Quality and Health-Optimizing Physical Education:

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Quality and Health-Optimizing Physical Education: Using assessment at the health and education nexus

Abstract

Background: The United Nations Educational, Cultural and Scientific Organization (UNESCO) recognises quality physical education (QPE) must, along with physical, social and affective educative goals, seek to improve the health status of youth (UNESCO, 2015). Health-Optimizing Physical Education (HOPE) is a model of physical education (PE) that seeks this goal but is creating much debate in the discipline (Sallis et al, 2012).

Purpose: The aim of this paper is to present a conceptual assessment framework for QPE and HOPE on which future assessment protocols may be based that serve both health and educative goals.

Methods/Data analysis: Policy and literature pertaining to QPE and HOPE were reviewed and compared for similarities and differences. This was followed by an analysis of literature on assessment in the health and education disciplines. These analyses provided the authors with the insight to propose a new model of assessment for HOPE models in order to implement QPE.

Results: Many similarities exist in the policy of QPE and the published literature on HOPE. However, the measurement model of assessment can often circumvent two important assessment functions for education settings that need to be addressed in a wider QPE and Models-Based Practice (MBP) context.

Conclusions: HOPE models were established using an interventionist mindset and are therefore well suited to integrating well-defined MBP pedagogies as appropriate ‘intervening’ strategies by using a clinical approach to teaching and assessment. To date, they have lacked an assessment framework that has been capable of addressing both the health and educative goals that both HOPE and MBP seek to achieve. This paper provides new insight by reimagining the role MBPs and assessment practices have to play in the health and education nexus.

Introduction

It is widely accepted that regular participation in physical activity is an essential component of a healthy lifestyle (Biddle, Gorely, & Stensel, 2004). Despite this recognition, studies of American (Pate et al., 2002), European (Currie et al., 2004) and Australian (National Heart Foundation and Cancer Council, 2011) show that considerable proportions of youth do not meet their national physical activity guidelines for daily physical activity. However, the public health concerns of physical inactivity in youth are just one of the many priorities of PE curricula. To address this public health concern with competing educative goals, the United Nations, Educational, Scientific, and Cultural Organization (UNESCO) released their Quality Physical Education (QPE) Guidelines for Policymakers monograph (UNESCO, 2015). The UNESCO monograph makes a serious policy attempt of combining both public health goals and educative goals for PE. The document stressed that rising levels of physical inactivity and the substantial increase in associated non-communicable disease warrant governments to take substantial action to ensure that physical education positively influences health. This contribution of physical education as an influential entry point to physical activity and health promotion has received increasing scrutiny from researchers in recent years (Cale, Harris & Chen, 2014; Cale & Harris, 2011; Dudley et al, 2011; Haerens et al., 2011; Quennerstedt, 2011). Although there have been significant political and empirical efforts to improve physical activity experiences for youth (see Armour & Harris, 2013), a worldwide report compiled by Hardman, Routen, and Tones (2014) on the state of physical education suggests otherwise. They state there continues to be a steady erosion of QPE programs in schools with many curriculum programs having limited impact on increasing young people's levels of physical activity.

The aspiration of the UNESCO QPE guidelines, like many other initiatives, is to ensure physical education secures a rightful place in school curricula (Kirk, 2010; UNESCO, 2015). Specifically, the QPE guidelines set out to address the cognitive, affective and psychomotor elements of learning in order for youth to be capable of living a healthy active life (UNESCO, 2015). This however, is not a new proposition. This perspective of physical activity for health is inculcated within the key underpinnings of most PE pedagogical (or instructional and curricula) models and models-based curricula (Haerens et al., 2011; Kirk, 2013; Metzler, 2011). While also inclusive of the social

domain - which Casey & Goodyear (2015) argue is necessarily distinctive to the affective – PE pedagogical models seek to promote physical, cognitive, social and affective outcomes by providing teachers with 'design specifications' (Kirk, 2013, p. 979) for organizing teaching, learning and content material. Separate reviews of literature have confirmed that PE pedagogical models can positively influence the physical, cognitive, social and affective learning of youth (see for detail, Casey & Goodyear, 2015; Harvey & Jewett, 2014; Hastie et el., 2011). As a result, many now argue that PE pedagogical models offer a legitimate pedagogical or 'curricular scaffolding' (Ennis, 1999) necessary to improve the quality of physical education and, subsequently, enhance young people's health-related physical activity behaviours (Metzler, 2011).

Despite a growing consensus surrounding PE pedagogical models and their alignment with government aims and strategies for learning in physical education (see for example, UNESCO, 2015), in practice and policy the use and promotion of quality PE models is not widespread (Casey, 2014; Kirk, 2013). Running parallel to research around PE pedagogical models is how teachers diagnose the health-related learning needs of their students and how 'we' capture the effect teachers' practices and pedagogies have on the health-status of youth (Armour & Harris, 2013; Puhse et al., 2011).

Health effects in physical education are predominantly captured through health-related assessments (e.g. fitness tests, body composition assessments, pedometer counts, etc…) which can lead to inappropriate judgments being made about teachers' practices and the health capacity of youth (Cale, Harris & Chen, 2014; Macdonald, 2011; Keating & Silverman, 2009). Whilst these types of assessment can contribute to understanding of health behaviours, they often fail to account for learning across all four domains as they focus primarily on the physical (Cale & Harris, 2011; Cale, Harris & Chen, 2014; Haerens et al., 2011) and may neglect the complex, diverse and individual needs of young people (Armour, 2014). The purpose of this paper is to present an assessment framework for Health Optimizing Physical Education (HOPE) and other Models-based practices (MBPs) as a means to support the development of QPE.

In the following section, we use the Health Optimizing Physical Education (HOPE) Model to show how a model that aligns closely with the stated goals of QPE is restrained by current health assessment practices. Following this we provide a justification for a new type of assessment framework in PE that seeks to support teachers addressing and developing physical, cognitive, social, and affective health-related learning behaviours across a continuum of diverse and individual learning needs. Finally, we consider how this framework and any number of PE pedagogical models can be 'Health Optimizing' and hence used by teachers to support the promotion of health in a clinical teaching framework.

