most critical of these implications is that schools must adapt, adjust and even reinvent themselves to address the changing and evolving student needs, while teacher education programmes must consider how to more effectively help PSTs to work with young people in challenging and difficult settings (Fong, 2006b). Thorburn, Jess, and
Atencio (2011) describe their efforts to design a new vision of physical education pedagogy in Scotland that requires teachers to move from what they term as a narrow ‘pedagogy of certainty’ to a more open ‘pedagogy of emergence’. This new ‘pedagogy of emergence’ reflects many of the characteristics of complex learning theory, ‘emphasising teacher and student reflection, co-construction of knowledge, active exploration and the unpredictable and non-linear nature of learning to move’ (Jess, et al, 2011, p. 182). As noted by Jess et al (2011) ‘pedagogy of emergence’ would be reflected by physical education teachers who facilitate student learning, are co-creators of knowledge and in some respects co-learners in the learning process.

As PSTs learn to teach they learn to construct their understanding of instructional design and alignment.

1.2 Instructional alignment

Constructivism and instructional alignment contribute to the concept of ‘constructive alignment’, which represents a ‘marriage’ between a constructivist understanding of the nature of learning, and an aligned design for teaching;

‘a working version of constructivism can be integrated with instructional design at three crucial points: the curriculum or unit objectives are clearly stated in terms of content specific levels of understanding that imply appropriate performances, the teaching methods require students to be placed in contexts that will likely elicit those performances, and the assessment tasks address those same performances’ (Biggs, 1996, p. 361).

Teachers need to recognise that optimal learning environments need to be designed for specific learning outcomes, student background and prior knowledge, and the context in which learning will occur. Wiggins and McTighe (1998) encourage teachers to plan backwards from the ‘big ideas’ they want students to learn, choose teaching strategies to facilitate students reaching those ideas, and design assessment tools that will demonstrate students having achieved
success. This constitutes instructional alignment where goals, assessment, teaching strategies and learning experiences are aligned, promoting richer learning for students. Instructional alignment is a pre-requisite for worthwhile and meaningful learning, but should not be viewed as a panacea in and of itself (Carter, 2008). In teacher education it is critical that we provide opportunities for PSTs to (i) both experience and learn to design programmes that demonstrate alignment between what we want students to know and be able to do, (ii) enhance the opportunities students receive to learn, practice and explore what they have been taught and (iii) explore how we assess for learning, in other words, we need to help PSTs search for their own understandings and how these might align with those of their students.

Instructional alignment has had limited exposure in the physical education literature. Where it has been examined, the interest has been attached to the increasing interest in student learning as a result of (authentic) assessment and accountability (James, 2004; James et al., 2008; Lund, 1992) and less with the perceptions that teachers and learners have of instructional alignment. We propose modelling a specific form of pedagogical practice and associated assessment utilized in physical education teacher education (PETE) that encapsulates our interest as teacher educators to not only teach and model the practices of instructional alignment but also to allow PSTs to live the experience.

We acknowledge that the relationship between the three components of instructional alignment (learning goals, assessment, instructional strategies) is bidirectional (Chen & McNamee, 2006). In practice, we use assessment activities to both enhance PSTs’ learning and to evaluate the effectiveness of our instruction. Subsequently, this directs the nature of (revisiting) future curriculum activities with the result being, ‘the pattern is no longer a linear sequence with assessment preceding curriculum development. Instead, the pattern is a spiral with each leading to the other in a continuous process’ (Chen & McNamee, 2006, p. 125). We also introduce design-focused evaluation, ‘an approach that seeks to provide guidance in
systematically addressing questions to the issue of the links between curriculum designs and the
learning they elicit’ (Smith, 2008, p. 644). That is, we pose questions to gain PSTs’ perceptions
of the effectiveness of the learning experiences / tasks encouraged through our instructional
practices and intentions for facilitating the development of the assessed learning outcomes.

2. Purpose of Study

There is a dearth of research reporting how PSTs apply knowledge learned during teacher
education (Cochran-Smith, 2005). Examining how teacher education influences PSTs’
application of content knowledge, decision making when planning for teaching, creation of
innovative teaching practices and design of aligned instruction, has significant implications for
understanding learning to teach. The purpose of this study was to explore the extent to which the
constructivist pedagogies employed by teacher educators assisted PSTs in their understanding
and construction of knowledge about instructional alignment. It was important that we examine
how PSTs experienced and viewed instructional alignment in practice, and the extent to which
they were able to use their developing skill in designing worthwhile and enduring knowledge
that would be viewed as realistic to young people. We consider how the coursework undertaken
by PSTs and the constructivist pedagogies employed in teacher education influenced PSTs
learning to teach. Drawing on the work of Azzarito and Ennis (1996), Kirk and Macdonald
(1998), and Fosnot’s principles (1996), the pedagogical strategies we chose to employ in these
modules included peer interaction, community discussions, problem solving tasks and group
sharing. Such strategies were utilised to foster PSTs drawing connections between their personal
experiences and beliefs, knowledge created through peer interaction, and PSTs taking
responsibility for collaboratively designed instructional materials. These interactive
constructivist pedagogies recognize the importance of teachers (teacher educators and PSTs)
working together in a community to develop skills, knowledge, expertise, share practices
This collective learning has been encouraged through teacher communities and networks and provides us with a foundation for some of the pedagogical practices we chose. We explore how one teacher education programme encouraged and facilitated PSTs working as a community of learners, drawing on the framework proposed by Hammerness, Darling-Hammond, Bransford, Berliner, Cochran-Smith, McDonald, and Zeichner (2005), who state:

‘New teachers learn to teach in a community that enables them to develop a vision for their practice; a set of understandings about teaching, learning and children; dispositions about how to use this knowledge; practices that allow them to act on their intentions and beliefs; and tools that support their efforts.’ [authors’ emphasis] (p. 69).

This study developed from an interest in understanding the learning processes of our PSTs and the impact of specific pedagogies utilized by teacher educators. The research is significant because it will provide insight for all teacher educators, intent on examining their own practices with PSTs, pedagogical aspects of their teacher education programmes, and how PSTs interpret their learning experiences as they learn content, learn about learning and learning to teach. (Rovegno & Dolly, 2009).

3. Methodology

3.1. Context of the PETE Program

The first two authors were involved in delivering two first-semester pedagogy-related modules to two one-year cohorts undertaking a one-year Graduate Diploma program in physical education (16 PST were enrolled in year one of the study and 15 PSTs in year two). In both year groups there was a range of ages (20 to 44 years) and more females than males (11 females in year one of the study and 12 in year two). These PSTs came from non-teaching undergraduate programs in physical education or closely aligned areas of study in Ireland, the UK or the USA.

Successful completion of this Graduate Diploma program results in PSTs being qualified to
teach Irish post-primary physical education. The expectation of PSTs on entering the one-year Graduate Diploma program in physical education is that they have gained a sufficient level of expertise in subject content knowledge (both applied and theoretical), allowing the program more scope to develop and examine specific, observable teaching skills associated with student learning. Matching this with Feiman-Nemser’s (1990) dominant conceptual orientations of teacher education programs, the program reported here promotes more of a ‘personal orientation’ (focus on the teaching competencies of PSTs) and less of an ‘academic orientation’ (focus on subject matter of games, dance, gym, etc).

3.2. The Two Pedagogy-Related Modules

PSTs attended both modules for four hours each on a weekly basis over twelve weeks. The first module, ‘Physical Education Curriculum and Assessment’ provided PSTs with an opportunity to understand curriculum concepts and investigate the extent to which personal value orientations and philosophies impact on curricular choices. Along with PSTs’ understanding of the (physical education) curriculum within the Irish school system, and what they believe is worth learning, PSTs were guided in using selected curriculum and instruction models in their own teaching. Understanding assessment and its relationship to learning goals and learning experiences intended to allow PSTs to determine what is worth assessing and how this can be done in a meaningful, relevant and effective way. The second module, ‘Introduction to Teaching in Physical Education’ assisted the PST in making the connection to the alignment of teaching in physical education, the teaching and learning process and effective instructional models and teaching skills / strategies. PSTs learned about, and practiced, foundational management strategies, how to design learning experiences and select instructional models / skills / strategies for delivering developmentally and culturally relevant physical education experiences that
respect students as independent learners. Table 1 illustrates the learning outcomes, tentative schedule of weekly themes and assessment points for each module.

[Insert Table 1 here]

In conjunction with these two modules, PSTs were assigned a post-primary school where they taught on ten Mondays throughout 10 weeks of the semester. Throughout both modules and the Monday teaching practice, PSTs reflected upon, critiqued and discussed their school experiences with broader discussions of research on teaching in physical education and the role of the physical educator in the delivery of an equitable, coherent, and culturally relevant physical education in contemporary Irish schools. Within this reflection, and subsequent discussions, there was a focus on how instructionally aligned lessons impacted student learning.

The content of both modules was delivered through learning experiences that matched what we wanted PSTs to know and be able to do at the conclusion of the modules which demonstrates our design of instructionally aligned modules of the content and pedagogical skills we wanted our PSTs to learn. Assessment across these two modules is both formative and summative, illustrating our efforts of allowing PSTs to ‘live’ and learn the process of instructional alignment.

4. Data collection

The purpose of this study was to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and constructions of knowledge about instructional alignment. In a bid to examine how PSTs’ experienced and viewed instructional alignment in practice, data collection employed the use of a ‘rich task’ and subsequent rich task scoring rubric related to the specific pedagogy used with PSTs. In addition, focus groups were designed to elicit PST perceptions of the constructivist pedagogy.

4.1. Rich task
Constructivist pedagogies are explored in this study through the notion of the ‘rich task’, derived from the work of Education Queensland (Cooper, Nuyen & Baturo, 2003; Luke, 1999; Macdonald, Hunter & Tinning, 2007). The rich task presents substantive, real problems for the students to solve, based on a range of learning outcomes, and may be used as an organizational framework for the design of a unit of work (MackPhail & Halbert, 2010). The task is deemed to be ‘rich’ when it is authentic for the student and relevant to the learning outcomes in question. It should also contain 1) transparent criteria and standards, 2) encompass more than one learning outcome, 3) involve acquiring, applying and evaluating knowledge, and 4) provide opportunities for students to demonstrate subject knowledge, skills and understanding (MacPhail & Halbert, 2010).

4.2 Rich Task Scoring Rubric

The rich task was a way to examine the PSTs’ learning of instructional alignment through authentic and practical application. The rich task was discussed with PSTs, explaining what we wanted them to know and be able to do, how they were to get there and how they were to demonstrate achievement in the end. The rich task used in this study was divided into three aspects (see Figure 1); (1) unit design (scheme of work) by PSTs, (2) PSTs developing a scoring rubric to assess the scheme of work, and (3) PSTs assessing a scheme of work using their designed scoring rubric, providing a rationale for each score given. We felt it most appropriate for us to assess this final piece allowing us to see the combined skills and knowledge PSTs had gained from the modules. Key to this was the PSTs’ ability to self-assess their knowledge and its application to practice by providing a rationale for their scoring decisions that reflected the alignment between curriculum, assessment and instruction.

During seminar time for each module, similar to Sockman and Sharma’s (2008) practice, PSTs were required to discuss, construct and agree on an assessment tool and scoring criteria to
be used to score the scheme. The scheme could be completed for any content area and was to suit
either a first, second or third year group of students (11 to 14 year olds). PSTs worked in small
groups on one element of the scheme design guidelines (e.g., big picture goal) in a bid to
construct appropriate scoring criteria aligned with concepts being learned for that element.
However, dissimilar to Sockman and Sharma’s (2008) creation of a rubric, PSTs were given
ample opportunity to offer feedback to other groups working on other elements of the scheme
design guidelines. It was reinforced to PSTs that the rubric was a representation of the criteria
and expectations in completing the rich task / scheme design and not, as commonly perceived by
undergraduate students, a tool for satisfying faculty members’ demands (Andrade & Du, 2005).
During autumn examinations PSTs used their agreed assessment tool (Table 2) to evaluate and
score their own scheme design, providing their rationale for each score given. Key to this was the
PSTs’ ability to provide a rationale for their scoring decisions that reflected the alignment
between curriculum, assessment and instruction. The scoring rubric in Table 3 was completed by
both instructors assessing PSTs’ responses to their perception of the extent to which they had
fulfilled their agreed scoring rubric criteria. This allowed the instructors to identify patterns of
student learning.

