Assessing the rigor and relevance of planned instruction on an authentic assessment task in which pre-service teachers target the moving skills of the NSW PDHPEK-6 syllabus.

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ABSTRACT

The investigation of an authentic assessment task is the focus of this research. The lesson plan is used in many pre-service teacher education programs. Such plans potentially enable teacher educators to better understand pre-service teachers thinking about teaching. In an effort to investigate this potential, a Rigor/Relevance Framework is adapted to the psychomotor domain. It is then applied to pre-service teachers work samples. These pre-service teachers have completed only the mandatory unit of study on the PDHPE specialist pathway currently offered at the University of New England. In order to measure the efficacy of such a pathway, instruments are being explored and trialled as potential indicators of professional readiness to plan for successful learning in PDHPE. Challenges and contributions to tertiary education are presented in reporting the outcomes of this study.
INTRODUCTION

The design and trial of a researcher-developed instrument for a larger study is the focus of this paper. The larger study investigates the efficacy of a specialisation pathway during initial teacher education to improve the qualification of generalist primary school teachers to teach the physical education component of the New South Wales Personal Development, Health and Physical Education (PDHPE) K-6 Syllabus. More specifically, the intended cross-sectional study investigates differences between groups of pre-service teachers as they plan instruction to develop the primary-aged child's skills in moving with competence and confidence. To achieve this, an instrument capable of differentiating levels of pre-service teacher preparedness to plan to teach moving skills is required.

An action research methodology facilitates the investigation of three questions that frame this pilot study:

- Can the dimensions of rigor and relevance of planned instruction form the basis of a classification system of lesson plans?
- Which critical features of these dimensions result in the most reliable measure of rigor and relevance?
- Does the data generated from the resultant instrument provide an indirect measure of preparedness of a teacher to teach moving skills?

These questions are addressed sequentially in the following sections.

BACKGROUND

According to Morgan & Bourke (2004), several Australian studies report a lack of qualification of classroom teachers to deliver physical education programs, largely as a result of inadequate teacher training in physical education (Moore, Webb & Dickson, 1997; Thompson, 1996; Walkley, 1992; Webb, Moore, Gray & Jessup, 1993). In response to these findings, the Health, Physical Education and Health Studies (HPESS) team at The University of New England (UNE), introduced a specialization pathway into the Bachelor of Education (Primary) degree program. The context of the design of the specialisation pathway is complex (Freak, Miller & Haynes, 2005), however, the intent of this initiative is to improve the preparedness of generalist teachers to teach PE in the primary school.

Currently the preparation and development of teachers in NSW is given direction and structure by the New South Wales Institute of Teachers (NSW IT Act 2004). Professional teaching standards make explicit what teachers need to know, understand and be able to do. Relevant to this paper, is the domain of Professional Practice in which the Graduate Teacher must "possess the requisite knowledge, skills, values and attitudes to plan for and manage successful learning" (Professional Teaching Standards 2004: 1). More particularly, they must be able to "Plan and implement coherent lessons and lesson sequences that are designed to engage students and address learning outcomes" (Element 3.1.2 - NSWIT 2004:6). The link between teacher planning, quality of the teacher's practice, student learning, and the role of initial teacher education to both establish and strengthen these links is central to this paper.
Whilst it is acknowledged that efforts to develop assessment of the complex performance of teaching continue to be problematic (Darling-Hammond & Synder, 2000), authentic assessment tasks are often utilized during initial teacher education to assess student learning. This practice is informed by the suggestion that embedding performance assessment in coursework is one strategy for teacher educators to maintain quality in teacher education programs (Campbell, 2000). The assessment task is believed to be more valid if it reflects more closely the 'real world' of teaching.

Most units within the specialization pathway include at least one authentic assessment task that requires pre-service teachers to plan instruction of moving skills. This is because "Planning a lesson puts into practice what teachers know about learners, the learning context and better teaching" (McLeod and Reynolds, 2003:122). In so doing, teachers analyse learning needs and design or specify instruction to address these needs in the context of the informing syllabus. The result is a plan that "defines a focus for learning and outlines the actions that teachers and learners engage in to achieve this focus" (McLeod and Reynolds, 2003:126).