Health Optimizing Physical Education (HOPE): An opportunity for QPE

In 2012, Sallis and colleagues replaced the "health-related physical education" term they introduced in 1991 with "health optimizing physical education" or HOPE (Sallis et al, 2012). As in the QPE guidelines (UNESCO, 2015), HOPE identifies PE as the entry point of lifelong participation in physical activity and therefore a major contributor to the public health agenda. HOPE seeks to provide students with the knowledge, skills, abilities, and confidence to be physically active for life in a learning environment that itself promotes physical activity participation. Essentially, the HOPE model makes the same assertions as UNESCO (2015) in that other important PE goals (such as physical, social, cognitive and affective learning goals) are achieved through and in a physical activity context (Sallis et al, 2012). They proposed defining HOPE as a model of PE that encompasses context, curriculum and teaching designed to achieve several objectives: health-related physical activity; keeping students active during lesson time; engaging all students regardless of their physical ability; and significantly contributing to students' overall physical activity participation, thereby improving their health. Specifically, the HOPE model advocates a goal of providing moderate to vigorous physical activity (MVPA) for 50% of PE class time.

According to Sallis et al (2012) adopting a health optimizing approach to PE does not mean abandoning all other physical education goals, but ensuring that teaching towards health goals are prioritised in the PE lesson. This overt prioritization of health goals ahead of educative goals that may be preventing HOPE from being more widely used by education systems as a model of QPE. Some

researchers have actually argued that the educative goals (measured by achievement of learning outcomes) and public health goals (measured by improvement in health indices) are dichotomously opposed (Armour & Harris, 2013; Macdonald, 2011; Tinning, 2015) leaving the notion of what constitutes a QPE experience for students being highly contested. Moreover, this makes measures of model effectiveness complex and difficult to track.

Although some organisations may have embraced HOPE because it aligns with the guidelines now endorsed by the Centres of Disease Control and Prevention (2011) as key components of a Comprehensive School Physical Activity Program (CSPAP) (Metzler et al, 2013) few education institutions have done so. Conversely, other pedagogical models that prioritize educative goals – such as Sport Education, Cooperative Learning, or Teaching Personal and Social Responsibility - have also failed to be adopted widely in PE practice and by public health agencies (Kirk, 2013). The failure of public health and education institutions to synergise in this agenda and successfully implement QPE programs that can achieve both health and educative outcomes is of growing concern and quite a paradox. In using HOPE as an example of QPE, we have been able to highlight the notable absence of the HOPE approach to speak a common language that exists in both the health and education disciplines.

The inability for people from different disciplines to work together to consider effective interventions and PE pedagogical actions for young people in schools continues to be a problem for our field (Armour, 2014). Most education and health systems have struggled to find the balance between addressing the public health imperative of PE with the educative imperative of learning (Armour & Harris, 2013). Teachers and schools are expected to address public health concerns in a population whilst simultaneously struggling for time in an ever-crowded school curriculum that values ‘intellectual’ achievement ahead of an individual’s health status (West, Sweeting & Leyland, 2013). This in fact, creates a false dichotomy that education of the mind and education of the body in some way different or separate (Kirk, 1996; Whitehead, 2010).

Despite this impasse, the intimate link between health and education status is well cited in the empirical literature (Ross & Wu, 1996; Cutler & Lleras-Muney, 2006). Whilst the direction of

causality in this relationship between health and education remains fiercely debated, accepting that both disciplines are interrelated allows researchers to work toward identifying why the health and educative nexus has been difficult to achieve. The role assessment plays in achieving this nexus is less researched and we argue is worthy of further investigation. Indeed, the focus on teaching in a physical activity medium rather than diagnosing and assessing the learning needed to be physically active may in fact be a key to driving and instigating a wider adoption of the HOPE model in educative settings. Armour and Harris (2013) and Armour, Makopoulou and Chambers (2012) have argued that diagnosing the learning needs of young people first should drive the entire pedagogical process and it is this lack of attention to this diagnostic process that is a key contributing factor to the reported low levels of physical activity engagement in the adult population. In QPE and HOPE, like any other concept in education, there needs to be a shift from an over reliance on simply providing 'success' experiences and judging against nebulous 'standards' (Masters, 2013). We need assessment instruments and teaching practices that focus on 'growth over time' and are evolutionary in their capacity to capture learning. These assessment instruments then need to be coupled to a teaching model that does not see pedagogy employed by 'educationalists' and 'interventionists' as the dichotomy described by Tinning (2015). Rather, attempts to understand the differences between interventionist research and the pedagogy of educationalists (regardless of MBP employed) are mutually beneficial in addressing the public health and educative nexus sought by any model claiming a QPE mandate.

Moving forward - assessing at the health and education nexus

If assessment is positioned to address both health and educative goals, there also needs to be an understanding of 'student growth'. Student growth simply refers to how much a student's learning has grown over any given period.

In many PE curricula and models, the focus can tend to be on narrow or nebulous standards and measurements without context, as evidenced through standardised educative or health testing regimes, and hence ignore the important measure of growth. Students may meet or exceed the 'standards' set for their age, but their learning may not have sufficiently grown over their last year of

schooling. We argue for a shift in focus to growth AND standards in any QPE and HOPE model. Our emphasis should be on assessment for learning, which is the means by which teachers can focus on and measure student growth; that is, devising assessment that assists teachers to make decisions about the optimal pedagogy appropriate for their students during PE.

Goodyear and Dudley (2015) recognised that effective PE teachers play an active role in the teaching and learning process. They create a learning environment that promotes student learning with their peers. Even in 'student-centred' MBP, teachers interact with students, not only when students reach a barrier in their learning but to interpret, understand, support, and develop the learning that is taking place. Effective PE teachers need to constantly diagnose what is occurring during the lesson, have multiple interactional strategies (that include multiple MBP approaches), and evaluate (assess) the impact of these actions on student learning (Goodyear & Dudley, 2015).