[Insert Tables 2 & 3 here]

4.3 Focus Group Interviews

Focus groups provided a means by which to reinforce or question PSTs’ perceptions and
opinions related to the constructivist pedagogy promoted by the teacher educators. In an attempt
to gain PSTs’ perceptions of the rich task to facilitate their learning and understanding of
instructional alignment, four focus group interviews were conducted across the first and second
year of the project. Focus groups can provide information about a range of ideas and perceptions
that individuals have about certain issues. They can also help to illuminate the differences in
perspective between groups of individuals. One of the distinct features of focus-group interviews
is its group dynamics hence the type and range of data generated through the social interaction of the group are often deeper and richer than those obtained from one-to-one interviews (Krueger & Casey, 2000). From each year, two focus groups of four and three PSTs respectively were completed, with PSTs volunteering to be involved at the conclusion of their one-year Graduate Diploma program. Focus groups ranged from 40 minutes to 60 minutes. The focus groups were facilitated each year in a teaching classroom by an independent teacher educator and researcher visiting the program. It was thought that the use of an independent facilitator would reduce the possibility of students providing responses that might meet instructor expectations (a form of studentship) or influence the receipt of good grades (Graber, 1991). PSTs were prompted to engage with questions related to (1) their initial reaction to the rich task, (2) the extent to which modules prepared them to undertake the rich task, (3) what they learned and achieved through the rich task process and (4) ideas that they had for improving the modules and related content in the future. The facilitator encouraged all PSTs to comment in an attempt to preclude any students who might dominate the discussion. All focus groups were audiotaped and transcribed.

5. Data Analysis

Data were analyzed inductively (Patton, 1990; Strauss & Corbin, 1990) which relies on the constant comparative method (Rubin & Rubin, 1995). Carter’s (2008) conceptual framework of the integration between the three components of instructional alignment, i.e., curriculum, evaluation/assessment and instruction, was used to examine PSTs’ understanding of the alignment of goals, assessment, teaching strategies and learning experiences. Analyses of the study data consisted of three phases of coding: open, axial and selective (Strauss & Corbin, 1990). Open coding involved taking data (rich task analysis and focus group transcriptions) and segmenting them into categories of information, e.g., responses to the rich task categories were each analysed and compared across cases. This was followed by axial coding, in which
connections were made among categories, e.g., overall, how was backward design used? The
final phase was selective coding, in which the researchers related the central phenomena to other
categories and validated the relationships, e.g., patterns of learning were determined about
instructional alignment and specifically PSTs’ understanding between curriculum, assessment
and instruction.

Data from the rich task scoring rubric (see Table 4) was clearly associated to common
elements /criteria related to the task, i.e., big picture goal, big picture assessment, area of study,
curriculum model, concept map, specific learning outcomes, teaching strategies, modes of
assessment and alignment. The first two authors were responsible for grading the submitted rich
tasks (Table 3) and subsequently kept a log of the extent to which each PST assessed and scored
their own work. In reading individual submissions carefully thoughts and / or perceptions from
PSTs related to their responses to each element of the rich task were identified in relation to
instructional alignment and could then be discussed across cases. The first and second authors
moderated a sample of each other’s grading as is common practice for submitted course work.

Focus group interview responses were analyzed in relation to the PSTs’ engagement
with the instructional alignment process. Common themes and patterns were identified by the
third author, aided by the four questions that were shared earlier. Triangulation within and across
the focus groups was employed to cross check responses, allowing evidence to be confirmed or
disconfirmed and interpreted. The first and second author each moderated one set of focus
groups from year one or year two of the study to prompt any further analysis that may have been
less evident to the third author but more obvious to the two authors involved in the delivery of
the modules.

It was made clear to the group of PSTs that what we hoped to gain from the experience of
evaluating their experiences, perceptions and opinions was to improve future employment of
constructivist pedagogies to enhance PSTs’ associated learning experiences. While the topic of
study, i.e., to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment, may not be sensitive in itself, there is no denying that there was a likely interplay between what the PSTs were prepared to divulge and what they thought we wanted to hear (Graber, 1991). This was complicated by the implications of the researchers also being the teacher educators working with the PSTs on a weekly basis. We are also cognizant that the favoured PST comments may bias those PSTs who were more capable of communicating, through written responses and verbally, their understanding (or not) of the constructive pedagogies being utilized (Kvale & Brinkman, 2006). Hence, we acknowledge perceptions and opinions from some PSTs may be privileged. We by no means attempt to convey privileged truth claims from what the PSTs did share but rather make an attempt to identify and challenge the principles of constructive pedagogies to enhance PSTs’ learning experiences.

6. Results

The purpose of this study was to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment. The results are subsequently aligned with three construct that contribute to such exploration. These are (1) how the coursework undertaken by PSTs and the constructivist pedagogies employed in teacher education influenced PSTs’ learning to teach, (2) the challenges constructive pedagogies posed for PSTs and suggestions from PST on refining and extending constructive pedagogies and (3) how PSTs experienced and viewed instructional alignment in practice, and the extent to which they were able to use their developing skill in designing worthwhile and enduring knowledge that would be viewed as realistic to young people. Pseudonyms are used for each PST and quotes are presented either as they were written or spoken. Focus group data is denoted by FG and quotes shared from PSTs formal responses to
the rich task assignment are dented as ‘script’.

6.1 Development of PST learning and an association with learning to teach

When considering their own achievement as a result of the rich task and the pedagogies we employed to introduce and develop their own understandings of the task, we found that a number of PSTs understood the alignment process in developing content through a scheme as a result of this approach, but not without challenges. After taking part in focused readings, individual and group reflections, consulting with a critical friend or taking part in probing peer and group-dicussions one PST noted,

*I had learned more that way [rich task] than if I actually was sitting reading a book, trying to memorise, ‘Okay, a goal has to be achievable, clear …’ (...) If you were sitting learning definitions (...) ‘What’s an assessment?’, ‘What’s an aim?’ so for me it [rich task] was far easier that way because I knew exactly what I was looking for. (Lorna, FG 1)*

*It was like a jigsaw (...) the toughest thing for me was getting the instructional alignment to gel with all the other pieces, to actually understand that and piece it all together (...) once it was done you could see how the pieces were fitting. (Marie, FG 2)*

*I wouldn’t have fully understood the whole alignment and the whole everything fitting into each other if I hadn’t done the rich task. (Therese, FG 1)*

As a result of being introduced to instructional alignment through varied types of peer interactions, group case analysis and reflective activities, PSTs highlighted how these pedagogies provided the foundation for their growth and developing understanding of the concepts (Fosnot, 1996). One PST admitted that initially he would have approached the task in one way; ‘Pick a goal and then try to see ‘Look, how can I achieve that?’ rather than saying ‘Look, what do I want these kids to achieve?’ and then work backwards from that’ (Martin, FG 1). Ashlee admitted, ‘I
would have put down the objectives, but I would have left it hanging rather than linking them with (...) teaching strategies’ (FG 2)’.

PSTs frequently indicated that the rich task and associated pedagogies and learning experiences allowed them to develop a template for future planning, acknowledging that the work they had completed provided them with a resource they could use when teaching in schools;

*It wasn’t just like an exam paper where you look at it, you never see it again, it goes straight in the bin (...) It was something that you had that we were going to use (...) it was our best weapon going into teaching practice.* (Henry, FG 1)

*The scheme of work I use now for doing all schemes of work is that one, so I work through the process off that. You know, so I’m able to go back and have the headings and have everything and fit them all in.* (Therese, FG 1)

Thus the rich task strategy and associated constructivist pedagogies to support it was useful in developing a template for instructional alignment.

6.2 The challenge of constructivist pedagogies and suggestions on extending constructivist pedagogies

In an attempt to bridge the gap between theory and practice we explored the use of pedagogies that caused PSTs to explore their own current knowledge and begin to link new concepts and principles in ways that made sense to them, even though they initially questioned the practice. For example, the use of a scoring rubric learning task that PSTs, as a cohort, were to construct, agree and use to assess their own, and their peers’ work, heightened the PSTs’ apprehension towards such constructivist pedagogy, expressing fear of the unknown;
It was just different to anything we’ve ever done before (...) Having to mark your own work, it means that you have to be a total expert and know everything about what you were talking about and to have a reason for everything. (Miriam, FG 1)

It was so different to anything that I had ever done before. You know, I would never have designed what I was going to assess myself on before. (Lorna, FG 1)

We could decide on what we were actually being assessed on and it was a bit weird because usually we’re being told what we’re being assessed on. (Ashlee, FG 2)

Despite the PSTs apprehension, we attempted to challenge our students, hold them accountable for exploring and discovering new knowledge through what we perceived were challenging constructivist pedagogies (Brooks et al, 1993). We refrained from coming to the rescue and providing answers when they struggled preferring to encourage, prompt and push them beyond their normal comfort zone. The result was PSTs beginning to take responsibility for their own learning. PSTs did convey an appreciation for involvement in constructing and agreeing on the scoring rubric as a group, noting an extent of responsibility for their own learning. A number of PSTs noted concern that being too self-critical in the assessment process may result in them receiving a low grade. This was an inaccurate perception as PSTs were graded on the extent to which they had accurately presented a rationale for the self-allocated score for each element of the scheme. We suspect such an inaccurate perception arises through PSTs having limited exposure to constructivist pedagogies that encourage them to be active, social and creative learners.

While there was an appreciation that the two modules were closely linked with respect to encouraging instructional alignment, there was a suggestion that combining the two modules may have made it easier for PSTs to develop their understanding of instructional alignment;
Oh yeah, they were doing alignment in Ann’s, but it was separate to what we were doing with Deborah, so then we weren’t realising that the teaching strategies we were doing with Deborah is actually included in the alignment (...) Yeah, it would have been better if they were combined, because they linked off each other, but we weren’t aware that they linking off each other. (Miriam, FG 1)

Ashlee stated that while instructional alignment was covered in both modules, it was towards the end of the semester that the elements appeared to become ‘glued together’ (FG 2). PSTs highlighted and appreciated the continuous learning process that the modules promoted, continually being encouraged to ‘chop and change’ their scheme where appropriate. PSTs reported learning from the various pedagogies we utilised, especially those that caused them to think about and reflect on the process of alignment. This is evident in Martin’s comment where he spoke of instructional alignment and the thought process required of them in developing practice, noting;

We has [have] to think about exactly where we go and not just be thinking about a goal and then be thinking about assessment and then be thinking about your content but actually have to have everything together. (Martin, FG 1)

As the modules progressed and PSTs were continually being reminded of instructional alignment, there was an acknowledgment that once the rubric was complete there was a greater understanding of how it would direct PSTs’ pursuit of instructional alignment within the rich task;

I remember at the time thinking it [the rubric] was a good idea for the scheme of work, to take things off the rubric and make sure they were in the scheme of work’ (Matthew, FG 2)
With the rich task and with the rubric, you actually had to look at each piece and make sure that it did align and you could see the progression from one stage to the other and it all linked in together and wasn’t just in different parts of the scheme. (Martin, FG 1)

Martin expanded on his comment after focused readings and challenges from his peers caused him to think differently and develop new insights on his learning, admitting that in using the rubric alongside his scheme with peer assessment he noticed that the elements of his scheme ‘weren’t really linking in and there wasn’t alignment’ (FG 1).