Suggestions that "lesson plans and post teaching reflections can serve as windows through which teacher educators can better understand the pre-service teachers thinking about teaching and, ultimately, their observed teaching behaviours" (Schmidt, 2005:6) are at least worthy of further investigation. If this were to be the case, it is plausible that "as pre-service teachers design lessons, their choices for the task they plan to assign to students, and the complexity and sophistication of these tasks, provide insights into candidates' developing understanding for pedagogy" (Anhalt, Ward and Vinson, 2006:1). Such insights may provide a potential source of data for investigating differences in teacher preparedness with increasing specialisation.

**METHODODOLOGY**

Methodology for the exploration of the researcher-developed instrument is described in two major phases. Phase one includes instrument development. Phase two is a pilot study including description of participants, instrumentation, procedures, results, discussion and interpretations.

**Instrument Development**

Based on the experience of grading planning tasks from four units within the specialization over three years, the first author identified two performance dimensions that anecdotally differentiate the quality of planned instruction. These dimensions are:

1. Rigor of the instruction. Rigor in this context referred to observable differences in how much the primary school-aged child could potentially learn about a moving skill from the planned instruction.
2. Relevance of the instruction. Relevance in this context infers a connection between learning the moving skill and the usefulness or purpose of that learning.
A review of literature identified an existing Rigor/Relevance Framework (RRF) first created by Daggett (1997) and currently in use by the International Center for Leadership in Education (ICLE). This RRF is shown in Figure 1.

**Figure 1: ICLE Rigor/Relevance Framework**

The framework in Figure 1 was of interest because:

- It infers a relationship between the dimensions of rigor and relevance.
- The axes of the matrix define a set of critical features for each dimension.
- Plotting measures of rigor against relevance located the lesson plan in a quadrant. Each of these quadrants described the goal, justification and intention of the lesson.
- The four quadrants could infer a typology of lesson plans.

Based on the potential of these points of interests, a RRF was adopted as the design structure for the new instrument. More specifically, the ICLE RRF was adapted for application in the psychomotor domain. This involved translating the:

- 'y' axis from a 'knowledge continuum' to a 'skills continuum'.
- 'x' axis from a generic application model (Daggett, 2005) to a specific curriculum implementation model in the NSW context.
- the descriptions of each quadrant to the psychomotor domain albeit that the title and integrity of each description were maintained.

Following is a more detailed description of each of the three translations. The purpose of these descriptions is to document the design phases of the instrument so it is available for professional scrutiny.
Translating the 'y' axis

The ICLE framework uses Bloom's taxonomy (Bloom et al, 1956) to describe the critical features of the 'y' axis. This axis represents increasing cognitive load along a knowledge continuum. To translate Bloom's taxonomy for the intended instrument, Dave's Psychomotor Taxonomy (1970) was chosen to replace the knowledge continuum with a psychomotor continuum. Dave's taxonomy was selected because of the conceptual links between the two taxonomies, as Dave was a student of Bloom when he developed his taxonomy. The salient features of Dave's taxonomy are shown in Table 1.

Table 1: Dave’s Taxonomy of Psychomotor Domain

<table>
<thead>
<tr>
<th>Level</th>
<th>Definition</th>
<th>Possible Verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imitation</td>
<td>Observe a skill and attempt to repeat it, or see a finished product and attempt to replicate. Patterning behaviour after someone else.</td>
<td>Attempt, carry out, copy, duplicate follow, imitate, mimic, move, practice, repeat, reproduce, respond, try</td>
</tr>
<tr>
<td>Manipulation</td>
<td>Perform the skill or produce the product in a recognizable fashion by following general instructions rather than observation.</td>
<td>Complete, follow, play, perform, produce.</td>
</tr>
<tr>
<td>Precision</td>
<td>Independently perform the skill or produce the product with accuracy, proportion, and exactness; at an expert level.</td>
<td>Achieve automatically, Excel expertly, Perform masterfully</td>
</tr>
<tr>
<td>Articulation</td>
<td>Modify the skill or produce the product to fit new situations; combine more than one skill in sequence with harmony and consistency.</td>
<td>Adapt, alter customise, originate</td>
</tr>
<tr>
<td>Naturalization</td>
<td>Completion of one or more skills with ease and making the skill automatic with limited physical or mental exertion.</td>
<td>Naturally, Perfectly</td>
</tr>
</tbody>
</table>

Three features of this taxonomy are important to the translation of the vertical axis for use in the psychomotor domain. Firstly, the levels listed in Table 1 provide critical features that determine position on the psychomotor continuum. These levels when represented numerically along the continuum become a five point rating scale for the psychomotor axis of the framework. These points infer increasing psychomotor load with increasing value. Secondly, the definitions of each level provide descriptors for each scale on the rating scale instrument. Thirdly, the possible verb list (shown in Table 1) sourced from Dave's original taxonomy anecdotally typify the verbs used by pre-service teachers in their lesson plans to describe instruction.