At the centre of Goodyear and Dudley's (2015) argumentis the learner and an assessment of students' learning needs. This argument is in agreement with Armour and colleagues' discussions around effective pedagogies and pedagogies for health, termed 'PE-for-health' pedagogies (Armour, 2014; Armour & Harris, 2013; Armour et al., 2012), and Hattie's (2012) discussions around visible learning. As Armour and Harris (2013) suggest, models and proposals for health pedagogies have suffered weaknesses and have failed to be adopted because they have not had the vested interests of the clients – i.e. the children – at the heart of the pedagogical encounter. To ensure teachers have maximum and positive impact on children's health the diverse and individual needs should be at the centre of practice and, therefore, the starting point for an effective pedagogy is the student and the ongoing assessment of students' learning needs (Armour, 2014; Armour & Harris, 2013; Armour et al., 2012). Equally, Hattie (2012) has argued that the pedagogical encounter should begin with an identification of students targeted learning needs that involves identifying (i) learning intentions for students and (ii) success criteria. Through this diagnostic approach, teachers can use the framework provided in this paper to address their students diverse and individual needs but also determine the level of impact their practices have on their students' learning. While we, as authors, agree with these arguments, as

Puhse et al. (2011) argued, a framework to support teachers assessing learning and the impact they are having or have had on students' health is missing in the field.

Building an assessment framework that can serve both educative and public health needs

If QPE models (including HOPE and other MBPs) accept their capacity to achieve both health and educative goals, the role of the assessment framework within these models needs to be considered as assessment always becomes the enacted curricula (Biggs, 1999). Effective frameworks of assessment need to be grounded in defendable models of metacognition and observable learning (Biggs, 1999). Unfortunately for PE, popular metacognitive models in education, such as Bloom's Taxonomy of Learning Objectives (Bloom, 1956) and the later revisions by Anderson et al (2005) were primarily concerned only with the cognitive domain of learning. Even though adaptations were constructed for the affective (Krathwohl et al, 1973) and psychomotor domains (Simpson, 1972), they remained beleaguered by a lack of empirical support as to their validity and reliability at distinguishing between the learning domains, confusion with levels of knowing and forms of knowledge, and endemic semantic misinterpretations when used by teachers (Colder, 1983; Hattie & Purdie, 1998).

In order to describe the progression of increasing cognitive, affective, social and psychomotor complexity for QPE and HOPE being outlined in this paper, a tool was sought that was not limited to any one of the aforementioned learning domains. The selected learning model had to be capable of addressing all four learning domains simultaneously AND be observable in a physical activity medium if the claim that QPE and HOPE could achieve both educative and public health outcomes is to be sustained. For this reason, within each domain of learning (Figure 2) is an embedded dissection of observed learning behaviors using the Structure of Observed Learning Outcomes (SOLO) taxonomy proposed by Biggs and Collis (1982).

The SOLO taxonomy was used in this framework to understand the learning complexity of QPE and HOPE because it has been used to effectively measure levels of conceptual understanding across a wide range of subject areas, including PE. The SOLO taxonomy is based on neo-Piagetian

descriptions of learning and was constructed by Biggs and Collis (1982) through detailed observations of the developmental pattern of student behaviors and responses in relation to assessment tasks in a wide variety of school subjects in both the humanities and scientific disciplines (Biggs & Collis, 1982). It has been used since 1982 to assess levels of student performance in subjects as diverse as undergraduate science education (Newton & Martin, 2013), secondary science (Soobard & Reiska, 2015), statistics (Nor & Idris, 2010), dental education (İlgüy, İlgüy, Fişekçioğlu & Oktay, 2014), pre-service education in mathematics (Özdemir & Yildiz, 2015) and literary studies (Svennson, Manderstedt & Palo, 2015). Most significantly for this project, SOLO has been used to measure teacher understanding of PE pedagogy and to assess student understanding of concepts related to PE (Baxter & Dudley, 2008; Dudley & Baxter, 2013; 2009; Dudley, Drinkwater & Kelly, 2014). Haynes (2009) also showed that SOLO cycles of learning could be applied to the sensorimotor mode of learning, notably in the performance of gymnastic-type movements. Most recently, Dudley (2015) applied the SOLO taxonomy to a Conceptual Model of Physical Literacy. The SOLO-based assessment rubric described by Dudley (2015) catered for guiding simultaneous assessment of school-aged youth across four core domains of physical literacy. Each of these four core elements addressed interpretations of numerous pedagogical models across the cognitive, affective and psychomotor domains of the PE discipline. What makes application of the SOLO Taxonomy most appealing for addressing the educative and public health nexus of QPE and HOPE is that it has been evaluated as particularly applicable to the measurement AND categorization of standards at different levels of conceptual understanding (Boulton-Lewis, 1998; Chan et al., 2002; Hattie & Brown, 2004).

The SOLO taxonomy (Biggs & Collis, 1982) describes five levels in the learner's development of deep conceptual understanding of a construct. These levels are:

1. Prestructural (Limited or no understanding)

2. Unistructural (Understanding of one element)

3. Multistructural (Understanding of a number of elements but not the pattern of relationships between them)

4. Relational (Understanding of the links between the elements and the ability to describe the elements as a whole – pattern recognition)

5. Extended Abstract (The ability to relate and apply the concept to other contexts and other concepts – critical evaluation).

Viewed thus, the SOLO taxonomy can be seen 'to chart the growth' of student learning from surface to deep understanding. A feature of this progression is that from one level to another may be marked by transitional stages in which a student may exhibit both an upper and lower level in the same assessment artifact. Biggs and Collis (1982, p. 217) also maintain that SOLO levels were discernible in the Piagetian modes (sensory-motor, intuitive, concrete symbolic and formal) which means they can be expressed across the spectrum of learning undertaken during all years of schooling (i.e. from pre-school to tertiary education).