While throughout the modules the PSTs appeared to value different pedagogies and ultimately recognized that what they learned from one activity might be quite different to the insights gained by their peers, they provided a number of suggestions on how to extend constructivist pedagogies to better meet their needs and development. They suggested we share examples of previously completed rich tasks at the beginning of the course. They wished to maintain the practice of allowing them to prepare one component of an assessment rubric in pairs (as this was helpful) and suggested the use of a jigsaw format (Aronson, 2008) to learn the other components. They requested more extensive opportunities to grade/critique their own and peers’ schemes using a scoring rubric as this is required as part of the rich task, providing useful and practical feedback. Though they received and appreciated feedback, guidance and constructive criticism from peers and instructors, they would have liked formal feedback and assessment on the scheme and its design from the instructors. This learning from, and interacting with, someone viewed as an expert is in line with constructivist pedagogy and worth consideration. The PSTs suggested combining the two modules and more consistency in introducing learning intentions at the start of each class to contextualise the focus of the lecture and how it ‘fits’ in the program of study for the related modules. The PSTs also felt it would have been helpful to prepare them at the start of the modules for the amount of time learning the instructional alignment process.
takes to fully understand and be able to achieve, and ultimately to provide sufficient time for PSTs to revisit their schemes before the end of semester.

6.3 Facilitating an understanding of instructional alignment

The rich task asked PSTs to design a scheme of work, develop an aligned scoring rubric, and then assess their own scheme. The assessment of the final piece, i.e., their assessment of their own work, allowed us to see the combined skills and knowledge PSTs had gained from the modules. It appeared that the PSTs gained insight into the design process through experiencing and reflecting on their own practice in pair and group discussions. Evidence of this was the PSTs’ ability to provide a rationale for their scoring decisions that reflected the alignment between curriculum, assessment and instruction.

Table 5 provides an overview of the scores given to PSTs on how accurate we felt they assessed and scored their schemes of work, paying particular attention to the rationale they provided for the score given, and not our view of the scheme per se.

7. Scheme of Work

There are two particular components of the scheme of work that are pertinent to the focus of our paper. Firstly, the PSTs’ ability to engage with the concept and application of instructional alignment (denoted as ‘Alignment’ in Table 5) allows us to determine the extent to which PSTs were able to clearly articulate how/why they believed all aspects of the scheme of work were instructionally aligned. Secondly, PSTs’ analysis of the teaching strategies (denoted as ‘Teaching strategies’ in Table 5) allows us to examine the extent to which PSTs provided an appropriate set of learning experiences and instructional strategies to progress toward the learning outcomes. Interestingly, both items were scored relatively low by the teacher educators with regards to the rationale PSTs conveyed for the way in which they had addressed each item.
7.1 Application of instructional alignment

PSTs ability to design lessons that align the learning goal with the assessment and then use appropriate instructional strategies and learning experiences to allow the students to be successful was quite variable. Some PSTs gained a deeper understanding of pedagogical practices by questioning and probing one another in an environment that provided freedom to explore while being held accountable for their own developing practices. For example, Ciaran commented that, ‘the process of matching goals to assessment and to instructional strategies focuses on three questions (Siedentop & Tannehill, 2000). What do I want them to achieve (big picture goal)? How will I know they have achieved it (assessment)? How will I get them their in the most effective way (teaching strategies)? Group challenges helped me answer this question’ (script 8). It is however worrying that a few PSTs were just developing the notion of instructional alignment, with Declan failing to articulate what the concept means in practice, ‘I failed to discuss the alignment between the goals, teaching strategies and assessment. I can see them linked in the scheme but did not discuss what or how this was achieved’ (script 13). A few PSTs demonstrated alignment well in the scheme and rationale and several were able to articulate understanding of the alignment concept, and demonstrate it in the scheme. Carmel accurately suggested that ‘instructional alignment is deciding what you are going to teach and then teaching and assessing that’ (script 23), and then continues to do so in her scheme and in her scheme assessment, being specific and clear in discussing her alignment of each aspect of the scheme. A few PSTs were not able to indicate why they scored themselves lower, or what was missing in making the scheme more aligned. One PST failed to describe alignment or determine if it was present in the scheme (script 9). In a couple of cases the PST expected us to ‘see’ the alignment without the need to explain what it meant or how they view it, such as Sonya who
stated, ‘As you can see through the scheme all areas were looked at in depth and aligned accordingly’ (script 11).

When analysing instructional strategies and viewing PSTs’ comments, it was interesting to us that most of the PSTs did not link their learning or lack of learning to the pedagogies we employed to aide them. This is a problematic for us in that our analysis of PSTs’ choice of instructional strategies indicated a mixed ability among the PSTs to design appropriate strategies and explain how and why they might be effective. Yet, we do not know if it was the content or the learning experiences we provided that were the issue in their ability to select appropriate strategies. There were a few instances where instructional strategies and learning experiences were chosen and described yet did not appear to match or be linked to learning outcomes. This suggests that PSTs may have randomly cut and paste from handouts or picked activities they had enjoyed but had not connected to outcomes of the specific lesson. Not linking instructional strategies to the specific scheme of work is apparent in Casey’s script when he listed four strategies (small group work, teaching through questions, student mediated learning, and problem solving) and reproduces the descriptions provided in lectures (script 2). On the other hand, Therese provides detailed and specific rationale for her choice of learning experiences and aligned instructional strategies to meet the outcomes students are striving to achieve (script 3). Interestingly, some PSTs designed assessment tools that were also learning experiences, yet these were not mentioned in the instructional strategies section of the scheme, encouraging us to question whether they understood the concept of an educative assessment that might be one instructional component of a lesson. Other PSTs provided limited discussion of instructional strategies to demonstrate understanding and lacked detail to clarify how strategies would assist in student development of learning outcomes. Some PSTs used appropriate language yet did not explain how such terms were linked to student learning. This is apparent in Martin’s comment, ‘teacher focused activities made sure that safety and discipline were maintained’ (script 10) as
he does not discuss what teacher-focused activities include or how they achieve what he suggests.

8. Discussion and Conclusion

The purpose of this study was to explore the extent to which the constructivist pedagogies, associated with the rich task, employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment. Through peer interaction in the form of discussion with critical friends, probing and challenging one another’s insights and interpretations, group problem solving and sharing of outcomes through various pedagogical strategies such as the jigsaw and world café allowed PSTs to develop or struggle with the construction of their knowledge of instructional alignment. Our practice of criterion referenced instruction (Cohen, 1987) encouraged the tasks that were to be learned to be the same ones that are taught and ultimately measured (Tannehill, 2001), not only in the PETE program but also in providing PSTs with constructivist pedagogies they could transfer to learning to teach as novice teachers.

While word limits allowed us to unpack only two items from the scheme of work, Table 5 conveys that PSTs were competent (exemplary or strong) at setting a big picture goal and identifying learning outcomes for student learning. They demonstrated skill (strong to acceptable) in identifying the area of study to which their scheme best fit, selecting the content to be learned through a concept map, designing appropriate instructional strategies to facilitate learning and developing assessment tools to reinforce and extend that learning. PSTs displayed a mixed range of skills at selecting an appropriate curriculum model to serve as the framework for the scheme of work and student learning. These areas of strength and deficiency serve to guide the teacher educators in their revision of the two modules as they are combined into one module.
that provides a more sequential and progressive introduction to learning and practicing concepts of instructional alignment.

PSTs conveyed initial confusion about the rich task assessment expectations and difficulty in making the connections between the two modules and their content. As the semester progressed, the PSTs moved from feelings of fear and apprehension to being confident as they recognized their own development. This recognition was a result of their experience with the rich task learning process that included both the design and the self and peer-assessment of the instructional alignment scheme development. It was clear that PSTs had perhaps not been previously exposed to such constructivist pedagogies that encouraged them to be responsible for their own assessment criteria and to be directly assessed on what they had opportunities to overtly practice throughout the modules. We gained insight into PSTs’ learning as a result of self-assessment. Similar to Ross and Bruce’s (2007) study, these PSTs found that self-assessment served to confirm their learning, and supported their current and developing beliefs and practices while being prompted to examine alternatives to improve teaching and learning. Ross and Bruce (2007) also explore the use of peer interaction as a means to challenge peer perspectives, encourage sharing of ideas and feedback to encourage change, and even pose questions that may contradict and/or support the instructor. This type of challenge may cause the PST to rethink their stance on a topic and build on existing knowledge to develop alternative perspectives.

Ultimately, the PSTs understood and valued the process of instructional alignment while also providing suggestions on how to make the modules more useful in facilitating their learning of the alignment process. Such suggestions encourage us to revisit Carter’s (2008) conceptual model of an aligned instructional program, and re-examine the extent to which we can more deliberately convey the integration between the three components of instructional alignment, particularly related to the way in which the curriculum for both modules is constructed.
This study is the first step in our development of one aspect of the Graduate Diploma in Physical Education program. We were able to determine how knowledge for teacher education can be generated at a local level to address the unique and situational issues embedded in own settings and be generative for PST learning. We intend to continue the partnership format we have established with the PSTs, and take their advice attempting alternate strategies and formats to more fully capture their needs. This is not dissimilar to the concept of ‘communicative alignment’ (Knewstubb & Bond, 2008) which conveys the relationship between faculty and students’ understandings of the same teaching-learning event. Consistent with Shulman’s (1999) notion that the scholarship of teaching is focused on student learning as much as teaching, we considered the instructional strategies employed in these modules as a means of allowing the PSTs to be productively engaged in their own learning, and learning to teach, thus reinforcing their understanding.

This study could be envisaged as the first ‘chain’ in what Cochran-Smith (2005) terms the ‘chain of evidence’ concerned with providing empirical evidence to link constructivist teacher education to student learning. That is, while this study initiates an interest in teacher preparation programs and PSTs’ learning, examining the more immediate effects of teacher education coursework on PSTs’ knowledge, further research is necessary to not only establish how instructional alignment affects PSTs’ learning and their practices in classrooms but also what and how much their students learn from associated practices. There is a continuing concern internationally in teacher education (Feiman-Nemser, 1990) and PETE (O’Sullivan, 2003) with establishing the extent to which the outcomes of teacher learning contribute to student learning.

In reporting research specific to the use of constructivist perspectives on teacher learning in physical education, Tsangaridou (2006) concluded that “teacher knowledge is experiential, procedural, situational and particularistic” (p. 511), which suggests the need for innovative, reflective, and thought provoking pedagogies be employed by teacher education to assist
teachers in their construction of teacher knowledge and practice. Tsangaridou (2006) suggests that, “there are indications in the literature that greater thought needs to be given on what actually teachers know, how they come to know, and/or what they think they need to know about teaching and learning. More studies to capture the collective understanding and orientations of the nature and content of teacher knowledge are definitely needed in the near future” (p. 511).

We have become more aware of the pedagogical tools we employed that were most effective in stimulating, motivating and promoting learning among our PSTs. We recognize that not all the strategies we employed will be effective in all settings yet suspect that they can be adapted and modified to meet the needs of developing teachers internationally in various contexts and cultures. As Avalo (2011) suggests, “the effort to construct models of teacher development is also a way of searching for unifying threads in the midst of diversity” (p. 17).


Preparing physical education pre-service teachers to design instructionally aligned lessons through constructivist pedagogical practices

Abstract

Examining how teacher education influences preservice teachers’ (PSTs) application of content knowledge, decision making when planning for teaching, creation of innovative teaching practices and design of aligned instruction, has significant implications for understanding learning to teach. The purpose of this study was to explore the extent to which the constructivist pedagogies (e.g., interactive community discussions, problem-solving, group challenges) employed by teacher educators through the implementation of a rich task (Macdonald, Hunter & Tinning, 2007) assisted PSTs in their understanding and construction of knowledge about instructional alignment. Data collection employed rich tasks and focus group interviews with a sample of 31 physical education teacher education (PETE) PSTs enrolled on a one-year Graduate Diploma Physical Education programme. Data were analyzed inductively (Patton, 1990) using the constant comparative method (Rubin & Rubin, 1995). Results revealed that PSTs varied in their articulation of the various elements of instructional alignment that were captured in the rich task. Through the use of such constructivist strategies as problem-solving, group discussions, and critical friends, PSTs understood and valued the process of instructional alignment as they moved from feelings of fear and apprehension to being confident in their own development. Areas of strength and deficiency that were noted in the PSTs’ attempts to design instructionally aligned lessons will guide the teacher educators in revising programme components and their own practice.