Subsequently, the 'y axis' of the adapted rigor/relevance framework was translated. As shown in Figure 2 the salient features of this axis are Dave's levels and specific labelling of the axis as 'psychomotor'. The original intention was to label this axis 'rigor continuum' however reference to psychomotor was considered a stronger connection to the purpose of improving instruction of psychomotor skills. The label 'psychomotor' also maintained the integrity of the translation from the 'knowledge' axis of the ICLE framework.
Adapted Rigor/Relevance Framework

**Figure 2: The HPESS Rigor/Relevance Framework**

*ii) Translation of the 'x' axis*

The 'x' axis of the ICLE framework uses Daggett's (2005) Application Model to describe the features of the application continuum. Modification to this axis were informed by Smith and Kendall (1963) who report that an instrument developed in the language of the occupation being investigated increases its face validity. As shown in Figure 2, the relevance continuum of the 'x' axis adopts terminology from the NSWBOS to bring the generic model into a specific context. The terminology evident in Figure 2 is defined in Table 2.

**Table 2: Definition of NSW BOS Terminology**

<table>
<thead>
<tr>
<th>Term</th>
<th>NSW BOS Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content strand</td>
<td>A grouping of content under a common topic or area of study.</td>
</tr>
<tr>
<td>Key learning area (KLA)</td>
<td>A broad grouping of subjects that help teachers manage the scope of the curriculum and ensure students access a well-balanced curriculum.</td>
</tr>
<tr>
<td>Curriculum</td>
<td>The aggregate or sum of courses of study</td>
</tr>
</tbody>
</table>

An additional benefit for the use of the above terminology in the framework would be to enhance its value as a teaching tool. Pre-service teachers would be encouraged to engage with the terminology and in so doing explore the relevance discourse in planning instruction, lessons or units of work from the NSW syllabus.

Following translation of the ICLE framework to the HPESS RR Framework, the next phase of instrument design involved the writing of a ratings instrument that could effectively locate an instructional plan within the quadrants of the framework. The instrument developed is shown in Figure 3 and is identified as the HPESS Rigor/Relevance Instrument (HPESS RRI).
THE HPESS RIGOR/RELEVANCE INSTRUMENT

INSTRUCTIONS:
1. Use the following schema to rate the skill development phase of the lesson plan.
2. Record your ratings on the data collection sheet.

**RIGOR**

**IMITATION**
Learners have the opportunity to repeat or imitate an action that has been demonstrated or explained. This may include using trial and error.

**RATING 1**

**MANIPULATION**
Learners have the opportunity to reproduce a skill or movement sequence from instruction or memory until it becomes both recognizable and habitual.

**RATING 2**

**PRECISION**
Learners have the opportunity to perform a skill or movement sequence independently and proficiently with an emphasis on accuracy, proportion or exactness.

**RATING 3**

**ARTICULATION**
Learners have the opportunity to modify a skill or movement pattern to fit a new situation or solve a problem.

**RATING 4**

**NATURALIZATION**
Learners have the opportunity to use skills or movement patterns that are now autonomous. The learner begins to experiment or create new motor acts.

**RATING 5**

**RELEVANCE**

**WITHIN CONTENT STRAND**
The learner can apply the learning from this lesson only within one content strand of the NSW PDHPE K-6 syllabus.

**RATING 1**

**ACROSS CONTENT STRANDS**
The learner can apply the learning from this lesson across the content strands of the NSW PDHPE K-6 syllabus.

**RATING 2**

**ACROSS KEY LEARNING AREAS**
The learner can apply the learning from this lesson across the key learning areas of the NSW Primary School Curriculum.

**RATING 3**

**PREDICTABLE REAL WORLD**
The learner can apply the learning from this lesson beyond the NSW K-6 curriculum to real world predictable situations.

**RATING 4**

**UNPREDICTABLE REAL WORLD**
The learner can apply the learning from this lesson beyond the NSW K-6 curriculum to real world unpredictable situations.