The SOLO taxonomy provides a well-evidenced (Killen, 2005) and applied learning model that informs the dominant pedagogical approach of constructive alignment (Biggs, 1999). Hattie (2009) states that the most effective teachers are able to see through the eyes of their students therefore by focusing on 'observed' outcomes, teachers are able to reduce the risk of nebulous or overly narrow standards infiltrating their judgments of student learning and physical activity behavior. In other words, the application of SOLO taxonomy should serve to empower teachers and students to view the educative goals of PE in any physical activity context.

Applying a SOLO derived assessment framework to QPE and HOPE

The development of an assessment framework based on the taxonomy described within this paper should enable teachers to begin the informed development of assessment instruments to be used in the assessment of QPE and HOPE programs in schools. These instruments should be used to determine the progress students make based on varied starting points in any given physically active learning context over time.

Figure 1 is a suggested multi-learning rubric to be used as an assessment framework for the design of assessment instruments in QPE and HOPE programs. On the vertical columns, the SOLO

Taxonomy is articulated as presented by Biggs and Collis (1982). On the horizontal rows, the rubric exemplifies that physical activity is used as a medium to observe student behavior in order to infer cognitive, affective, social and psychomotor achievement. This notion of observed learning by a teacher in a physical activity medium is known as assessing 'legitimate manifestations of learning' as described by Dudley (2015) and supported by Goodyear and Dudley (2015) in an active learning environment. Ensuring that physical activity remains the focused context in which assessment occurs, allows the proposed assessment framework in Figure 2 can serve the simultaneous health and educative goals of QPE and HOPE.

It is however important to note, that the primary goal of the HOPE model was to increase the amount of MVPA accrued during PE classes (Sallis et al, 2013). The assessment framework proposed in Figure 2 suggests a new lens in which to envisage physical activity within the PE class. An addition to the Sallis et al (2012) premise that accruement of MVPA minutes is important for health goals, We propose that this alone negates the fact that as learning improves, quality as well as quantity of physical activity should manifest. Assessing physical activity in this light allows for greater pedagogical liberty at the health/education nexus in PE. Teachers can legitimately defend that the learning that occurs during a PE lesson can be exhibited as a quantifiable measure (i.e. MVPA minutes) or a qualitative measure (i.e. efficiency of movement, refined skill execution).

It also encapsulates a 'growth' mindset approach to student assessment. As previously discussed, this is a consistent limitation of both standards and measurement models in PE seeking to achieve public health and educative goals. The approach demonstrated in this rubric permeates the constraints of any given chronologically-derived curricula in favor of identifying points in the learning experience whereby curricula context or complexity must evolve in order for student learning to progress. This is identified in the rubric as the '*Progression Threshold*'. The adoption of a *'Progression Threshold'* was consistent with contemporary iterations of the SOLO Taxonomy described by Pegg and Panizzon (1997) and later by Dudley and Baxter (2009). The reason for this '*Progression Threshold*' is that it indicates a point in the learning progression whereby a student's learning is likely to move to new conceptual understanding of the context. Unlike previous published

literature though, this assessment framework explicitly states that it is the context of physical activity that needs to change to ensure that an increase in learning and potential health efficacy can occur.

It should be noted that very few students will actually progress to the Extended Abstract level in any given task but being consistent with adopting a 'growth' mindset, teachers also need to be able to capture this exceptional learning when it occurs. It is likely to result in a significant paradigm shift in the way in which students think, act or feel about their physical selves (Dudley & Baxter, 2009; 2013).

The power of applying this framework is to direct the discussion and thinking of teachers, students, and health policy makers to knowing about what students think, do and feel (Hattie & Yates, 2013). Once this becomes the discussion among these key stakeholders in public health and education, they may then focus their efforts on making students aware at the start of any given physical activity experience what success is expected to look like (based on appropriate level of challenge) and then engaging them in the challenge to achieve that success (Hattie & Yates, 2013).

In QPE and HOPE, like any other concept in education, there needs to be a shift from an over reliance on simply providing 'success' experiences and judging against nebulous 'standards' (Masters, 2013). We need assessment instruments and teaching practices that guide teachers to focus on students learning needs, support teachers in identifying students' learning needs, focus on 'growth over time' and are evolutionary in their capacity to capture learning. This needs to be coupled by an approach to teaching that does not see pedagogy employed by 'educationalists' and 'interventionists' by as the dichotomy described by Tinning (2015). Rather, attempts to understand the causality of interventionist research and the pedagogy of educationalists are mutually beneficial in addressing the public health and educative nexus sought by QPE and HOPE. As discussed earlier in this paper, this segregation cannot exist if educative and public health goals are going to be achieved.

Case studies of application

Figures 2 and 3 are two hypothetical case studies of how the proposed assessment framework might shape a teachers' thinking in applying this type of HOPE model assessment practice. "James" in Figure 2 is a student participating in a soccer-based unit within his PE lessons. At the beginning of the unit, he demonstrates Unistructural manifestations of cognitive, social, affective and psychomotor learning when presented with the physical activity context of soccer. As the unit progresses, his cognitive, affective and psychomotor learning begin to exhibit as Multistructural behaviours. In other words, he is solving simple tactical problems in the game (like passing to beat opponents), and can now complete many of this skills unassisted. His social learning development however remains stalled as he will not encourage other teammates during the games or shake hands with his opponents at the conclusion of the game. The physical activity that manifested during this assessment period for James was improved quality of physical activity that manifested as a more efficient passing technique and an increase in time in possession of the ball if he steals possession, but a reluctance of teammates to share with him. Quantity of physical activity is evidenced by an increased MVPA minutes during the unit and his increased intensity of PA during the same period. Given this lack of social growth in James during this unit, the teacher knows to present a pedagogical intervention that promotes greater emphasis on his social development in this physical activity context.