Key Words

Constructivist pedagogy, learning to teach, instructional alignment
Preparing physical education pre-service teachers to design instructionally aligned lessons through constructivist pedagogical practices

1. Introduction

Teacher learning and learning how to teach is a major focus of most teacher education programmes worldwide. Avalos (2011) contends that teacher learning should ultimately be focused on student growth and represents a type of teacher professional development that begins within initial teacher education and continues throughout a teacher’s career. As a result of her literature review on teacher professional development, she encourages teacher educators to remember that learning to teach requires personal commitment, and a collective focus to cooperate and challenge one another’s beliefs and perspectives while considering options that might improve practice. Organization for Economic Co-operation and Development (OECD) recognises initial teacher learning as just one phase of the teacher learning continuum, albeit a complex and challenging phase (OECD, 2005).

This study examines the extent to which our pedagogical practices as teacher educators encouraged pre-service teachers’ (PSTs’) perspectives and dispositions towards learning to teach, appreciating that there is a strong association between the design of the learning environment and the quality of PSTs’ experiences and their learning (Darling-Hammond, 1997).

More specifically, the purpose of this study was to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment. The study represents an effort to ground PST learning in a particular set of experiences that promote meaningful engagement with, and reflection on, the notion of instructional alignment as a practice of good teaching. In order to frame our intentions of working with PSTs in meaningful ways to support their learning as teachers, it is imperative that we engage with the complexity of learning to teach, constructivist
theory and associated pedagogies, and instructional alignment as a pre-requisite for worthwhile and meaningful learning.

1.1 Learning to teach

Whether at the preservice or beginning teacher level, learning to teach is complex and requires learning content, learning about learning, and learning about teaching. There is a wealth of international research in general education and across all subject areas that examines learning to teach and how a beginning teacher moves from a novice teacher to a competent, and even expert, teacher. Some of this literature is focused on the types of knowledge needed to teach (Loughran, 2006; Lowenberg-Ball, Hoover Thames, & Phelps, 2008; Rovegno, 1993; Shulman, 1986), the stages through which PSTs pass in their quest to become competent teachers (Furlong & Maynard, 1995), and the phases of teacher socialisation that impact a teacher’s development (Lawson, 1987; MacPhail, O’Sullivan & Tannehill, 2010). Teacher education is responsible for setting the stage for PSTs, and ultimately novice teachers, to work through these challenges using different pedagogies, at different times, and with different learners. These pedagogies take diverse forms and involve various learning theories and perspectives that guide learning including behaviourist, cognitive, constructivist, social learning, and more recently complexity theory, all of which offer diverse approaches for teaching practices.

When learning to teach, preservice and novice teachers are forced to negotiate the relationship between learning how to teach and practicing teaching with young people in varying contexts (Loughran, 2006). How teachers’ knowledge is developed is of critical concern to teacher education internationally. If teacher education is to educate teachers to design and deliver quality education programmes to impact student learning, they must recognise and acknowledge how teachers construct knowledge, the conditions under which this learning is most effective and the pedagogical strategies that might facilitate this knowledge development (Tsangaridou, 2006).
An abundance of research has examined the process by which these inexperienced and novice teachers learn to teach and the content considered essential for this teaching. This includes content knowledge (Graber, 1995; Herold & Waring, 2009), pedagogical content knowledge learned simultaneously with content knowledge (Shulman, 1986) and more recently the idea of PSTs appreciating the flexibility of content when teaching (Darling-Hammond & Snowdon, 2005; Loewenberg-Ball, 2000).

Recognising the importance of pedagogical content knowledge (PCK) in the design and teaching of quality physical education, Tsangaridou (2006) summarised much of the research on PCK in physical education. Findings that she reported as having important implications for teachers’ construction of PCK include: 1) PSTs’ PCK is insufficient in today’s school contexts (Rovegno, 1992, 1993, 1994, 1995), 2) PSTs’ content knowledge lacks developmental appropriateness (Rovegno, 1994, 1995), 3) PSTs’ use of PCK during teaching practice is linked to level being taught, prior experience in using these pedagogies, interactions with and support from cooperating teachers, and response received from pupils (Graber, 1995), 4) PCK may need to develop following acquisition of more in-depth knowledge about teaching (Sebrin, 1995), 5) PCK develops as a result of teachers willing to focus on analysing, adapting and revising their own teaching practices (Griffin et al, 1996), 6) PCK can have a significant impact a PSTs pedagogical practice (Tsangaridou, 2002), and 7) PSTs PCK develops as a result of what McCaughtry and Rovegno (2003) refer to as the reality of the teaching context e.g., moving from blaming students as opposed to recognising their own inadequacies and the complexity of motor development, or ignoring students feelings and emotions by coming to terms with how emotions can enhance student learning. Constructivist pedagogy emphasises the role of pedagogical content knowledge and the ability to engage learners in knowledge construction.

Constructivist pedagogies influence on learning to teach
A constructivist approach to the teaching of teachers, prominent in teacher education is based on the notion of using current knowledge and past experiences as the framework for constructing new knowledge and new meaning (Behets & Vergauwen, 2006; Richardson, 1997; Tinning, 2006). Use of constructivist pedagogies requires teacher education programmes to redesign and reformat many of their practices to invite and utilize the individual and collective voice of the PST (Rovegno, 2003; Winitzky & Kauchak, 1997). Kirk and Macdonald (1998) encourage the use of constructivist approaches to teacher education suggesting that they provide opportunities for critical, in-depth and important thinking about teaching and learning.

Constructivism suggests learning is experiential in that people create knowledge and draw meaning from that knowledge through their own experiences and ideas (Dewey, 1933, 1998; Kolb, 1975). From a constructivist perspective, learning is both cultural and social involving social interaction and collaboration with learning peers, as well as interaction with more knowledgeable individuals within society (Biggs, 1996; Kuiper, Volman & Terwel, 2009; Pontecorvo, 2007). For this experiential learning process to be sustained and developed, Vygotsky (1978) argues that learners will progress from one educational task to more challenging tasks only through improved self confidence in their ability to be successful in various problem solving experiences. Brooks et al (1993), similarly, suggested that constructivist pedagogies include 1) inspiring student initiative, 2) accepting student autonomy, 3) employing cognitive language to challenge critical thinking, 4) fostering independent thinking and innovation by building on student responses, 5) developing knowledge construction by challenging students to recognise prior learning, 6) provide interactive opportunities among students, 7) encourage critical thinking and problem solving individually and collectively, and 8) provide time, prompts, redirected questions and probing to push students to develop and integrate new knowledge and construct their own meaning. Fosnot (1996) recommends five principles of constructivism with implications for educational practice with which teachers and
teacher educators engage as they design learning experiences. He suggests that (i) learning is developmental, (ii) learning requires cognitive dissonance where questioning facilitates learning, (iii) reflexivity drives learning, (iv) community dialogue promotes thinking, and (v) through the process of learning new conceptions of knowledge are often developed.

In their review of physical education research from a constructivist perspective, Rovegno and Dolly (2009) stress that, ‘constructivism is a theory of learning and not a set of instructional strategies’ (p. 243). As their education colleagues have done, they highlight the widely accepted principles on which constructivism is based, i.e., learning is active, knowledge is socially constructed, and learners create knowledge in relation to what they already know (Holt-Reynolds, 2000). Constructivist pedagogy encourages knowledge fashioned by learners, taking place in classrooms created as learning communities where learning occurs through peer interaction, collaboration and student ownership of educational experiences (Azzarito & Ennis, 1996; Kirk and Macdonald, 1998). When referring to previous work, Hastie and Curtner-Smith (2006) encourage teacher educators that, when using a constructivist approach to teaching physical education, ‘students must be active learners, in that they perform tasks which involve solving problems and making decisions; social learners, in that they formulate knowledge by interacting with their peers; and creative learners, in that they discover and understand knowledge by experimenting with the subject matter’ [authors’ emphasis] (p. 22).

An increased interest in constructivist theory and practices in physical education has made an impact on teacher education programmes as they assist PSTs in developing their teaching skills and knowledge. Brock, Rovegno and Oliver (2009) propose that two physical education curriculum models, Sport Education and Teaching Games for Understanding, utilize constructivist pedagogies that foster students making sense of their own learning. Examples of these pedagogies include small group work (often in teams), responsibility (for self and team), leadership (in the form of roles beyond player), problem solving (what skills to use when), and
decision making (making tactical decisions). Moreover, both of these curriculum models require
students to construct their own knowledge through social interaction with classmates (Rovegno
& Dolly, 2009). Light (2008) also encourages recognition that Teaching Games for
Understanding and Sport Education can be best understood through Lave and Wenger’s (1991)
situated learning framework as reflected in a student centered team approach, critical thinking
and group problem solving. As with Light (2008), Rovegno (1998) argues that physical
education teachers need a strong understanding of constructivist principles if they are to
implement physical education effectively and allow students to achieve success.

Light (2008) highlights that constructivism has become a mainstay in the physical
education literature. He encourages physical educators to consider what has been termed
‘complex learning theory’ to convey what all constructivist approaches have in common, that is,
learning is a process, is student-centered, contextual, develops from experience, involves
interaction between the mind and the body, and is complex and unpredictable. Light (2008)
notes the prominent role of the body in complex learning theory and argues that this provides
physical educators the opportunity for ‘reconceptualizing the teaching of physical education and
its place in the curriculum’ (p. 28) to extend beyond acquisition of skills and to view learning
content more holistically and seldom linear.

Internationally, discussion of complex learning theory in physical education and
education is evident. In 2006, the Asia-Pacific Educational Research Association (APERA)
International Conference focused on the application of complex learning theory in curricular
reforms in Hong Kong, with Fong (2006a) suggesting implications of complex learning theory
for pedagogy and student learning. Perhaps the most critical of these implications is that schools
must adapt, adjust and even reinvent themselves to address the changing and evolving student
needs, while teacher education programmes must consider how to more effectively help PSTs to
work with young people in challenging and difficult settings (Fong, 2006b). Thorburn, Jess, and
Atencio (2011) describe their efforts to design a new vision of physical education pedagogy in Scotland that requires teachers to move from what they term as a narrow ‘pedagogy of certainty’ to a more open ‘pedagogy of emergence’. This new ‘pedagogy of emergence’ reflects many of the characteristics of complex learning theory, ‘emphasising teacher and student reflection, co-construction of knowledge, active exploration and the unpredictable and non-linear nature of learning to move’ (Jess, et al, 2011, p. 182). As noted by Jess et al (2011) ‘pedagogy of emergence’ would be reflected by physical education teachers who facilitate student learning, are co-creators of knowledge and in some respects co-learners in the learning process.

As PSTs learn to teach they learn to construct their understanding of instructional design and alignment.

1.2 Instructional alignment

Constructivism and instructional alignment contribute to the concept of ‘constructive alignment’, which represents a ‘marriage’ between a constructivist understanding of the nature of learning, and an aligned design for teaching; ‘a working version of constructivism can be integrated with instructional design at three crucial points: the curriculum or unit objectives are clearly stated in terms of content specific levels of understanding that imply appropriate performances, the teaching methods require students to be placed in contexts that will likely elicit those performances, and the assessment tasks address those same performances’ (Biggs, 1996, p. 361).