**RATING 5**

Figure 3: The HPESS Rigor/Relevance Instrument

The HPESS RRI generates a measure (x, y) whereby x is the measure of rigor and y is a measure of relevance. When plotted on the RRF these co-ordinates describe the instruction as existing in either quadrant A, B, C or D. The development of these quadrants into classes of instructional plans is discussed later in this paper. Collectively the HPESS RRF and RRI complete the initial phase of instrument development. The resultant instrument is then trailed in the pilot study.
The Pilot Study

The pilot study involves the trial of the HPESS instrument and framework. It is described in terms of participants, instrumentation, procedures, results and discussion.

Participants
A cohort of pre-service teachers (N=126) enrolled in the second year of the Bachelor of Education (Primary) degree at the UNE were chosen for this pilot study. Having completed and passed the mandatory six credit point unit (identified as EDPE214) each participant had satisfied the minimum qualification to teach PDHPE K-6. Three lecturers in physical education and members of the HPESS team volunteered to act as raters (N=3). All were involved in the teaching of the EDPE214 unit. The fourth member of the HPESS team took the role of principal researcher in the pilot study.

Instrumentation
Both the HPESS RRI and RRF were used in the first trial. Following further refinement, the HPESS RCI and RCF were used in the second trial.

Procedures
Following university ethics clearance the principal researcher assembled copies of the programming assignment submitted for assessment in the unit. At this point of data collection all identifiers were removed and codes assigned to the lesson plan. To avoid conflict of interest for the participants, the work samples were securely stored until the Board of Examiners ratified the unit grades.

Subsequently, all work samples were sorted into PDHPE NSW syllabus stage groups. There are four stages across the K-6 span. Each stage had twelve unit plans. Of this sample, four unit plans were from each of the gymnastics, dance and 'games and sports' syllabus content strands.

The first lesson plan in each unit of work that addressed a moving skill was purposively sampled and arranged alphabetically by lesson title. The first practical lesson was selected to maintain some constant in lesson plan selection. This selection was also underpinned by an assumption that the early lessons of a unit plan are more likely to have a focus on skill learning.

Raters worked independently on a sample of twelve lessons using only the instructions written on the RRI. An informal, unstructured feedback session with the principal researcher followed.

The first sample of lesson plans to be rated were those devised for Early Stage One (ES1). In NSW students in this stage are in their first year of schooling. This stage was selected for the first trial of the instrument because it is assumed that moving skills are fundamental during this phase of schooling. Following further refinement to the instrument, the Stage 3 (Years 5 and 6) were assessed. This Stage was selected as it provided maximum variation to Early Stage One.

Raters were required to complete a data collection sheet, which made provision for comment. The principal researcher recorded additional, anecdotal feedback in a research diary.
Results and Discussion:

Trials of the HPESS RRI yielded the following results. As shown in Figure 4 the scatter graphs show that the instrument was able to identify planned instruction in all four quadrants of the framework. This contributes some evidence that the HPESS RRI has the sensitivity to measure at least four classes or categories of planned instruction. Further, clustering within each quadrant such as (1,1) in Figures 4.1 and 4.2 may suggest that the instrument when used with a larger sample is capable of finer differentiation of plan types with each quadrant.

The graphs in Figure 4 also show similarity in the distribution of ratings across the quadrants by all three raters. Whilst not statistically analysed at this stage such similarities may later be tested for inter-rater reliability using Kendall's Coefficient of Concordance. This test was not deemed necessary at this point since the instrument is in a refinement phase.

Figure 4: Scatter graphs for ES1 instructional plans

Figure 4.4 shows the cumulative data from all raters. Of the 36 ratings allocated to the twelve lesson plans, 50% were located in the acquisition quadrant, 11% in the application quadrant, 8% in the assimilation quadrant and 31% in the adaptation quadrant. In the absence of established psychometric properties of the instrument these results are presented as illustrative. In addition to supporting the notion that there maybe a classification of lesson plans based on the criteria of R/R this data may also provide a richer data set to enable case study methodology in the larger study.

In discussing the experimental nature of the results shown in Figure 4, the predominance of ratings within the acquisition quadrant suggests that pre-service teachers planned instruction has generally low rigor and low relevance. This is consistent with reports by Shambaugh and Magliaro (2006) that suggest that the focus
of attention of pre-service teachers as they learn lesson planning skills follows a sequential progression. The progression begins with a focus on student behaviour, then student activity, the search for existing activities and strategies to hold student's attention after which a clearer view of what constitutes learning outcome, teaching strategy and assessment occurs.