Katie (Figure 3), like James in Figure 2, she too is a student participating in a soccer-based unit within her PE lessons. At the beginning of the unit, she too demonstrates Unistructural manifestations of cognitive, social, affective and psychomotor learning when presented with the physical activity context of soccer. As the unit progresses though, she reaches a cognitive understanding at a Relational level whereby she can applies different tactical and problem solving decisions to adapt her performance to changing rules/instructions and demonstrates a capacity to develop strategy to improve her efficacy in successive lessons. The quantity of physical activity is evidenced by her progression would be an increase in MVPA minutes during the unit and his increased intensity of PA during the same period. However, the quality of the physical activity she exhibits surpasses that of James. Not only is she more effective at the same techniques and has increased time in possession, her increase in social development results in teammates sharing the ball

with her more often. Her ability to solve operate cognitively at the relational level during the soccer unit means that if further growth in this domain is going to occur, the intensity or complexity of the unit will need to increase. It also indicates to the teacher that the pedagogical focus for this student needs to be directed to the other three learning domains for this student.

Identifying a place for the QPE/HOPE assessment framework – Practical teacher applications

Teachers should use this QPE/HOPE framework presented in Figure 1 to shape their thinking in the whole design of their PE programs. To do so effectively requires positioning the framework within a basic model of an aligned PE curriculum. The main theoretical underpinning of standards or outcomes-based curriculum is the model constructive alignment (Biggs, 1999). John Biggs defines this as coherence between assessment, teaching strategies and intended learning outcomes.

At its most basic, the model requires alignment between the intended learning outcomes, how the student is assessed, and what the student does in order to learn. The following is a practical 'step by step' guide for teachers to use in their application of this QPE/HOPE assessment framework.

Step 1: Identify the intended learning outcomes of your PE curriculum – The standards or outcomes come first and allow the teacher to refine the assessment framework into an effective instrument.

Step 2: Use the QPE/HOPE assessment framework as the regime in which the learning activities are organised that will teach the students how to meet the assessment criteria (and hence, reach the standards/outcomes). Each of the criteria from the framework can be extracted and contextualised into an assessment instrument whereby social, affective, cognitive and psychomotor are assessed simultaneously. Furthermore, physical activity (both quality and quantity) remain an underlying imperative of the expected behaviour in a PE curriculum. Figure 4 is an example of how a teacher might extract a PE standard/outcome and apply it to the QPE/HOPE assessment framework as a usable assessment instrument. The example outcomes have been extracted from the New South Wales Personal Development, Health and Physical Education Curriculum (BOSTES, 2003). For optimal effect, the

instrument should be administered both formatively and summatively to ascertain student growth.

Step 3: What the teacher does and what the students do are aimed at achieving the outcomes or standards by meeting the assessment criteria. This takes advantage of the numerous MBPs that PE teachers can draw on as intervention strategies in tacking the diverse nuance of PE curricula standards/outcomes.

Step 4: Review student achievement across the designated PE program based on the criteria and return to Step 1 by selecting the next standards/outcomes from the PE curriculum to be assessed.

Achieving the health/education nexus via assessment

HOPE curricula were established using an interventionist mindset and are therefore well suited to integrating their well-defined pedagogies (including other MBPs) as appropriate 'intervening' strategies within this assessment framework. To date, they have lacked the rigor of an assessment framework and an integrated teaching model that has been capable of addressing both the health and educative goals they seek to achieve. Moreover, these curriculum designs have largely bypassed the teacher and students' learning needs. The assessment framework presented in this paper, therefore, serves to help teachers in the process of diagnosis, the subsequent design or selection of appropriate pedagogical models or strategies, and finally, an evaluation of the impact of their practice on students' learning. We HOPE that this paper provides new insight in how that gap may be reduced by reimagining the role a QPE program can to play in improving both the health and education within their communities. We would also like to think that while here is a focus on HOPE models of PE, this framework could be useful for any existing MBP.

Limitations

There are numerous limitations with this paper given its conceptual approach to tackling a persistent and divisive topic in health and education. This paper did not attempt to tackle issue regarding the definitions of health or interpretations of it within the two disciplines and we

acknowledge that views on health ‘all depend on your health perspective’ (Quennerstedt, 2011, p. 46). There also needs to be an acknowledgement of the challenges teachers encounter in supporting health goals in an educative institution. These cultural and political barriers are real in the day to day lives of teachers and students and ultimately narrow the capacity of teachers and schools to consider such radical reform. Despite all of this, it is the HOPE of the authors that is this is a starting point for further debate and discussion on how to support, develop, and improve young people’s experiences of physical education.

Note on authorship: As noted by Goodyear and Dudley (2015), the means for determining the order of authorship should be stipulated in journal articles. The order of authorship for this paper was decided by timing which author could hold their breath under at least 1 meter of water for the longest period of time. Whilst not a conventional means of determining order of authorship, we offer it as a consideration to other authors in the physical education disciplines for determining order of authorship for future publications whereby colligative work is necessary.

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Figure 1: A Quality and Health Optimizing Physical Education Assessment Framework