Teachers need to recognise that optimal learning environments need to be designed for specific learning outcomes, student background and prior knowledge, and the context in which learning will occur. Wiggins and McTighe (1998) encourage teachers to plan backwards from the ‘big ideas’ they want students to learn, choose teaching strategies to facilitate students reaching those ideas, and design assessment tools that will demonstrate students having achieved
success. This constitutes instructional alignment where goals, assessment, teaching strategies and learning experiences are aligned, promoting richer learning for students. Instructional alignment is a pre-requisite for worthwhile and meaningful learning, but should not be viewed as a panacea in and of itself (Carter, 2008). In teacher education it is critical that we provide opportunities for PSTs to (i) both experience and learn to design programmes that demonstrate alignment between what we want students to know and be able to do, (ii) enhance the opportunities students receive to learn, practice and explore what they have been taught and (iii) explore how we assess for learning, in other words, we need to help PSTs search for their own understandings and how these might align with those of their students.

Instructional alignment has had limited exposure in the physical education literature. Where it has been examined, the interest has been attached to the increasing interest in student learning as a result of (authentic) assessment and accountability (James, 2004; James et al., 2008; Lund, 1992) and less with the perceptions that teachers and learners have of instructional alignment. We propose modelling a specific form of pedagogical practice and associated assessment utilized in physical education teacher education (PETE) that encapsulates our interest as teacher educators to not only teach and model the practices of instructional alignment but also to allow PSTs to live the experience.

We acknowledge that the relationship between the three components of instructional alignment (learning goals, assessment, instructional strategies) is bidirectional (Chen & McNamee, 2006). In practice, we use assessment activities to both enhance PSTs’ learning and to evaluate the effectiveness of our instruction. Subsequently, this directs the nature of (revisiting) future curriculum activities with the result being, ‘the pattern is no longer a linear sequence with assessment preceding curriculum development. Instead, the pattern is a spiral with each leading to the other in a continuous process’ (Chen & McNamee, 2006, p. 125). We also introduce design-focused evaluation, ‘an approach that seeks to provide guidance in
systematically addressing questions to the issue of the links between curriculum designs and the learning they elicit” (Smith, 2008, p. 644). That is, we pose questions to gain PSTs’ perceptions of the effectiveness of the learning experiences / tasks encouraged through our instructional practices and intentions for facilitating the development of the assessed learning outcomes.

2. Purpose of Study

There is a dearth of research reporting how PSTs apply knowledge learned during teacher education (Cochran-Smith, 2005). Examining how teacher education influences PSTs’ application of content knowledge, decision making when planning for teaching, creation of innovative teaching practices and design of aligned instruction, has significant implications for understanding learning to teach. The purpose of this study was to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment. It was important that we examine how PSTs experienced and viewed instructional alignment in practice, and the extent to which they were able to use their developing skill in designing worthwhile and enduring knowledge that would be viewed as realistic to young people. We consider how the coursework undertaken by PSTs and the constructivist pedagogies employed in teacher education influenced PSTs learning to teach. Drawing on the work of Azzarito and Ennis (1996), Kirk and Macdonald (1998), and Fosnot’s principles (1996), the pedagogical strategies we chose to employ in these modules included peer interaction, community discussions, problem solving tasks and group sharing. Such strategies were utilised to foster PSTs drawing connections between their personal experiences and beliefs, knowledge created through peer interaction, and PSTs taking responsibility for collaboratively designed instructional materials. These interactive constructivist pedagogies recognize the importance of teachers (teacher educators and PSTs) working together in a community to develop skills, knowledge, expertise, share practices
(Fosnot, 1996). This collective learning has been encouraged through teacher communities and networks and provides us with a foundation for some of the pedagogical practices we chose. We explore how one teacher education programme encouraged and facilitated PSTs working as a community of learners, drawing on the framework proposed by Hammerness, Darling-Hammond, Bransford, Berliner, Cochran-Smith, McDonald, and Zeichner (2005), who state:

‘New teachers learn to teach in a community that enables them to develop a vision for their practice; a set of understandings about teaching, learning and children; dispositions about how to use this knowledge; practices that allow them to act on their intentions and beliefs; and tools that support their efforts.’ [authors’ emphasis] (p. 69).

This study developed from an interest in understanding the learning processes of our PSTs and the impact of specific pedagogies utilized by teacher educators. The research is significant because it will provide insight for all teacher educators, intent on examining their own practices with PSTs, pedagogical aspects of their teacher education programmes, and how PSTs interpret their learning experiences as they learn content, learn about learning and learning to teach. (Rovegno & Dolly, 2009).

3. Methodology

3.1. Context of the PETE Program

The first two authors were involved in delivering two first-semester pedagogy-related modules to two one-year cohorts undertaking a one-year Graduate Diploma program in physical education (16 PST were enrolled in year one of the study and 15 PSTs in year two). In both year groups there was a range of ages (20 to 44 years) and more females than males (11 females in year one of the study and 12 in year two). These PSTs came from non-teaching undergraduate programs in physical education or closely aligned areas of study in Ireland, the UK or the USA. Successful completion of this Graduate Diploma program results in PSTs being qualified to
teach Irish post-primary physical education. The expectation of PSTs on entering the one-year Graduate Diploma program in physical education is that they have gained a sufficient level of expertise in subject content knowledge (both applied and theoretical), allowing the program more scope to develop and examine specific, observable teaching skills associated with student learning. Matching this with Feiman-Nemser’s (1990) dominant conceptual orientations of teacher education programs, the program reported here promotes more of a ‘personal orientation’ (focus on the teaching competencies of PSTs) and less of an ‘academic orientation’ (focus on subject matter of games, dance, gym, etc).

3.2. The Two Pedagogy-Related Modules

PSTs attended both modules for four hours each on a weekly basis over twelve weeks. The first module, ‘Physical Education Curriculum and Assessment’ provided PSTs with an opportunity to understand curriculum concepts and investigate the extent to which personal value orientations and philosophies impact on curricular choices. Along with PSTs’ understanding of the (physical education) curriculum within the Irish school system, and what they believe is worth learning, PSTs were guided in using selected curriculum and instruction models in their own teaching. Understanding assessment and its relationship to learning goals and learning experiences intended to allow PSTs to determine what is worth assessing and how this can be done in a meaningful, relevant and effective way. The second module, ‘Introduction to Teaching in Physical Education’ assisted the PST in making the connection to the alignment of teaching in physical education, the teaching and learning process and effective instructional models and teaching skills / strategies. PSTs learned about, and practiced, foundational management strategies, how to design learning experiences and select instructional models / skills / strategies for delivering developmentally and culturally relevant physical education experiences that
respect students as independent learners. Table 1 illustrates the learning outcomes, tentative schedule of weekly themes and assessment points for each module.

In conjunction with these two modules, PSTs were assigned a post-primary school where they taught on ten Mondays throughout 10 weeks of the semester. Throughout both modules and the Monday teaching practice, PSTs reflected upon, critiqued and discussed their school experiences with broader discussions of research on teaching in physical education and the role of the physical educator in the delivery of an equitable, coherent, and culturally relevant physical education in contemporary Irish schools. Within this reflection, and subsequent discussions, there was a focus on how instructionally aligned lessons impacted student learning.

The content of both modules was delivered through learning experiences that matched what we wanted PSTs to know and be able to do at the conclusion of the modules which demonstrates our design of instructionally aligned modules of the content and pedagogical skills we wanted our PSTs to learn. Assessment across these two modules is both formative and summative, illustrating our efforts of allowing PSTs to ‘live’ and learn the process of instructional alignment.

4. Data collection

The purpose of this study was to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and constructions of knowledge about instructional alignment. In a bid to examine how PSTs’ experienced and viewed instructional alignment in practice, data collection employed the use of a ‘rich task’ and subsequent rich task scoring rubric related to the specific pedagogy used with PSTs. In addition, focus groups were designed to elicit PST perceptions of the constructivist pedagogy.

4.1. Rich task
Constructivist pedagogies are explored in this study through the notion of the ‘rich task’, derived from the work of Education Queensland (Cooper, Nuyen & Baturo, 2003; Luke, 1999; Macdonald, Hunter & Tinning, 2007). The rich task presents substantive, real problems for the students to solve, based on a range of learning outcomes, and may be used as an organizational framework for the design of a unit of work (MackPhail & Halbert, 2010). The task is deemed to be ‘rich’ when it is authentic for the student and relevant to the learning outcomes in question. It should also contain 1) transparent criteria and standards, 2) encompass more than one learning outcome, 3) involve acquiring, applying and evaluating knowledge, and 4) provide opportunities for students to demonstrate subject knowledge, skills and understanding (MacPhail & Halbert, 2010).

4.2 Rich Task Scoring Rubric

The rich task was a way to examine the PSTs’ learning of instructional alignment through authentic and practical application. The rich task was discussed with PSTs, explaining what we wanted them to know and be able to do, how they were to get there and how they were to demonstrate achievement in the end. The rich task used in this study was divided into three aspects (see Figure 1); (1) unit design (scheme of work) by PSTs, (2) PSTs developing a scoring rubric to assess the scheme of work, and (3) PSTs assessing a scheme of work using their designed scoring rubric, providing a rationale for each score given. We felt it most appropriate for us to assess this final piece allowing us to see the combined skills and knowledge PSTs had gained from the modules. Key to this was the PSTs’ ability to self-assess their knowledge and its application to practice by providing a rationale for their scoring decisions that reflected the alignment between curriculum, assessment and instruction.

During seminar time for each module, similar to Sockman and Sharma’s (2008) practice, PSTs were required to discuss, construct and agree on an assessment tool and scoring criteria to
be used to score the scheme. The scheme could be completed for any content area and was to suit
either a first, second or third year group of students (11 to 14 year olds). PSTs worked in small
groups on one element of the scheme design guidelines (e.g., big picture goal) in a bid to
construct appropriate scoring criteria aligned with concepts being learned for that element.
However, dissimilar to Sockman and Sharma’s (2008) creation of a rubric, PSTs were given
ample opportunity to offer feedback to other groups working on other elements of the scheme
design guidelines. It was reinforced to PSTs that the rubric was a representation of the criteria
and expectations in completing the rich task / scheme design and not, as commonly perceived by
undergraduate students, a tool for satisfying faculty members’ demands (Andrade & Du, 2005).
During autumn examinations PSTs used their agreed assessment tool (Table 2) to evaluate and
score their own scheme design, providing their rationale for each score given. Key to this was the
PSTs’ ability to provide a rationale for their scoring decisions that reflected the alignment
between curriculum, assessment and instruction. The scoring rubric in Table 3 was completed by
both instructors assessing PSTs’ responses to their perception of the extent to which they had
fulfilled their agreed scoring rubric criteria. This allowed the instructors to identify patterns of
student learning.

[Insert Tables 2 & 3 here]

4.3 Focus Group Interviews

Focus groups provided a means by which to reinforce or question PSTs’ perceptions and
opinions related to the constructivist pedagogy promoted by the teacher educators. In an attempt
to gain PSTs’ perceptions of the rich task to facilitate their learning and understanding of
instructional alignment, four focus group interviews were conducted across the first and second
year of the project. Focus groups can provide information about a range of ideas and perceptions
that individuals have about certain issues. They can also help to illuminate the differences in
perspective between groups of individuals. One of the distinct features of focus-group interviews
is its group dynamics hence the type and range of data generated through the social interaction of
the group are often deeper and richer than those obtained from one-to-one interviews (Krueger &
Casey, 2000). From each year, two focus groups of four and three PSTs respectively were
completed, with PSTs volunteering to be involved at the conclusion of their one-year Graduate
Diploma program. Focus groups ranged from 40 minutes to 60 minutes. The focus groups were
facilitated each year in a teaching classroom by an independent teacher educator and researcher
visiting the program. It was thought that the use of an independent facilitator would reduce the
possibility of students providing responses that might meet instructor expectations (a form of
studentship) or influence the receipt of good grades (Graber, 1991). PSTs were prompted to
engage with questions related to (1) their initial reaction to the rich task, (2) the extent to which
modules prepared them to undertake the rich task, (3) what they learned and achieved through
the rich task process and (4) ideas that they had for improving the modules and related content in
the future. The facilitator encouraged all PSTs to comment in an attempt to preclude any students
who might dominate the discussion. All focus groups were audiotaped and transcribed.

