

Proceedings of the Authentic Assessment Practices for Student Learning Conference













Mentor Teachers Conference: Authentic Assessment Practices for Student Learning

16th and 17th August 2007

I have great pleasure in writing an introduction to the reviewed proceedings of the two-day professional learning conference, *Authentic Assessment Practices for Student Learning*, held at the Faculty of Education and Social Work at the University of Sydney on the 16th and 17th August 2007.

The two-day conference featured keynote lectures and workshops conducted by leading researchers and educators in their respective fields. Each of the presenters focused on an aspect of assessment. The conference offered a wealth of both theoretical and practical ideas for practitioners to develop their own assessment practices on well-researched and theorised ideas.

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Proceedings of the Authentic Assessment Practices for Student Learning Conference August 16-17 2007

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The papers published in these proceedings were originally presented at a two-day conference entitled, *Authentic Assessment Practices for Student Learning* held in the Division of Professional Learning at the Faculty of Education and Social Work on August 16-17 2007. Each one of the diverse group of presenters were given the opportunity to submit their paper for a peer-reviewed proceedings. These proceedings are the final outcome of the rigorous process of review that occurred.

I take this opportunity to thank the review team and the staff at the Division of Professional Learning in the Faculty of Education and Social Work for their fine work in getting these proceedings published.

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Lesson Study as Formative Assessment in Secondary Schools

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Lesson study has become an important tool in teachers' repertoires of practice; it is a means for studying learning *in situ*. Usually several teachers are involved and watch each other teaching various iterations of a lesson where there may be a possibility of student misunderstanding and then seek to address the difficulty. While much assessment in classrooms is summative in nature; with little opportunity for feedback as the learning occurs, it is possible through lesson study to assess the learning as it happens. Of course this does not mean giving the learning some kind of mark; but is an occasion to authentically judge how effective it is.

Lesson Study as Learning Study¹:

It is a norm of professional practice that when we teach we have goals and outcomes that we want our students to achieve (Fernandez, Cannon & Chockshi, 2003). These may be directed to them acquiring a specific skill or becoming familiar with a more general learning process that we consider to be desirable. Some may be long term, others embedded in larger frameworks but immediate in nature. Too often it is the case that teachers design and evaluate teaching episodes, designed to fulfil such goals and outcomes in isolation from one another (Fullan, 2001); more so in secondary than in primary schools. Furthermore, teachers' concerns seem to generally explore what it is that they as teachers are doing, rather than upon what it is that their students are experiencing. Wang-Iverson (2002) sees lesson study as a means of making teacher

¹ These early observations form part of a discussion paper prepared by Susan Groundwater-Smith for the Economics and Business Educators who had an AGQTP to examine aspects of lesson study.

professional collaboration concrete by focusing on specific goals that examine not just students' work, but students at work, in other words the learning that is going on.

Teaching can itself become professional learning when the activity is collegial and where the learning arises, principally from the students' engagement and behaviours (Lewis, Perry, Hurd & O'Connell, 2006). In their advocacy for the study of teaching and learning through the study of lessons Fernandez & Yoshida (2004) place their greatest emphasis upon the culture of collegiality that brings teachers together to deeply consider their practice in the context of the classroom and the diverse needs of students therein. In a similar vein Chokshi & Fernandez (2004) argue for sustained lesson study work as a vehicle for helping teachers build a shared body of professional knowledge.

What then is the lesson study concept? In essence it could be characterised as ways of seeing; that is observing how learners respond to a teaching episode that has been prepared collaboratively by a group of teachers with the intention of developing, refining and improving the lesson in the light of such feedback. It is a particularly powerful process when the concepts to be taught are problematic for the students and where there is much scope for misunderstanding. It is based upon the foundation of teachers as researchers – where the classroom practitioners are engaged in systematic inquiry regarding what it is that take place during the teaching episode, which can be characterised as a natural experiment².

Rock & Wilson ((2005) see these 'research lessons' as being:

- Focused on specific teacher-generated problems, goals or vision of pedagogical practice;
- Carefully planned, in collaboration;
- Observed by other teachers;
- Recorded for analysis and reflection; and
- Discussed by lesson study group members. (p.78)

 $^{^{2}}$ Experiment in the sense that a hypothesis is formed and evidence collected that test the hypothesis; but not an experiment in the sense of a scientific, randomised controlled trial.

They argue that lesson study is based upon principles of constructivism: that is that knowledge is constructed through social interaction rather than as a result of individual experience; that knowledge is acquired as an adaptive experience; and that knowledge is the result of active mental processing by the individual in a social environment. Much of this takes place in the classroom as the lesson itself is progressing. In effect the classroom is a learning laboratory for the students as they come into contact with new ideas, principles and practices.