Progression **Learning Domain**	**'Prestructural'** The acquisition of unconnected information, which have no organisation and make no sense.	**'Unistructural'** Simple and obvious connections are made, but their significance is not grasped.	**'Multistructural'** A number of connections may be made, but the meta-connections between them are missed, as is their significance for the whole	**'Relational'** The student is now able to appreciate the significance of the parts in relation to the whole	**Progression Threshold**	**'Extended Abstract'** The student is making connections not only within the given subject area, but also beyond it, able to generalise and transfer the principles and ideas underlying the specific instance. **Students have exceeded the cognitive, affective, social or psychomotor expectations of the developmentally appropriate standard.**
'Cognitive' The cognitive domain refers to intellect or mental abilities. Cognition involves receiving, processing, and organizing information that has been perceived through the senses and using the information appropriately.	Students do not adhere to simple rules/instructions of an assigned physical activity.	Students complete an assigned physical activity task within the rules and instructions assigned to that task.	Students understand multiple rules/instructions (both major and specific) of a physical activity. **AND** Students demonstrate the ability to solve essential tactical problems presented in the physical activity.	Students demonstrate different tactical and problem solving decisions in the course of their physical activity to adapt their performance to changing rules/instructions. **AND** Students demonstrate a capacity to develop strategy to improve their efficacy in the assigned physical task.	When students meet this level in any one of the Learning Domains, the context or complexity of the physical activity experience should change	Students can evaluate the effect different rules, tactics or strategy have in any given physical activity context. **OR** Students can create new strategies, tactics and rules for improving the quality and efficacy of physical activity. **OR** Students demonstrate how strategy, tactics and rules of play/movement can be applied in contexts beyond participation in physical activity context.
'Affective' The affective domain encompasses feelings and emotions, behaviours, independence, self-esteem, and temperament.	Students do not control their own behaviour in physical activity settings. They require constant prompting and supervision. **OR** Students require external rewards or incentives to undertake a health or skill-related task in a physical activity setting.	Students can move in appropriate ways, executing the required movements if they are prompted, reminded or the movement is modeled.	Students readily accept numerous movement challenges **AND** Students practice movement skills in a self-motivated way.	Students are able to work without supervision. They can relate their movement needs in any given physical activity context **AND** Students move in ways that will improve their health and/or skill because they understand the relationship between movement and many aspects of their well-being (i.e. emotions, self-esteem, temperament)		Students can evaluate the effectiveness of their movement in improving their health and skill needs **OR** Students demonstrate that their movement decisions for health and skill might be adopted beyond their participation in physical activity.
'Social' The social domain encompasses learning related to communication, teamwork, management and leadership It is	Students do not interact with others in physical activity settings.	Students control their own behaviour so that I don't interfere with others. They do this without prompting and constant supervision. **AND** Students responds to others during a physically active task when initiated by another person	Students show respect for others and are also willing to play and move with others. **AND** Students participate in mutually meaningful rituals associated with the physical activity experience	Students are able to extend their sense of responsibility to others by cooperating, giving support, showing empathy or showing the inner strength to deal with adversity. **OR** Students are capable of managing assigned activities with equity and fairness by defining and allocating roles for participating in the physical activity		Students demonstrate effective and empathetic leadership of their team/peers during physical activity **OR** Students see how their social learning experiences through physical activity may be adopted beyond their participation in physical activity to broader life lessons. **OR** Students empower others during physical activities (i.e. encouraging ownership, giving credit, grooming subordinates) **OR** Students build a following of others through positivity, vision sharing, generating commitment and maintaining integrity.
'Psychomotor' Psychomotor objectives are concerned with the physically encoding of information, with movement and/or with activities where the gross and fine muscles are used for expressing or interpreting information or concepts.	Students cannot complete a movement skill/pattern without assistance or by imitation.	Students can complete a movement skill/pattern if they are assisted or if the movement is modeled for them to replicate.	Students can complete a movement skill/pattern unassisted or by independently following instructions.	Students can combine movement skills/patterns with other movement skills/patterns to perform successful movement sequences with very few errors.		Students can appraise their own movement competence as it varies. **OR** Students create new adaptations to these skills to make them more effective in different contexts. **OR** Students can apply these skills in context for which they were not intended.
Learning Context Learning is observed and assessed through a designated physical activity experience	**No apparent learning observed in a physical activity context** **Quality and quantity of physical activity do not improve**	**Quality and quantity of physical activity improve in proportion to learning progression and context** **(Quality indicators could include: efficiency of movement, etc..) (Quantity indicators could include: MVPA minutes, etc…)**				

Figure 2: An Applied Quality and Health Optimizing Physical Education Assessment Framework for a student during a soccer unit (Case study: James)

Progression **Learning Domain**	**'Prestructural'** The acquisition of unconnected information, which have no organisation and make no sense.	**'Unistructural'** Simple and obvious connections are made, but their significance is not grasped.	**'Multistructural'** A number of connections may be made, but the meta-connections between them are missed, as is their significance for the whole	**'Relational'** The student is now able to appreciate the significance of the parts in relation to the whole	**Progression Threshold**	**'Extended Abstract'** The student is making connections not only within the given subject area, but also beyond it, able to generalise and transfer the principles and ideas underlying the specific instance. **Students have exceeded the cognitive, affective, social or psychomotor expectations of the developmentally appropriate standard.**
'Cognitive' The cognitive domain refers to intellect or mental abilities. Cognition involves receiving, processing, and organizing information that has been perceived through the senses and using the information appropriately.	Students do not adhere to simple rules/instructions of an assigned physical activity.	Students complete an assigned physical activity task within the rules and instructions assigned to that task.	Students understand multiple rules/instructions (both major and specific) of a physical activity. **AND** Students demonstrate the ability to solve essential tactical problems presented in the physical activity.	Students demonstrate different tactical and problem solving decisions in the course of their physical activity to adapt their performance to changing rules/instructions. **AND** Students demonstrate a capacity to develop strategy to improve their efficacy in the assigned physical task.	When students meet this level in any one of the Learning Domains, the context or complexity of the physical activity experience should change	Students can evaluate the effect different rules, tactics or strategy have in any given physical activity context. **OR** Students can create new strategies, tactics and rules for improving the quality and efficacy of physical activity. **OR** Students demonstrate how strategy, tactics and rules of play/movement can be applied in contexts beyond participation in physical activity context.
'Affective' The affective domain encompasses feelings and emotions, behaviours, independence, self-esteem, and temperament.	Students do not control their own behaviour in physical activity settings. They require constant prompting and supervision. **OR** Students require external rewards or incentives to undertake a health or skill-related task in a physical activity setting.	Students can move in appropriate ways, executing the required movements if they are prompted, reminded or the movement is modeled.	Students readily accept numerous movement challenges **AND** Students practice movement skills in a self-motivated way.	Students are able to work without supervision. They can relate their movement needs in any given physical activity context **AND** Students move in ways that will improve their health and/or skill because they understand the relationship between movement and many aspects of their well-being (i.e. emotions, self-esteem, temperament)		Students can evaluate the effectiveness of their movement in improving their health and skill needs **OR** Students demonstrate that their movement decisions for health and skill might be adopted beyond their participation in physical activity.
'Social' The social domain encompasses learning related to communication, teamwork, management and leadership It is	Students do not interact with others in physical activity settings.	Students control their own behaviour so that I don't interfere with others. They do this without prompting and constant supervision. **AND** Students responds to others during a physically active task when initiated by another person	Students show respect for others and are also willing to play and move with others. **AND** Students participate in mutually meaningful rituals associated with the physical activity experience	Students are able to extend their sense of responsibility to others by cooperating, giving support, showing empathy or showing the inner strength to deal with adversity. **OR** Students are capable of managing assigned activities with equity and fairness by defining and allocating roles for participating in the physical activity		Students demonstrate effective and empathetic leadership of their team/peers during physical activity **OR** Students see how their social learning experiences through physical activity may be adopted beyond their participation in physical activity to broader life lessons. **OR** Students empower others during physical activities (i.e. encouraging ownership, giving credit, grooming subordinates) **OR** Students build a following of others through positivity, vision sharing, generating commitment and maintaining integrity.
'Psychomotor' Psychomotor objectives are concerned with the physically encoding of information, with movement and/or with activities where the gross and fine muscles are used for expressing or interpreting information or concepts.	Students cannot complete a movement skill/pattern without assistance or by imitation.	Students can complete a movement skill/pattern if they are assisted or if the movement is modeled for them to replicate.	Students can complete a movement skill/pattern unassisted or by independently following instructions.	Students can combine movement skills/patterns with other movement skills/patterns to perform successful movement sequences with very few errors.		Students can appraise their own movement competence as it varies. **OR** Students create new adaptations to these skills to make them more effective in different contexts. **OR** Students can apply these skills in context for which they were not intended.
Learning Context Learning is observed and assessed through a designated physical activity experience	**No apparent learning observed in a physical activity context** **Quality and quantity of physical activity do not improve**	**Quality and quantity of physical activity improve in proportion to learning progression and context** **(Quality indicators could include: efficiency of movement, etc..) (Quantity indicators could include: MVPA minutes, etc…)**				