5. Data Analysis

Data were analyzed inductively (Patton, 1990; Strauss & Corbin, 1990) which relies on
of the integration between the three components of instructional alignment, i.e., curriculum,
evaluation/assessment and instruction, was used to examine PSTs’ understanding of the
alignment of goals, assessment, teaching strategies and learning experiences. Analyses of the
study data consisted of three phases of coding: open, axial and selective (Strauss & Corbin,
1990). Open coding involved taking data (rich task analysis and focus group transcriptions) and
segmenting them into categories of information, e.g., responses to the rich task categories were
each analysed and compared across cases. This was followed by axial coding, in which
connections were made among categories, e.g., overall, how was backward design used? The final phase was selective coding, in which the researchers related the central phenomena to other categories and validated the relationships, e.g., patterns of learning were determined about instructional alignment and specifically PSTs’ understanding between curriculum, assessment and instruction.

Data from the rich task scoring rubric (see Table 4) was clearly associated to common elements /criteria related to the task, i.e., big picture goal, big picture assessment, area of study, curriculum model, concept map, specific learning outcomes, teaching strategies, modes of assessment and alignment. The first two authors were responsible for grading the submitted rich tasks (Table 3) and subsequently kept a log of the extent to which each PST assessed and scored their own work. In reading individual submissions carefully thoughts and / or perceptions from PSTs related to their responses to each element of the rich task were identified in relation to instructional alignment and could then be discussed across cases. The first and second authors moderated a sample of each other’s grading as is common practice for submitted course work.

Focus group interview responses were analyzed in relation to the PSTs’ engagement with the instructional alignment process. Common themes and patterns were identified by the third author, aided by the four questions that were shared earlier. Triangulation within and across the focus groups was employed to cross check responses, allowing evidence to be confirmed or disconfirmed and interpreted. The first and second author each moderated one set of focus groups from year one or year two of the study to prompt any further analysis that may have been less evident to the third author but more obvious to the two authors involved in the delivery of the modules.

It was made clear to the group of PSTs that what we hoped to gain from the experience of evaluating their experiences, perceptions and opinions was to improve future employment of constructivist pedagogies to enhance PSTs’ associated learning experiences. While the topic of
study, i.e., to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment, may not be sensitive in itself, there is no denying that there was a likely interplay between what the PSTs were prepared to divulge and what they thought we wanted to hear (Graber, 1991). This was complicated by the implications of the researchers also being the teacher educators working with the PSTs on a weekly basis. We are also cognizant that the favoured PST comments may bias those PSTs who were more capable of communicating, through written responses and verbally, their understanding (or not) of the constructive pedagogies being utilized (Kvale & Brinkman, 2006). Hence, we acknowledge perceptions and opinions from some PSTs may be privileged. We by no means attempt to convey privileged truth claims from what the PSTs did share but rather make an attempt to identify and challenge the principles of constructive pedagogies to enhance PSTs’ learning experiences.

6. Results

The purpose of this study was to explore the extent to which the constructivist pedagogies employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment. The results are subsequently aligned with three construct that contribute to such exploration. These are (1) how the coursework undertaken by PSTs and the constructivist pedagogies employed in teacher education influenced PSTs’ learning to teach, (2) the challenges constructive pedagogies posed for PSTs and suggestions from PST on refining and extending constructive pedagogies and (3) how PSTs experienced and viewed instructional alignment in practice, and the extent to which they were able to use their developing skill in designing worthwhile and enduring knowledge that would be viewed as realistic to young people. Pseudonyms are used for each PST and quotes are presented either as they were written or spoken. Focus group data is denoted by FG and quotes shared from PSTs formal responses to
the rich task assignment are dented as ‘script’.

6.1 Development of PST learning and an association with learning to teach

When considering their own achievement as a result of the rich task and the pedagogies we employed to introduce and develop their own understandings of the task, we found that a number of PSTs understood the alignment process in developing content through a scheme as a result of this approach, but not without challenges. After taking part in focused readings, individual and group reflections, consulting with a critical friend or taking part in probing peer and group-discussions one PST noted,

_I had learned more that way [rich task] than if I actually was sitting reading a book, trying to memorise, ‘Okay, a goal has to be achievable, clear …’ (…) If you were sitting learning definitions (…) ‘What’s an assessment?’, ‘What’s an aim?’ so for me it [rich task] was far easier that way because I knew exactly what I was looking for. (Lorna, FG 1)_

_It was like a jigsaw (…) the toughest thing for me was getting the instructional alignment to gel with all the other pieces, to actually understand that and piece it all together (…) once it was done you could see how the pieces were fitting. (Marie, FG 2)_

_I wouldn’t have fully understood the whole alignment and the whole everything fitting into each other if I hadn’t done the rich task. (Therese, FG 1)_

As a result of being introduced to instructional alignment through varied types of peer interactions, group case analysis and reflective activities, PSTs highlighted how these pedagogies provided the foundation for their growth and developing understanding of the concepts (Fosnot, 1996). One PST admitted that initially he would have approached the task in one way; ‘Pick a goal and then try to see ‘Look, how can I achieve that?’ rather than saying ‘Look, what do I want these kids to achieve?’ and then work backwards from that’ (Martin, FG 1). Ashlee admitted, ‘I
PSTs frequently indicated that the rich task and associated pedagogies and learning experiences allowed them to develop a template for future planning, acknowledging that the work they had completed provided them with a resource they could use when teaching in schools;

*It wasn’t just like an exam paper where you look at it, you never see it again, it goes straight in the bin (...) It was something that you had that we were going to use (...) it was our best weapon going into teaching practice.* (Henry, FG 1)

*The scheme of work I use now for doing all schemes of work is that one, so I work through the process off that. You know, so I’m able to go back and have the headings and have everything and fit them all in.* (Therese, FG 1)

Thus the rich task strategy and associated constructivist pedagogies to support it was useful in developing a template for instructional alignment.

6.2 The challenge of constructivist pedagogies and suggestions on extending constructivist pedagogies

In an attempt to bridge the gap between theory and practice we explored the use of pedagogies that caused PSTs to explore their own current knowledge and begin to link new concepts and principles in ways that made sense to them, even though they initially questioned the practice. For example, the use of a scoring rubric learning task that PSTs, as a cohort, were to construct, agree and use to assess their own, and their peers’ work, heightened the PSTs’ apprehension towards such constructivist pedagogy, expressing fear of the unknown;
It was just different to anything we’ve ever done before (…) Having to mark your own work, it means that you have to be a total expert and know everything about what you were talking about and to have a reason for everything. (Miriam, FG 1)

It was so different to anything that I had ever done before. You know, I would never have designed what I was going to assess myself on before. (Lorna, FG 1)

We could decide on what we were actually being assessed on and it was a bit weird because usually we’re being told what we’re being assessed on. (Ashlee, FG 2)

Despite the PSTs apprehension, we attempted to challenge our students, hold them accountable for exploring and discovering new knowledge through what we perceived were challenging constructivist pedagogies (Brooks et al, 1993). We refrained from coming to the rescue and providing answers when they struggled preferring to encourage, prompt and push them beyond their normal comfort zone. The result was PSTs beginning to take responsibility for their own learning. PSTs did convey an appreciation for involvement in constructing and agreeing on the scoring rubric as a group, noting an extent of responsibility for their own learning. A number of PSTs noted concern that being too self-critical in the assessment process may result in them receiving a low grade. This was an inaccurate perception as PSTs were graded on the extent to which they had accurately presented a rationale for the self-allocated score for each element of the scheme. We suspect such an inaccurate perception arises through PSTs having limited exposure to constructivist pedagogies that encourage them to be active, social and creative learners.

While there was an appreciation that the two modules were closely linked with respect to encouraging instructional alignment, there was a suggestion that combining the two modules may have made it easier for PSTs to develop their understanding of instructional alignment;
Oh yeah, they were doing alignment in Ann’s, but it was separate to what we were doing with Deborah, so then we weren’t realising that the teaching strategies we were doing with Deborah is actually included in the alignment (...) Yeah, it would have been better if they were combined, because they linked off each other, but we weren’t aware that they linking off each other. (Miriam, FG 1)

Ashlee stated that while instructional alignment was covered in both modules, it was towards the end of the semester that the elements appeared to become ‘glued together’ (FG 2). PSTs highlighted and appreciated the continuous learning process that the modules promoted, continually being encouraged to ‘chop and change’ their scheme where appropriate. PSTs reported learning from the various pedagogies we utilised, especially those that caused them to think about and reflect on the process of alignment. This is evident in Martin’s comment where he spoke of instructional alignment and the thought process required of them in developing practice, noting;

We has [have] to think about exactly where we go and not just be thinking about a goal and then be thinking about assessment and then be thinking about your content but actually have to have everything together. (Martin, FG 1)

As the modules progressed and PSTs were continually being reminded of instructional alignment, there was an acknowledgment that once the rubric was complete there was a greater understanding of how it would direct PSTs’ pursuit of instructional alignment within the rich task;

I remember at the time thinking it [the rubric] was a good idea for the scheme of work, to take things off the rubric and make sure they were in the scheme of work’ (Matthew, FG 2)
With the rich task and with the rubric, you actually had to look at each piece and make sure that it did align and you could see the progression from one stage to the other and it all linked in together and wasn’t just in different parts of the scheme. (Martin, FG 1)

Martin expanded on his comment after focused readings and challenges from his peers caused him to think differently and develop new insights on his learning, admitting that in using the rubric alongside his scheme with peer assessment he noticed that the elements of his scheme ‘weren’t really linking in and there wasn’t alignment’ (FG 1).

While throughout the modules the PSTs appeared to value different pedagogies and ultimately recognized that what they learned from one activity might be quite different to the insights gained by their peers, they provided a number of suggestions on how to extend constructivist pedagogies to better meet their needs and development. They suggested we share examples of previously completed rich tasks at the beginning of the course. They wished to maintain the practice of allowing them to prepare one component of an assessment rubric in pairs (as this was helpful) and suggested the use of a jigsaw format (Aronson, 2008) to learn the other components. They requested more extensive opportunities to grade/critique their own and peers’ schemes using a scoring rubric as this is required as part of the rich task, providing useful and practical feedback. Though they received and appreciated feedback, guidance and constructive criticism from peers and instructors, they would have liked formal feedback and assessment on the scheme and its design from the instructors. This learning from, and interacting with, someone viewed as an expert is in line with constructivist pedagogy and worth consideration. The PSTs suggested combining the two modules and more consistency in introducing learning intentions at the start of each class to contextualise the focus of the lecture and how it ‘fits’ in the program of study for the related modules. The PSTs also felt it would have been helpful to prepare them at the start of the modules for the amount of time learning the instructional alignment process
takes to fully understand and be able to achieve, and ultimately to provide sufficient time for PSTs to revisit their schemes before the end of semester.

6.3 Facilitating an understanding of instructional alignment

The rich task asked PSTs to design a scheme of work, develop an aligned scoring rubric, and then assess their own scheme. The assessment of the final piece, i.e., their assessment of their own work, allowed us to see the combined skills and knowledge PSTs had gained from the modules. It appeared that the PSTs gained insight into the design process through experiencing and reflecting on their own practice in pair and group discussions. Evidence of this was the PSTs’ ability to provide a rationale for their scoring decisions that reflected the alignment between curriculum, assessment and instruction.

Table 5 provides an overview of the scores given to PSTs on how accurate we felt they assessed and scored their schemes of work, paying particular attention to the rationale they provided for the score given, and not our view of the scheme per se.