Data of this kind also generate a set of subsidiary questions about the design structure of the instrument. Are the quadrants of the framework hierarchal such that instruction from quadrant B is necessarily of a higher quality than quadrant A? Were the majority of the lesson plans from quadrant A because they represent the first practical lesson in the unit in which acquisition of skills is more likely to be the imperative? Or is it related to the stage of schooling for which the lessons were designed?

Integral to the developmental phases of the instrument are the limitations and difficulties experienced by the raters using the dimensions of the HPESS RR Instrument.

**Limitations of Dave's Taxonomy**

- Raters perceived category descriptions in different ways. All raters assumed that the categories of the psychomotor taxonomy were ordered by degree of complexity. Not all raters perceived the categories as cumulative hierarchies.
- Raters reported difficulties discerning differences between categories. The Raters Information Sheet was interpreted to infer that categories were discrete as opposed to belonging to a continuum.
- Raters perceptions varied according to the raters preferred skill acquisition model such that the meaning of words such as 'skill', 'proficiently' and 'autonomous' were interpreted differently from one rater to the next.
- Raters reported difficulty rating instruction using problem solving, discovery learning or creative movement approaches.

To address the limitations identified in the rigor dimension the principal researcher reworked the skills continuum so it could potentially accommodate a greater range of models of skill acquisition and pedagogies. Dave's taxonomy was replaced by descriptions resulting from a synthesis of psychomotor taxonomies including Dave (1970), Simpson (1966), Harrow's (1972) and Dawson (1998). As shown in Figure 5 these descriptions were then framed on the skills continuum of Hannah and Michaelis (1977).

**Limitations of the Revised Application Model**

Whilst the original intention to modify Daggett's (1997) application model to the NSW context appeared purposeful the continuum proved problematic.

- Raters expressed difficulty working with the critical features of the continuum because information related to programming across strands and KLA was not directly accessible within the lesson plan. Raters were making connections that may not have been intended by the planner.
- Raters reported the intention of the planner was inferred rather than stated explicitly.
- Raters needed to read beyond the skill development phase of the lesson to access information related to the relevance of skill instruction.
- Raters varied in expectation according to the phase of development as teacher educators. Early career teacher educators appeared to expect more than late career teacher educators.

Reported difficulties with the continuum of relevance in the context of NSW were addressed by a further review of literature. A viable alternative was found in the NSW Model of Pedagogy. Rather than using the term 'relevance' this model described the dimension of significance. 'Significance refers to pedagogy that helps make learning meaningful and important to students' (Quality Teaching in NSW public schools: discussion paper, 2003: 9). According to this model:

To achieve high quality learning outcomes for each student, students need to see why, and to understand that, their learning matters. The significance of students' learning lies in the connections between and among the student as an individual and social being, the nature of the work at hand, and the contexts in which such work matters (Quality teaching in NSW public schools: Discussion paper 2003:14).

To establish the significance of students' learning, teachers link lessons to the future contexts in which school learning would be applied. Within this dimension is the element of 'connectedness'. According to the QTF "high connectedness is evident when a task has value and meaning beyond the classroom and school" (Quality teaching in NSW public schools 2004:42). Conceived in this way the notion of 'significance' is synonymous with relevance.

Accordingly, the framework was revised and the element of 'connectedness' was substituted for relevance. To this end the coding scale for connectedness was adopted (Quality Teaching in NSW public schools, 2004:42). The revised HPESS RR Framework (Figure 5) was identified as the HPESS Rigor/Connectedness Framework.

HPESS Rigor/Connectedness Framework

![HPESS Rigor/Connectedness Framework Diagram](image)

**Figure 5: The HPESS RCF**
At this point, the four quadrants shown in Figure 5 could be described. These descriptions are presented as a classification of planned instruction. Consequently the quadrants are henceforth referred to as classes. These are:

CLASS A: ACQUISITION
The main goal of planned instruction is to deliver syllabus content. Learners experience moving skills through imitating the action of another or following a description of a prescribed movement pattern.

CLASS B: APPLICATION
The main goal of planned instruction is application of syllabus content to real-world situations. Learners experience moving skills through applying skills to a new situation, solving a problem or creating a new motor act.

CLASS C: ASSIMILATION
The main goal of planned instruction is refinement of syllabus content to the real world. Learners experience moving skills by assimilating skills to a new situation but not necessarily in a real-world situation.

CLASS D: ADAPTATION
The main goal of planned instruction is adaptation of syllabus content to the real world. Learners experience moving skills by adapting to both predictable and unpredictable events.