Figure 3: An Applied Quality and Health Optimizing Physical Education Assessment Framework for a student during a soccer unit (Case study: Katie)

Progression **Learning Domain**	**'Prestructural'** The acquisition of unconnected information, which have no organisation and make no sense.	**'Unistructural'** Simple and obvious connections are made, but their significance is not grasped.	**'Multistructural'** A number of connections may be made, but the meta-connections between them are missed, as is their significance for the whole	**'Relational'** The student is now able to appreciate the significance of the parts in relation to the whole	**Progression Threshold**	**'Extended Abstract'** The student is making connections not only within the given subject area, but also beyond it, able to generalise and transfer the principles and ideas underlying the specific instance. **Students have exceeded the cognitive, affective, social or psychomotor expectations of the developmentally appropriate standard.**
'Cognitive' The cognitive domain refers to intellect or mental abilities. Cognition involves receiving, processing, and organizing information that has been perceived through the senses and using the information appropriately.	Students do not adhere to simple rules/instructions of an assigned physical activity.	Students complete an assigned physical activity task within the rules and instructions assigned to that task.	Students understand multiple rules/instructions (both major and specific) of a physical activity. **AND** Students demonstrate the ability to solve essential tactical problems presented in the physical activity.	Students demonstrate different tactical and problem solving decisions in the course of their physical activity to adapt their performance to changing rules/instructions. Students demonstrate a capacity to develop strategy to improve their efficacy in the assigned physical task.	When students meet this level in any one of the Learning Domains, the context or complexity of the physical activity experience should change	Students can evaluate the effect different rules, tactics or strategy have in any given physical activity context. **OR** Students can create new strategies, tactics and rules for improving the quality and efficacy of physical activity. **OR** Students demonstrate how strategy, tactics and rules of play/movement can be applied in contexts beyond participation in physical activity context.
'Affective' The affective domain encompasses feelings and emotions, behaviours, independence, self-esteem, and temperament.	Students do not control their own behaviour in physical activity settings. They require constant prompting and supervision. **OR** Students require external rewards or incentives to undertake a health or skill-related task in a physical activity setting.	Students can move in appropriate ways, executing the required movements if they are prompted, reminded or the movement is modeled.	Students readily accept numerous movement challenges **AND** Students practice movement skills in a self-motivated way.	Students are able to work without supervision. They can relate their movement needs in any given physical activity context **AND** Students move in ways that will improve their health and/or skill because they understand the relationship between movement and many aspects of their well-being (i.e. emotions, self-esteem, temperament)		Students can evaluate the effectiveness of their movement in improving their health and skill needs **OR** Students demonstrate that their movement decisions for health and skill might be adopted beyond their participation in physical activity.
'Social' The social domain encompasses learning related to communication, teamwork, management and leadership It is	Students do not interact with others in physical activity settings.	Students control their own behaviour so that I don't interfere with others. They do this without prompting and constant supervision. **AND** Students responds to others during a physically active task when initiated by another person	Students show respect for others and are also willing to play and move with others. **AND** Students participate in mutually meaningful rituals associated with the physical activity experience	Students are able to extend their sense of responsibility to others by cooperating, giving support, showing empathy or showing the inner strength to deal with adversity. **OR** Students are capable of managing assigned activities with equity and fairness by defining and allocating roles for participating in the physical activity		Students demonstrate effective and empathetic leadership of their team/peers during physical activity **OR** Students see how their social learning experiences through physical activity may be adopted beyond their participation in physical activity to broader life lessons. **OR** Students empower others during physical activities (i.e. encouraging ownership, giving credit, grooming subordinates) **OR** Students build a following of others through positivity, vision sharing, generating commitment and maintaining integrity.
'Psychomotor' Psychomotor objectives are concerned with the physically encoding of information, with movement and/or with activities where the gross and fine muscles are used for expressing or interpreting information or concepts.	Students cannot complete a movement skill/pattern without assistance or by imitation.	Students can complete a movement skill/pattern if they are assisted or if the movement is modeled for them to replicate.	Students can complete a movement skill/pattern unassisted or by independently following instructions.	Students can combine movement skills/patterns with other movement skills/patterns to perform successful movement sequences with very few errors.		Students can appraise their own movement competence as it varies. **OR** Students create new adaptations to these skills to make them more effective in different contexts. **OR** Students can apply these skills in context for which they were not intended.
Learning Context Learning is observed and assessed through a designated physical activity experience	**No apparent learning observed in a physical activity context** **Quality and quantity of physical activity do not improve**	**Quality and quantity of physical activity improve in proportion to learning progression and context** **(Quality indicators could include: efficiency of movement, etc..) (Quantity indicators could include: MVPA minutes, etc…)**				