[Insert Table 5 here]

7. Scheme of Work

There are two particular components of the scheme of work that are pertinent to the focus of our paper. Firstly, the PSTs’ ability to engage with the concept and application of instructional alignment (denoted as ‘Alignment’ in Table 5) allows us to determine the extent to which PSTs were able to clearly articulate how/why they believed all aspects of the scheme of work were instructionally aligned. Secondly, PSTs’ analysis of the teaching strategies (denoted as ‘Teaching strategies’ in Table 5) allows us to examine the extent to which PSTs provided an appropriate set of learning experiences and instructional strategies to progress toward the learning outcomes. Interestingly, both items were scored relatively low by the teacher educators with regards to the rationale PSTs conveyed for the way in which they had addressed each item.
7.1 Application of instructional alignment

PSTs ability to design lessons that align the learning goal with the assessment and then use appropriate instructional strategies and learning experiences to allow the students to be successful was quite variable. Some PSTs gained a deeper understanding of pedagogical practices by questioning and probing one another in an environment that provided freedom to explore while being held accountable for their own developing practices. For example, Ciaran commented that, ‘the process of matching goals to assessment and to instructional strategies focuses on three questions (Siedentop & Tannehill, 2000). What do I want them to achieve (big picture goal)? How will I know they have achieved it (assessment)? How will I get them in the most effective way (teaching strategies)? Group challenges helped me answer this question’ (script 8). It is however worrying that a few PSTs were just developing the notion of instructional alignment, with Declan failing to articulate what the concept means in practice, ‘I failed to discuss the alignment between the goals, teaching strategies and assessment. I can see them linked in the scheme but did not discuss what or how this was achieved’ (script 13). A few PSTs demonstrated alignment well in the scheme and rationale and several were able to articulate understanding of the alignment concept, and demonstrate it in the scheme. Carmel accurately suggested that ‘instructional alignment is deciding what you are going to teach and then teaching and assessing that’ (script 23), and then continues to do so in her scheme and in her scheme assessment, being specific and clear in discussing her alignment of each aspect of the scheme. A few PSTs were not able to indicate why they scored themselves lower, or what was missing in making the scheme more aligned. One PST failed to describe alignment or determine if it was present in the scheme (script 9). In a couple of cases the PST expected us to ‘see’ the alignment without the need to explain what it meant or how they view it, such as Sonya who
stated, ‘As you can see through the scheme all areas were looked at in depth and aligned accordingly’ (script 11).

When analysing instructional strategies and viewing PSTs’ comments, it was interesting to us that most of the PSTs did not link their learning or lack of learning to the pedagogies we employed to aide them. This is a problematic for us in that our analysis of PSTs’ choice of instructional strategies indicated a mixed ability among the PSTs to design appropriate strategies and explain how and why they might be effective. Yet, we do not know if it was the content or the learning experiences we provided that were the issue in their ability to select appropriate strategies. There were a few instances where instructional strategies and learning experiences were chosen and described yet did not appear to match or be linked to learning outcomes. This suggests that PSTs may have randomly cut and paste from handouts or picked activities they had enjoyed but had not connected to outcomes of the specific lesson. Not linking instructional strategies to the specific scheme of work is apparent in Casey’s script when he listed four strategies (small group work, teaching through questions, student mediated learning, and problem solving) and reproduces the descriptions provided in lectures (script 2). On the other hand, Therese provides detailed and specific rationale for her choice of learning experiences and aligned instructional strategies to meet the outcomes students are striving to achieve (script 3). Interestingly, some PSTs designed assessment tools that were also learning experiences, yet these were not mentioned in the instructional strategies section of the scheme, encouraging us to question whether they understood the concept of an educative assessment that might be one instructional component of a lesson. Other PSTs provided limited discussion of instructional strategies to demonstrate understanding and lacked detail to clarify how strategies would assist in student development of learning outcomes. Some PSTs used appropriate language yet did not explain how such terms were linked to student learning. This is apparent in Martin’s comment, ‘teacher focused activities made sure that safety and discipline were maintained’ (script 10) as
he does not discuss what teacher-focused activities include or how they achieve what he suggests.

8. Discussion and Conclusion

The purpose of this study was to explore the extent to which the constructivist pedagogies, associated with the rich task, employed by teacher educators assisted PSTs in their understanding and construction of knowledge about instructional alignment. Through peer interaction in the form of discussion with critical friends, probing and challenging one another’s insights and interpretations, group problem solving and sharing of outcomes through various pedagogical strategies such as the jigsaw and world café allowed PSTs to develop or struggle with the construction of their knowledge of instructional alignment. Our practice of criterion referenced instruction (Cohen, 1987) encouraged the tasks that were to be learned to be the same ones that are taught and ultimately measured (Tannehill, 2001), not only in the PETE program but also in providing PSTs with constructivist pedagogies they could transfer to learning to teach as novice teachers.

While word limits allowed us to unpack only two items from the scheme of work, Table 5 conveys that PSTs were competent (exemplary or strong) at setting a big picture goal and identifying learning outcomes for student learning. They demonstrated skill (strong to acceptable) in identifying the area of study to which their scheme best fit, selecting the content to be learned through a concept map, designing appropriate instructional strategies to facilitate learning and developing assessment tools to reinforce and extend that learning. PSTs displayed a mixed range of skills at selecting an appropriate curriculum model to serve as the framework for the scheme of work and student learning. These areas of strength and deficiency serve to guide the teacher educators in their revision of the two modules as they are combined into one module.
that provides a more sequential and progressive introduction to learning and practicing concepts of instructional alignment.

PSTs conveyed initial confusion about the rich task assessment expectations and difficulty in making the connections between the two modules and their content. As the semester progressed, the PSTs moved from feelings of fear and apprehension to being confident as they recognized their own development. This recognition was a result of their experience with the rich task learning process that included both the design and the self and peer-assessment of the instructional alignment scheme development. It was clear that PSTs had perhaps not been previously exposed to such constructivist pedagogies that encouraged them to be responsible for their own assessment criteria and to be directly assessed on what they had opportunities to overtly practice throughout the modules. We gained insight into PSTs’ learning as a result of self-assessment. Similar to Ross and Bruce’s (2007) study, these PSTs found that self-assessment served to confirm their learning, and supported their current and developing beliefs and practices while being prompted to examine alternatives to improve teaching and learning. Ross and Bruce (2007) also explore the use of peer interaction as a means to challenge peer perspectives, encourage sharing of ideas and feedback to encourage change, and even pose questions that may contradict and/or support the instructor. This type of challenge may cause the PST to rethink their stance on a topic and build on existing knowledge to develop alternative perspectives.

Ultimately, the PSTs understood and valued the process of instructional alignment while also providing suggestions on how to make the modules more useful in facilitating their learning of the alignment process. Such suggestions encourage us to revisit Carter’s (2008) conceptual model of an aligned instructional program, and re-examine the extent to which we can more deliberately convey the integration between the three components of instructional alignment, particularly related to the way in which the curriculum for both modules is constructed.
This study is the first step in our development of one aspect of the Graduate Diploma in Physical Education program. We were able to determine how knowledge for teacher education can be generated at a local level to address the unique and situational issues embedded in own settings and be generative for PST learning. We intend to continue the partnership format we have established with the PSTs, and take their advice attempting alternate strategies and formats to more fully capture their needs. This is not dissimilar to the concept of ‘communicative alignment’ (Knewstubb & Bond, 2008) which conveys the relationship between faculty and students’ understandings of the same teaching-learning event. Consistent with Shulman’s (1999) notion that the scholarship of teaching is focused on student learning as much as teaching, we considered the instructional strategies employed in these modules as a means of allowing the PSTs to be productively engaged in their own learning, and learning to teach, thus reinforcing their understanding.

This study could be envisaged as the first ‘chain’ in what Cochran-Smith (2005) terms the ‘chain of evidence’ concerned with providing empirical evidence to link constructivist teacher education to student learning. That is, while this study initiates an interest in teacher preparation programs and PSTs’ learning, examining the more immediate effects of teacher education coursework on PSTs’ knowledge, further research is necessary to not only establish how instructional alignment affects PSTs’ learning and their practices in classrooms but also what and how much their students learn from associated practices. There is a continuing concern internationally in teacher education (Feiman-Nemser, 1990) and PETE (O’Sullivan, 2003) with establishing the extent to which the outcomes of teacher learning contribute to student learning.

In reporting research specific to the use of constructivist perspectives on teacher learning in physical education, Tsangaridou (2006) concluded that “teacher knowledge is experiential, procedural, situational and particularistic” (p. 511), which suggests the need for innovative, reflective, and thought provoking pedagogies be employed by teacher education to assist
teachers in their construction of teacher knowledge and practice. Tsangaridou (2006) suggests that, “there are indications in the literature that greater thought needs to be given on what actually teachers know, how they come to know, and/or what they think they need to know about teaching and learning. More studies to capture the collective understanding and orientations of the nature and content of teacher knowledge are definitely needed in the near future” (p. 511).

We have become more aware of the pedagogical tools we employed that were most effective in stimulating, motivating and promoting learning among our PSTs. We recognize that not all the strategies we employed will be effective in all settings yet suspect that they can be adapted and modified to meet the needs of developing teachers internationally in various contexts and cultures. As Avalo (2011) suggests, “the effort to construct models of teacher development is also a way of searching for unifying threads in the midst of diversity” (p. 17).
References

Practical Assessment, Research and Evaluation, 10, ISSN 1531-7714.


<table>
<thead>
<tr>
<th>Learning outcomes</th>
<th>Physical Education Curriculum and Assessment module</th>
<th>Introduction to Teaching in Physical Education module</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) define the meaning of curriculum and list curriculum concepts and issues</td>
<td>On completion of this module you will; articulate the dimensions of effective teaching in physical education</td>
<td></td>
</tr>
<tr>
<td>(2) describe the components and dimensions that define Irish school physical education curriculum</td>
<td>(2) distinguish between a select number of instructional strategies for use in teaching physical education</td>
<td></td>
</tr>
<tr>
<td>(3) identify specific connections between value orientations and the teaching and implementation of physical education curriculum</td>
<td>(3) describe preventive and remedial class management strategies to ensure a supportive and equitable learning environment.</td>
<td></td>
</tr>
<tr>
<td>(4) distinguish between the aims and objectives of the primary and post-primary physical education curriculum in Ireland and examine the extent to which each convey an overt and / or hidden curriculum</td>
<td>(4) design lesson plans that motivate and engage all students in their classes</td>
<td></td>
</tr>
<tr>
<td>(5) articulate the principles of curriculum models in physical education</td>
<td>(5) articulate their beliefs about teaching</td>
<td></td>
</tr>
<tr>
<td>(6) differentiate between the best use of particular curriculum models in relation to the curriculum focus, the interests and values of the students and the values of the teacher</td>
<td>(6) develop capacities to monitor their own growth as teachers and use that learning to reflect on and improve their teaching practices</td>
<td></td>
</tr>
<tr>
<td>(7) distinguish between formative and summative assessment and identify means of assessment that support each</td>
<td>(7) develop skills to monitor the teaching and learning process and use that learning and their own teaching metaphor and life experiences to enhance their teaching and pupil learning</td>
<td></td>
</tr>
<tr>
<td>(8) discuss the relationship between assessment, learning goals and learning experiences (instructional alignment), determining what is worth assessing and how this can be done in a meaningful, relevant and effective way</td>
<td>(8) develop capacities to manage the classroom/learning environment and deliver instruction that reflects respect for pupils and care for their learning</td>
<td></td>
</tr>
<tr>
<td>(9) appraise the effectiveness of ‘assessment for learning’ in the physical education context</td>
<td>(9) design lessons and strategies to motivate the pupils in their classes</td>
<td></td>
</tr>
<tr>
<td>(10) construct an argument for or against the development of a solid relationship between the school physical education curriculum, extracurricula and youth sport and the role of the physical education teacher</td>
<td>(10) develop a professional web page to communicate their values as teaching professionals and their vision of physical education and the physically educated student</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(11) develop concern with enhancing pupil learning and their development as persons who support a just and equitable society</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(12) develop dispositions to reflect on the teaching and learning</td>
<td></td>
</tr>
</tbody>
</table>
process and use that learning together with their teaching metaphor and life experiences to enhance their teaching and pupil learning.