It is clear from the literature that there is no *one* formula for lesson study. As Lewis, Perry & Murata (2004) have noted: "Japanese lesson study is an extremely variable practice that has evolved over a century in tens of thousands of Japanese sites." (pp. 3 - 4). However, there are some overarching procedures among them the close observation of students as they engage in learning. Thus lesson study becomes a potent vehicle for teachers to systematically explore learning, on the basis of evidence, with an intention of improving it. It is a process that is described by Lewis (2002) as 'developing the eyes to see children.'

Employing lesson study as a means for investigating classroom practices would seem to be a powerful opportunity to not only improve student learning but also teacher professional learning, including learning to be researchers of practice. There is little doubt that authentic assessment of learning is a major challenge for teachers and students alike; and that ,'how are concepts being formed, understood and applied?' is a major formative assessment question for each.

Authentic Assessment:

Paris and Ayres (1994, pp. 7–8) drawing upon the work of Valencia, Hiebert and Afflerbach (1994) suggested authentic assessment has four features, which can synthesised thus:

It is consistent with classroom practices. Students are asked questions about meaningful information and asked to solve problems that are relevant to their

educational experiences.

Authentic assessment collects diverse evidence of students' learning from multiple sources rather than relying exclusively upon single tests or single modes.

Authentic assessment is designed to promote improved student learning, based upon the premise that all students are capable of ongoing improvement in their learning.

Authentic assessment is contextualised and takes account of local culture and experience.

To these four features I would further add:

Authentic assessment recognises student agency in the process; it assumes that students are able and capable in understanding and evaluating their own learning.

Authentic assessment values error-making and misunderstanding as cues about learning, rather than as a means of labelling learners.

Authentic assessment is ethical assessment. It is designed to support and assist learning in ways that are not harmful to the learner.

Teachers who utilise authentic assessment are necessarily engaged in a change process. They are helping students to become more effective learners, seeking to change their learning; and they are helping themselves to become more effective teachers, seeking to change their teaching practices. We know from much recent research, particularly in relation to The Queensland School Reform Longitudinal Study (QSRLS) that teacher practices are the most significant factor in student learning outcomes (Hayes, Mills, Christie & Lingard, 2006) and that doing assessment well, is one of the most demanding tasks facing teachers. Authentic assessment is learner-focused and requires a learner-focused classroom. Furthermore, authentic assessment is mainly formative as it seeks to explore learning as it is occurring with the intention of assisting the learners in developing their insights, understandings, concepts and applications.

Formative assessment and its relation to learning

The power of formative assessment has been demonstrated by the Organisation for Economic Cooperation and Development (OECD) who reported in its 2005 bulletin (OECD 2005) that the achievement gains arising from formative assessment are "among the largest ever reported for an educational intervention" (p.2). In particular under-achieving students were identified as gaining the most.

Formative assessment is the regular, relevant and specific feedback students receive as they engage in their learning. It enables them to apprehend what they know, understand and believe at a particular moment and what directions their learning needs to take. Formative assessment takes both verbal and written forms. Teachers regularly occupy themselves in evaluating student responses in classroom interaction and providing their students with feedback to written tasks, both large and small. As well, students self-assess when they reflect upon their learning, what has been achieved and what is desired. The student is not a passive receiver of assessment, he or she is an active agent. For formative assessment to be at all useful to the learner it must be predicated upon an understanding that there is a gap between what he or she currently knows and can do and what he or she can potentially know or do. Learning is seen as incremental and socially constructed. It is also understood that learning can result from misunderstanding.

However, and importantly, misunderstanding cannot be identified if students have not been able to discuss and explain their ideas with their teachers and demonstrate to them the gap between teaching and learning (Wiggins, 1998). Learning conversations in the classroom are essential to the development of good formative assessment practices. As Black, Harrison, Lee, Marsh & Wiliam (2004) argue "many teachers do not plan and conduct classroom dialogue in ways that might help students to learn" (p.10). Too often the rapid-fire questioning that characterizes much of what happens in classrooms interrupt student thinking rather than support it. Increasing wait-time and having a greater openness to 'the wrong answer' can enhance the learning of all. After all, it is unlikely that students will risk a wrong answer if the result is humiliation in front of their peers.

Of course, teachers themselves are caught into regimes of practice, often determined by others. The tyranny of the timetable, the bell and the overcrowded curriculum make for conditions that are inimicable to having sustained learning conversations in the classroom. However, the opportunity to engage in lesson study as set out above can provide for teachers to more closely observe and formatively assess learning.