These descriptions of classes completed development of the instrument. It is envisaged that these descriptors would provide yet another form of measure resulting from the instrument.

Thus, after the second cycle of action research the phases instrument development, instrument trial and instrument refinement resulted in the HPESS RCI. This instrument comprises a Rigor/Connectedness Framework (Figure 5), a Rigor/Connectedness Rating Instrument (Figure 6) and a set of descriptors for each quadrant of the framework.
THE HPESS RIGOR/CONNECTEDNESS INSTRUMENT

INSTRUCTIONS: Using the following scales rate the rigor and connectedness of the instructional plan to teach moving skills. Record your ratings on the data collection sheet.

<table>
<thead>
<tr>
<th>RIGOR</th>
<th>CONNECTEDNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MASQUERADING</strong></td>
<td><strong>NO PLANNED INSTRUCTION</strong></td>
</tr>
<tr>
<td>The learner is given no instruction related to a moving skill.</td>
<td>There is no planned instruction related to a moving skill and therefore there is no connection.</td>
</tr>
<tr>
<td><strong>RATING 0</strong></td>
<td><strong>RATING 1</strong></td>
</tr>
<tr>
<td><strong>IMITATING</strong></td>
<td><strong>NO CONNECTION</strong></td>
</tr>
<tr>
<td>The learner is instructed to observe the action of another and respond by attempting to copy or replicate that action.</td>
<td>The planned instruction has no clear connection to anything beyond itself. No justification is offered for the instruction beyond school requirement.</td>
</tr>
<tr>
<td><strong>RATING 2</strong></td>
<td><strong>WEAK CONNECTION</strong></td>
</tr>
<tr>
<td><strong>PATTERNING</strong></td>
<td></td>
</tr>
<tr>
<td>The learner is instructed to practice one or a sequence of movement patterns in a prescribed way. Practice is guided until the skill is either recognizable and/or habitual.</td>
<td>The planned instruction attempts to connect student learning with the world beyond the class space but the connection is weak, superficial or trivial.</td>
</tr>
<tr>
<td><strong>RATING 3</strong></td>
<td><strong>CONNECTION TO REAL WORLD</strong></td>
</tr>
<tr>
<td><strong>MASTERING</strong></td>
<td></td>
</tr>
<tr>
<td>The learner is instructed so as to refine a skill or movement pattern. Instruction continues until the skill or movement pattern can be performed with precision.</td>
<td>The planned instruction is based around some connection to the world outside the class space, but the task does not require students to explore the implications of these connections.</td>
</tr>
<tr>
<td><strong>RATING 4</strong></td>
<td><strong>CONNECTION TO PERSONAL MEANING</strong></td>
</tr>
<tr>
<td><strong>APPLYING</strong></td>
<td></td>
</tr>
<tr>
<td>The learner is instructed to apply a mastered skill or movement pattern to a special circumstance that is controlled by the teacher.</td>
<td>The planned instruction requires students to recognise and explore connections between the learning and situations outside the class space in ways that create personal meaning and highlight the significance of the moving skill.</td>
</tr>
<tr>
<td><strong>RATING 5</strong></td>
<td><strong>CONNECTION TO MEANING OF OTHERS</strong></td>
</tr>
<tr>
<td><strong>IMPROVISING</strong></td>
<td></td>
</tr>
<tr>
<td>The learner is instructed to use mastered skills or movement patterns in a circumstance that requires an original or creative response.</td>
<td>As for Rating 4 except that students are required to engage with and/or influence an audience beyond the class space.</td>
</tr>
</tbody>
</table>

Figure 6: The HPESS Rigor/Connectedness Ratings Instrument
When the HPESS instrument was applied to analyse the planned instruction designed for Stage 3 children the following scatter graphs were generated. Figure 7 shows a scatter graph for each of the three raters and the distribution of plans when the ratings from all three raters were presented as cumulative data.

**Figure 7: Scatter graphs for Stage 3 Instructional plans**

The scatter graphs in Figure 7 show that the HPESS RC Instrument is also able to differentiate plans across all four quadrants of the framework. Results from two of the three raters show the majority of instructional plans in the A quadrant or Acquisition Class. A marked difference between the RRI and the RCI is the need for a 'rating 0'. This rating indicates that not all instructional plans have a rigor/relevance dimension. Interviewing participants who planned the instruction is required to better understand the phenomena. This methodological stage is beyond the scope of this paper.