(13) develop a commitment to their own professional approach and work in collaboration with peers and experienced teachers to learn as much as they can about teaching and being a teacher who supports positive learning experiences for students.

| Weekly content themes | What is curriculum? / Value orientations / Curriculum issues / Assessment / Curriculum models / Instructional alignment / International perspectives on physical education curriculum / Relationship between physical education, extra-curricular sport and youth sport | Research on effective teaching skills and competencies / Creating and maintaining an effective learning environment / Developing skill in delivering instruction using generic teaching strategies / Delivering instruction to a diverse population of learners using selected instructional formats / Observing, assessing and reflecting on teaching performance and student learning / Planning for meaningful and effective learning / Create a your teaching metaphor, core beliefs/philosophy of teaching, and your goals/expectations for a physically educated student |
| Assessments | (1) Curriculum workshop preparation (20%) | (1) Preventive management plan (10%) |
| | (2) Assessment portfolio (40%) | (2) School ethnography of teaching practice site (teacher case study, student case study, school ethos, community mapping) (30%) |
| | (3) Rich task (40%) | (3) Teaching metaphor, core beliefs/philosophy of teaching, and goals/expectations for a physically educated student (20%) |
| | | (4) Rich task (40%) |
Table 2: Scoring Rubric Designed by Graduate Diploma Students to Score Schemes

Name: ________________________

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Assessment of your score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big picture goal</td>
<td>A goal that is developmentally appropriate, reflects something worth achieving, and is realistic, unique, and challenging</td>
<td>A goal that is developmentally appropriate, reflects something worthy achieving, and is realistic</td>
<td>A goal that is somewhat developmentally appropriate, reflects something worth achieving, and is somewhat realistic</td>
<td>A goal that is somewhat appropriate, somewhat worth achieving, and somewhat realistic</td>
<td>A goal that is inappropriate and not worth achieving</td>
<td></td>
</tr>
<tr>
<td>Big picture assessment</td>
<td>Clearly and logically matches the big picture goal</td>
<td>Clearly matches the big picture goal</td>
<td>Matches most elements of the big picture goal</td>
<td>Matches some elements of the big picture goal</td>
<td>No match to the big picture goal</td>
<td></td>
</tr>
<tr>
<td>Area of study</td>
<td>Learning outcomes clearly and logically match the big picture goal and the JCPE area of study</td>
<td>Learning outcomes clearly match the big picture goal and the JCPE area of study</td>
<td>Learning outcomes have some relevance to the big picture goal and the JCPE area of study</td>
<td>Learning outcomes have some relevance to the big picture goal or the JCPE area of study</td>
<td>Learning outcomes have no association to the big picture goal and/or the JCPE area of study</td>
<td></td>
</tr>
<tr>
<td>Curriculum model</td>
<td>Appropriate and detailed rationale stating why / why not a curriculum model will allow you to most effectively deliver the content</td>
<td>Appropriate rationale stating why / why not a curriculum model will allow you to deliver the content</td>
<td>Rationale for why / why not a curriculum model was chosen to deliver the content</td>
<td>Vague rationale for why / why not a curriculum module was selected</td>
<td>No rationale provided</td>
<td></td>
</tr>
<tr>
<td>Task and skill analysis</td>
<td>Relevant chunks (TA) of content are identified to reach Big Picture Goal and are broken into thorough and detailed component parts (SA)</td>
<td>Relevant chunks (TA) of content are identified to reach Big Picture Goal and are broken into component parts (SA)</td>
<td>Most relevant chunks (TA) of content are identified to reach Big Picture Goal and most are broken into component parts (SA)</td>
<td>Some relevant (TA) content identified to reach Big Picture Goal and some broken into component parts (SA)</td>
<td>No selection of chunks (TA) of content are identified</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>Assessment of your score</td>
</tr>
<tr>
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</tr>
<tr>
<td>Learning outcomes</td>
<td>Clearly defined learning outcomes that match all chunks of content identified in the task analysis</td>
<td>Defined learning outcomes that match all chunks of content identified in the task analysis</td>
<td>Defined most learning outcomes that match most chunks of content identified in the task analysis</td>
<td>Defined some learning outcomes that match some chunks of content identified in the task analysis</td>
<td>Insufficient learning outcomes that do not match chunks of content identified in the task analysis</td>
<td></td>
</tr>
<tr>
<td>Modes of assessment</td>
<td>A well-designed monitoring system that assesses learner performance and measures progress towards all learning outcomes with at least one authentic assessment for each outcome that is based on criteria and linked to a scoring tool where appropriate</td>
<td>A monitoring system that assesses learner performance and measures progress towards all learning outcomes with at least one assessment for each outcome that is linked to a scoring tool where appropriate</td>
<td>A monitoring system that attempts to assess learner performance and measures progress toward some learning outcomes with a few assessments linked to a scoring tool where appropriate</td>
<td>A vague monitoring system that attempts to assess learner performance and measures progress toward some learning outcomes with a few assessments</td>
<td>No assessment of learning performance</td>
<td></td>
</tr>
<tr>
<td>Teaching strategies</td>
<td>Students have clearly identified in annotated format a developmental set of instructional strategies and adaptations that cater to all learners to achieve all learning outcomes</td>
<td>Students have identified in annotated format a developmental set of instructional strategies and adaptations that cater to all learners to achieve all learning outcomes</td>
<td>Students have identified in annotated format a developmental set of instructional strategies and adaptations that cater to most learners to achieve most learning outcomes</td>
<td>Students have vaguely identified a developmental set of instructional strategies and adaptations that cater to some learners to achieve some learning outcomes</td>
<td>Students have not identified a set of instructional strategies and adaptations</td>
<td></td>
</tr>
<tr>
<td>Instructional alignment</td>
<td>Clear and innovative learning goals that logically align with teaching strategies/adaptations and assessments</td>
<td>Innovative learning goals that align with teaching strategies/adaptations and assessments match</td>
<td>There is unclear alignment between the learning goals, strategies and assessments</td>
<td>There is limited alignment between the learning goals, strategies and assessments</td>
<td>There is no alignment between the learning goals, strategies and assessments</td>
<td></td>
</tr>
</tbody>
</table>
As noted in the rich task description, your rationale for each element should be **specific and explicit** but not wordy (300 word maximum for each element), **articulate, accurate, and detailed**. Points will be determined according to these criteria.

<table>
<thead>
<tr>
<th>Aspect of Rubric</th>
<th>Exemplary 5 pts</th>
<th>Strong 4 pts</th>
<th>Acceptable 3 pts</th>
<th>Developing 2 pts</th>
<th>Lacking 1 pt</th>
<th>Comments</th>
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<tr>
<td>Big Picture Goal</td>
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<tr>
<td>Big Picture Assessment &amp;</td>
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</tr>
<tr>
<td>Scoring Tool</td>
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<tr>
<td>Area of Study</td>
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<tr>
<td>Curriculum Model</td>
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<tr>
<td>Concept Map</td>
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<tr>
<td>Specific Learning</td>
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<td>Outcomes</td>
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<td>Learning Experiences /</td>
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<tr>
<td>Teaching Strategies</td>
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<tr>
<td>Instructional Adaptations</td>
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<td></td>
</tr>
<tr>
<td>Modes of Assessment &amp;</td>
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<tr>
<td>Scoring Tools</td>
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<tr>
<td>Instructional Alignment</td>
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<tr>
<td>TOTAL</td>
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</tr>
</tbody>
</table>

**Exemplary**

Outstanding. In-depth knowledge and understanding of principles and concepts related to the topic. Integrates information into a wider context. Excellent analysis and interpretation. A logically structured and clear approach. Answer is original and reflective.

**Strong**

A comprehensive knowledge and understanding of principles and concepts. Well developed analysis and interpretation. Answer may have neglected to deal with one or two minor aspects of the issues involved. A logically structured and clear approach.
<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable</td>
<td>A reasonable level of knowledge. Good analysis and interpretation. Some gaps/oversights in either knowledge or in the approach taken. Reasonable analytical and interpretative skills.</td>
</tr>
<tr>
<td>Developing</td>
<td>Shows a familiarity with the content. The approach taken to answering the question is rather limited focusing solely on material covered in lecture notes. A basic knowledge of key principles and concepts only. Limited analytical and interpretative skills</td>
</tr>
<tr>
<td>Lacking</td>
<td>A poor answer, unsatisfactory in some significant ways. Little evidence of analytical or interpretive skills. Answer disorganized and lacks intellectual depth; little related to material discussed in class or applied in practice.</td>
</tr>
</tbody>
</table>
Table 4. Scores given by faculty on PST assessment of their own schemes of work (n=31)

<table>
<thead>
<tr>
<th>Items</th>
<th>Exemplary</th>
<th>Strong</th>
<th>Acceptable</th>
<th>Developing</th>
<th>Lacking/ Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big picture</td>
<td>7 (22%)</td>
<td>13 (42%)</td>
<td>3 (10%)</td>
<td>6 (19%)</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>*Big picture assessment (n=15)</td>
<td>10 (67%)</td>
<td>2 (13%)</td>
<td>3 (20%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of study</td>
<td>5 (16%)</td>
<td>14 (45%)</td>
<td>11 (35%)</td>
<td></td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Curriculum model</td>
<td>6 (19%)</td>
<td>12 (39%)</td>
<td>10 (32%)</td>
<td>2 (6%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Concept map</td>
<td>2 (6%)</td>
<td>12 (39%)</td>
<td>12 (39%)</td>
<td>5 (16%)</td>
<td></td>
</tr>
<tr>
<td>Specific learning outcomes</td>
<td>3 (10%)</td>
<td>18 (58%)</td>
<td>8 (26%)</td>
<td>1 (3%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Teaching strategies</td>
<td>7 (22%)</td>
<td>6 (19%)</td>
<td>12 (39%)</td>
<td>3 (10%)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Modes of assessment</td>
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<td>12 (39%)</td>
<td>5 (16%)</td>
<td></td>
</tr>
<tr>
<td>Alignment</td>
<td>4 (13%)</td>
<td>10 (32%)</td>
<td>14 (45%)</td>
<td>2 (6%)</td>
<td>1 (3%)</td>
</tr>
</tbody>
</table>

*Only 2008-09 (n = 15) examined big picture assessment*
Table 5  Scores Given by Faculty on PST Assessment of Their Own Schemes of Work (n=31)

<table>
<thead>
<tr>
<th>Items</th>
<th>Exemplary</th>
<th>Strong</th>
<th>Acceptable</th>
<th>Developing</th>
<th>Lacking/ Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Big picture</td>
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<tr>
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<td>12 (39%)</td>
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</tr>
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<td>Modes of assessment</td>
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<td>10 (32%)</td>
<td>14 (45%)</td>
<td>2 (6%)</td>
<td>1 (3%)</td>
</tr>
</tbody>
</table>

*Only 2008-09 (n = 15) examined big picture assessment
Component 1: Unit design

a) Identify a “big picture” goal and a ‘big picture’ assessment for a unit of instruction
b) Identify the area of study that promotes this goal best and discuss the learning outcomes of this area
c) Identify the curricular model that is best suited to teaching toward student achievement of this goal
d) Identify specific learning outcomes you would want pupils to achieve by the conclusion of this unit of study
e) Describe the teaching strategies and instructional formats (as opposed to teaching style) you might adopt and comment on their appropriateness to the learning outcomes and the content you would be
f) Present the modes of assessment you would use to assess student learning in this unit of study
g) Discuss the alignment between your learning goals, teaching strategies, and assessment measures.

Component 2: Assessment tool

b) During the modules PST will discuss and construct an assessment tool and marking criteria to be used to score the above unit.

Appendix # provides an example of the scoring tool that the PST developed to assess their own work.

Component 3: Exam

a) During autumn examinations PST will use the agreed assessment tool to evaluate and score their own unit design. PST will provide the rationale for each of their scores on all components, thus articulating their understanding of the concepts and appropriate application of them.