In effect, by working with colleagues to observe learning as it is happening, is a rare opportunity to engage in learning conversations with students. While in most lesson study literature the emphasis is upon improving teaching through improving student learning outcomes, little of it has focused thus far on the practice being a time when the formative assessment of learning might occur. It can provide not only feedback but also feedforward; in that subsequent de-briefings with the teacher can suggest ways in which the learning needs of the students can be better addressed. The information can be used to determine the next steps in learning, not only for individual students but for the class as a whole. Teaching is adjusted to take account of the formative assessment of the learning of the students.

Black and Wiliam (1998) in their seminal report *Inside the Black Box* identified a number of inhibiting factors that make formative assessment difficult. Among them has been the tendency to assess the quantity of work and presentation rather than the quality of learning with a tendency to mark and grade the work rather than analyse it alongside the learner. Another is the ways in which feedback that is given when a lesson progresses is more often for social and managerial purposes instead of to help the students learn more effectively.

Formative assessment for learning involves a number of desirable characteristics, among them: that the processes of learning are explicit and explained in the context of the class activity; and, that students understand what they are aiming to achieve and can discuss this with their peers and others. Where teachers are involved with their colleagues in forms of lesson study there are significant opportunities for this to occur. As it has already been suggested, it is a way of not only assisting the learners, but also the teachers in enabling them to identify areas where, for example, more explanation and practice are required.

Colleague teachers engaged in lesson study are able to:

- Observe the students, listening to how they describe what it is that they are doing and uncovering their reasoning;
- Question the students, using open ended questions that encourage exploration and which are not judgemental of the learning;
- Ask students to express their ideas in several forms (drawings, diagrams, concept maps and the like);
- Introduce students to metalanguage that will enable them to be more reflective about their learning as it happens.

The class teacher, with multiple responsibilities during a given lesson would find it very difficult to undertake such detailed formative assessment of learning. Indeed, it can be argued that rather than undertaking professional learning through attendance at course work, and the like, schools should consider setting up collegial lesson study as a means of improving formative assessment practices. Black & Wiliam (1998) point out that teachers can feel overwhelmed by the sheer enormity of the task that they face when attempting to authentically assess student learning.

In order to make these claims for lesson study as a means of formative assessment of learning this paper now turns to an example.

The Case of the Failing Business:

Context:

Three Year 12 classes in a variety of schools participated in a sequence of lessons concerned with employment relations. It was imagined that the students would need to know something of the current context of work choices legislation and the ways in which it impacts upon employment conditions and would need some exposure to the metalanguage associated with the area; this would be available through the text books to which the students had access.

The plan was to use three very different scenarios that groups of students would address in the role of a management consultant team. The scenarios would be constructed on the basis of developing more effective employment relations in a context where things are going awry. They would assess the effectiveness of the current employment relations at the organization; identify possible reasons for the problems that exist; and, suggest solutions to the problems that exist. Two different groups of students would deal with a given scenario.

Lessons in Action:

The first iteration of the lesson conducted at School A commenced with a brief recall of the volatility of the current industrial climate. A list was collected from the students of areas that would require attention for harmonious relations to exist, these were listed in no particular order as: Occupational Health and Safety Issues, Discrimination, Motivation, Recruitment, Participation in Management, Trust, Training and Development, Human Resource Training, Opportunities and Communication.

It was indicated that people would be working on different scenarios and the task was described. The students were encouraged to use the collective intelligence of the group and were advised to think and talk things through prior to answering the questions. It was pointed out that dealing with scenarios is a common HSC question. The teacher's role was as coach as he posed new questions to the students, for example, "do you think that Ian (a small business manager) has planned for the future?"³ These questions acted a provocations and not as solutions.

I (as an academic partner to the project) was able to closely observe one group of two students, working on a particular scenario where a business was failing. It was clear

³ In earlier discussions where the lesson was being prepared it was anticipated that taking account of future planning could be an area where the students encountered some difficulties and may require some assistance. This is an example of predicting misunderstanding and making provisions for it.

that they were highly engaged by the activity. They chose to develop a mind map with two major elements: problems and solutions to demonstrate to me how and what they were seeking to illuminate. They spent time searching for the exact wording that they wanted to employ to capture their ideas – they were mindful of the needs of their audience in this respect. As well as considering short term solutions they also considered the longer term implications of the impact of the loss of confidence among the firm's clients and the ways in which the firm's reputation could and should be rebuilt. It was possible to argue that the girls were not merely reiterating what they had encountered in their various text books and class discussions but were justifying their ideas, using them effectively and evaluating their impact.

I asked the girls whether they enjoyed working this way and they responded that it was an "underestimated strategy" as it was important to have times when they could listen to each other's ideas and apply them in concrete situations.