The percent of plans in each class as identified by the HPESS RCI are very similar results to those found using the HPESS RR Instrument. Again it was found that the more than half (55%) of the planned instruction was in the acquisition class. Despite the fact that the instruments were administered on a different sample of lesson plans this may suggest that a combination of the dimensions of rigor and relevance, irrespective of the critical features of the dimensions, may be sensitive enough to differentiate variations in lesson plans. These results also suggest that it maybe possible to anchor each dimension using fewer or a simpler set of criteria. This possibility requires further investigation.

**IMPLICATIONS**

The implications of these results are presented by answering the questions that initially framed this pilot study.
Can the dimensions of rigor and relevance of planned instruction form the basis of a classification system of lesson plans?

This study has provided initial evidence to support the notion that dimensions such as rigor/relevance or rigor/connectedness can be applied to classify lesson plans. In this study, four classes of instructional plans were identified and described. This classification system could be useful to the larger study in two ways. Firstly, each class of instruction plan represents difference. These differences may be statistically compared across the research groups of the specialization pathway. Alternatively, the classification system may assist the process of data reduction in the larger study. More specifically, identifying a classification of instructional plan allows the researcher the opportunity to use maximum variation sampling techniques. Consequently, Case Study Methodology may prove useful in the next phase of the research.

Which critical features of these dimensions result in the most reliable measure of rigor and relevance?

The results of this study would suggest that the choice of critical features along the continuum of each dimension is important for practical rather than conceptual purposes. Despite trials of two different sets of features for each dimension the data generated showed greater similarities than differences. The limitations imposed by the choice of features related more to the ability of the raters to interpret instructions and descriptions with some degree of consistency. This consistency is a central feature of reliability. Raters reported that the taxonomies chosen for the dimensions of the HPESS RCF were more reliable than those used in the HPESS RRF. Further investigation of inter-rater reliability is warranted at this time given the design framework, dimensions and critical features of the instrument have been determined.

Does the data generated from the resultant instrument provide an indirect measure of preparedness of a teacher to teach moving skills?

Data generated from the HPESS RC instrument have shown some degree of 'expert validity' based on the opinions of 'expert professionals' involved in the study. The two measures namely, ratings of rigor and relevance of the planned instruction and the class of plan, do appear to indirectly measure the preparedness of a pre-service teacher to teach moving skills. This claim requires further investigation to determine the validity of the instrument. This may involve the use of a nominal group (Kuang, 1995) or expert panel of 'expert professionals' from teacher education institutions external to The University of New England. Such a panel is better positioned to determine whether this researcher-developed instrument indirectly measures levels of teacher preparedness to teach the moving skills of the NSW PDHPEK-6 syllabus.

CONCLUSION

This pilot study has initiated the development of an instrument that has been shown to measure differences in the instructional plans of pre-service teachers when planning to teach skills in the psychomotor domain. The differences are described in terms of a
classification system of instructional plans. The instrument identified as the HPESS
Rigor/Connectedness Instrument when applied to a small sample of instructional
plans had the potential to measure both the class and distribution of instruction. The
instrument enabled each plan to be described in terms of a rating of rigor and
connectedness and a descriptor of the type or class of plan. These measures would
facilitate the process of investigating differences between instructional plans in the
larger study. The use of larger data sets in the larger study would enable the resultant
measures from the instrument to be investigated further using statistical methods.

The instrument has potential applications beyond the intended study. In tertiary
education, particularly initial teacher education and coach education, the instrument
can be used as both a teaching/learning tool and assessment instrument. For example,
the framework of the instrument provides a useful stimulus for consideration of the
contribution of dimensions of rigor and connectedness to quality planning and
therefore quality teaching. The instrument can also be applied to diagnose and address
the needs of pre-service teachers with respect to instructional planning skills. In both
university-based and field settings such as the practicum, the instrument can be
applied for the purpose of self-evaluation. During formative assessment of authentic
planning tasks the instrument may provide an alternative to the assessment rubric to
identify a performance grade.

For the principal researcher the challenge is twofold. Firstly, to further refine the
instrument for its intended purpose, by clarifying instrument instructions. Secondly, to
describe the psychometric properties of the instrument, so as to determine whether the
inclusion of the HPESS RCI in the larger study is justified.
REFERENCES


Hannah and Michaelis 1977 A comprehensive framework for instructional objectives: A guide to systematic planning and evaluation


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