Figure 4: A hypothetical assessment instrument based on the Quality and Health Optimizing Physical Education Assessment Framework

PE Program Unit: Invasion games - Soccer

PE Curricula Standards/Outcomes to be assessed: ***Outcome 2 - 5.4*** adapts, transfers and improvises movement skills and concepts to improve performance**;** ***Outcome 4 - 5.10*** adopts roles to enhance their own and others' enjoyment of physical activity (Observed behaviours of these outcomes all exist at the Multistructural level in the instrument)

Student checklist: During the unit, which of the following behaviours did the student exhibit

	Not achieving	Attention Needed	Working Toward Outcomes	Achieving Outcomes		Exceeding Outcomes
'Cognitive'	❑ Did not adhere to the simple rules/instructions during the soccer unit.	Completes at least one of the following assigned tasks within the rules and instructions of a soccer unit. ❑Staying onside in offence ❑Not committing direct foul infringements	❑ Understands multiple rules/instructions of soccer. **AND** Demonstrates the ability to solve essential tactical problems presented in soccer. ❑Attacking space ❑Zonal defence	Demonstrates different tactical and problem solving decisions in the course of a soccer game ❑executing an offside trap ❑playing a ball off in offence **AND** Demonstrates improved their decision efficacy in the soccer unit. ❑Transitions from man to zonal defence ❑Transitions from offence to defence	**Progression Threshold**	❑Evaluates the effect different rules, tactics or strategy in the game of soccer. **OR** ❑Creates new strategies, tactics and rules for improving the quality of their soccer performance. **OR** ❑Demonstrates how strategy, tactics and rules of play/movement can be applied in contexts beyond participation in a soccer game.
'Affective'	❑Do not control their own behaviour during the soccer unit. They require constant prompting and supervision. **OR** ❑Requires external rewards or incentives to undertake a health or skill-related tasks during the soccer unit.	❑Moves in appropriate ways for the game of soccer, executing the required movements when they are prompted, reminded or the movement is modeled. (i.e. run, pass, shoot when prompted)	❑Readily accepts numerous movement challenges in the game of soccer (i.e. running, passing, and shooting as required in the context of the game) **AND** ❑Practices soccer skills in a self-motivated way. (i.e. drill and minor team game periods are focused and on task)	❑ Works on drills or minor team games without supervision. **AND** ❑Trains in ways that will improve their health and/or skill in soccer because they understand the relationship between training and improved performance and enjoyment of soccer		❑Evaluates the effectiveness of their movement in soccer improving their broader health and skill needs (i.e. CRF, Anaerobic fitness, kicking strength, agility) **OR** ❑Demonstrates their movement decisions for health and skill might be adopted beyond their participation in soccer to other invasion games.
'Social'	❑Do not interact with others during the soccer unit.	❑Control their own behaviour so they don't interfere with others. They do this without prompting and constant supervision. **AND** ❑Responds to others during a game of soccer when initiated by another person	❑Shows respect for others and are also willing to play and move with others. **AND** ❑Participates in mutually meaningful rituals associated with soccer (i.e. shakes hands with the opposition after the game, cheers the winning team)	❑Extends their sense of responsibility to others by cooperating, giving support, showing empathy or showing the inner strength to deal with adversity. (i.e. supports injured players, consoles teammates/opposition in adverse game scenarios) **OR** ❑Manages assigned activities with equity and fairness by defining and allocating roles within a soccer unit. (i.e. assumes either player or officiating roles within the soccer unit)		❑Demonstrates effective and empathetic leadership of their team/peers during the soccer unit **OR** ❑Shows how their social learning experiences through soccer may be adopted beyond their participation in soccer to broader life lessons. **OR** ❑Empowers others during the soccer unit (i.e. encouraging ownership, giving credit, grooming subordinates) **OR** ❑Builds a following of others through positivity, vision sharing, generating commitment and maintaining integrity.
'Psychomotor'	❑Cannot complete a designated soccer skill/pattern without assistance or by imitation.	❑Completes assigned soccer skills/patterns if they are assisted or if the movement is modeled for them to replicate.	❑Completes assigned soccer skilsl/patterns unassisted or by independently following instructions.	❑Combines a number of assigned soccer skills/patterns with other locomotor, sability and manipulation skills to perform successful movement sequences with very few errors.		❑Appraises their own soccer competence as it varies. **OR** ❑Creates new adaptations to these skills to make them more effective in different contexts. **OR** ❑Applies these skills in context for which they were not intended.
Physical activity	❑Exhibits very low levels of MVPA intensity (<10% of PE time) ❑Quality of PA is poor	❑Exhibits low levels of PA intensity (10%-20%) of PE class time ❑Quality of PA is below what is needed to make progress	❑Exhibits increasing levels of PA intensity (20%-40%) of PE class time ❑Quality of PA is what is needed to make progress toward the outcomes	❑Exhibits MVPA for approximately 50% of total PE time on during most lessons ❑Quality of PA is consistent with all learning challenges		❑Exhibits MVPA often in excess of 50% of PE class time ❑Quality of PA surpasses that expected of a students of similar age/grade