During the post-lesson discussion by the team it was resolved that all students should have a copy of each scenario that they could refer to when presentations were being made. It was also important to model this as a case study that is a central feature of learning in business studies where the concepts have to be applied in "real-life" situations. It could be seen as a form of problem based learning. It was thought that having two presentations for each scenario had its merits, but it might be helpful if the second presentation recognised the points made earlier and foregrounded new or different insights. Although it was recognised that this would require a high level of skill.

Students in their self assessment noted that they learned more about reasons for business failure by engaging in analysis of the scenarios and the ways in which employment relations could be improved and made more effective.

Working in teams was overwhelmingly a positive response. As well, a number of respondents pointed to the value of applying theory to the case studies and how this illuminated the various issues. "I learnt something new. Like the way we did things like applying knowledge to a scenario made it better than when we do worksheets with questions about theory." "... I was forced to think rather than rattle off information".

One observation was the benefit of having to listen to other students and their ideas. Most students referred to their enhanced knowledge of employment relations and how poor relations can have a negative impact. For example, "how employment relations can affect the business in both negative and positive ways". "What are the problems businesses face, regards to employment relations and the various strategies a business can implement to benefit its productivity and achieve its goals." Several also indicated that they had learned that there was no 'one size fits all solution' as one put it "The solutions should be tailored to the business, not just stated generally". A number also looked at the skills they were learning such as "analysis of problems" and "developing solutions".

Importantly, the other teachers in the study, who like myself, were intensively interacting with the students could see that they themselves were engaged in formative assessment of learning. They could identify the strengths and weaknesses of the lesson itself, but also the ways in which individual students and groups of students became involved and where the pitfalls lay.

Some Constraining Factors:

Earlier in this discussion it was suggested that teachers may be caught up in regimes of practice that may not necessarily be of their own making. This point deserves some elaboration. Of course practice is not a single act but a bundle of activities that take place in a well established social field such as education. It is the practitioner's actual, daily embodied activity, including skills, tacit knowledge and presuppositions, as well as her social and professional interaction with others and with material and other resources. What takes place in the practitioner's head is also moderated by each individual's professional, social and political history. Professional practice is a many layered and complex phenomenon it is both purpose oriented and norm oriented; it encompasses mental, social and physical activity and codes and is governed by both internal and external factors. Teachers are by no means autonomous agents they are expected to conform to the policies that are laid down, within systems and within schools. Nonetheless, we cannot disregard an understanding that they are guided by the key question "how can I behave in an educated, well-informed moral and ethical manner?" Kemmis and Smith (2007) argue that *praxis* is shaped and formed by what they have named as *practice architectures* that are formations that determine how practice will be carried out, these being cultural and discursive preconditions; material and economic preconditions; and social and political preconditions. All these form the building blocks of practice. Schatzki (2005) calls these 'site ontologies'. He explains that sites can be seen as arenas, as a part of something that exists or occurs. It is a kind of context "that surrounds or immerses something and enjoys powers of determination with respect to it" (p.468). These sites, in both Schatzki's and Kemmis and Smith's terms are sites of the social governed by the dispositions and habits of those who both occupy them in the present and in the past, such that the practice in perpetuated, even in some cases solidified.

All this is to point out that to make changes, not only in ways in which formative assessment occurs, but also in teachers' capacities and willingness to make their practice more public through such strategies as lesson-study is no easy undertaking. It is indeed ironic that the classroom, inhabited as it is by so many people, is nonetheless a very private place. Once the classroom door is closed there is little surveillance on what happens therein. Not only are there the logistic challenges of bringing teachers together to observe teaching and learning in progress there is also a need to consider the strangeness of being watched and even having one's strategies questioned. This takes real courage.

That teachers' professional work has changed over the years is unarguable. Those changing conditions have been neatly summed up by Ballet, Kelchtermans and Loughran (2006) as a form of intensification. They argue that teachers are working harder and smarter, and are being driven by more and more demanding community expectations. They strive to comply with the rules and regulations determined by policy makers and various governing bodies, as well as by the high norms that they commit to themselves. Connell (2007) also reports that teachers are working longer and harder as they take on additional roles and responsibilities in line with changing social conditions. Furthermore, in common with many other workplaces, information and communication technologies with their ongoing convergences are also

contributing to intensification. In being truly professional in their practice in general and when undertaking lesson study in particular educators are taking on a formidable role, all the more so when they have an aspiration to challenge a prevailing educational climate that is trending to conservativism.

Conclusion:

Notwithstanding these difficulties, if our long term goals, as teachers, are associated with assisting young people to use the knowledge that they are acquiring effectively, then it is important that we have opportunities to observe learning in action. We need to know, not only who has or has not understood, but what has assisted or impeded them. As Wiggins (1998 pp. 86 - 88) asks among others things: Can the students provide complex, credible and insightful theories about the phenomenon they are examining? Can they provide stories, analogies, metaphors or models to explain themselves? Can they overcome common misunderstandings and avoid simplistic, hackneyed or disconnected theorising? Can they explain themselves to others? Do they know the limits of their ideas? These questions cannot fully be addressed outside a major context for learning – the classroom itself. Lesson study can provide us with just such a window into that intense and busy world.

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An Exploratory Study of the Pedagogical Use of Moodle to Scaffold Learning in a Senior Secondary Class

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This paper reports on an action-research study conducted by the author that examined how open source Moodle course management software might be used to scaffold learning in a senior secondary class. The class was a senior secondary class (yrs 11-12) of students enrolled in a NSW Board of Studies endorsed unit taught by the author acting in his role as university partner to a senior college. The student in this class mainly used the online activities to support the completion of assessment tasks and expressed a preference for discussions in face-to-face class time. The author concludes that the use of Moodle needs to be informed by coherent pedagogical principles rather than motivated by technological or socially deterministic imperatives.

Introduction

I begin this paper by establishing the parameters of this study. This paper critically examines the pedagogical value of Moodle, a Web2.0 open-source online course management software application, as a learning scaffold for students completing a senior secondary subject (ages 16-19).

There has been much written in the educational literature on the potential of elearning environments to transform traditional educational settings. Some of this literature is based on the reported experiences of tertiary educators working in online learning environments. Some of the claims in the literature are supported by warrants established from sound empirical research whilst other publications seem to be based on technological deterministic hype (Bigum, 2002) such as the speculative claims that are now being made about the so-called Web2.0 social networking applications.

I cannot make any large claims about the results from my study that were generated from teaching a class of 12 students for six months using Moodle, a Web2.0 learning application. For the purposes of this paper, Web 2.0 is the label given to any of the second wave of internet-based applications that emphasise communication,

collaboration and social networking. This label is offered in contrast to Web 1.0 that involved applications, such as the World Wide Web enabled through the technology of the internet, that primarily involved the one-way transmission of information. The most instructive harbinger of the evolution from Web 1.0 to Web 2.0 is embodied in the evolution of the ICT acronym that added Communication to Information Technologies (IT). This evolution recognised the burgeoning consumer interest in applications that enabled fast and relatively cheap communication such as hotmail.

The Moodle was designed for senior secondary students enrolled in a NSW Board of Studies endorsed unit (BEU) taught by the author acting in his role as university partner to the college. A Moodle is an open-source course management software application that can be used to design a range of online learning experiences. The Moodle software allows the teacher/administrator to employ different applications within the course modules that suit their pedagogical purpose. For example, in the Moodle that is the focus of the study I used web pages, quizzes, presentations, discussion forums, assessment submission spaces and Wiki pages. Wiki pages are web pages that allow for multiple authors to dynamically draft, edit and simultaneous publish web pages.

Moodle is attractive to schools because its open-source status makes it free for endusers such as senior public schools that do not have the funds to purchase expensive commercial course management software such as Blackboard or WebCT. This was definitely the case at the school where this study occurred where the teacher's exploratory use of Moodle with their classes had just begun. In this sense, my study was timely as I had more freedom to experiment with Moodle given my status as academic partner as well as the fact that I was teaching a Board of Studies Endorsed unit rather than an examinable Higher School Certificate subject.

The Board Endorsed Unit (BEU), *Understanding Human Development*, that provided the opportunity for this educational innovation is promoted to the students as an opportunity to experience tertiary style learning as preparation for their post-school academic careers. The BEU is not an examinable subject for their Higher School Certificate (HSC) so it does not count toward their university admission ranking. This means that the assessment tasks in this subject do not have the same status as assessment tasks for subjects that do count towards the HSC. This gave me the opportunity to experiment with the pedagogy in the course in a manner that I would not in a subject that comprised part of a students' Higher School Certificate.

The data that is reported in this study was generated over two terms, the final two terms of the three terms allocated for this subject. Face-to-face classes were held for two hours per week during these two terms. Twelve senior students were enrolled in the course, five from year 11 and seven from year 12. An online Moodle course was established on the school server to support students' learning both in-class and between classes. The rationale for this adoption of Moodle is deconstructed in the next section of this paper. The class was held in a seminar room that was equipped with desktop computers so the class could move easily from whole class and group discussion to computer-based work. The students could also access the Moodle on the WWW from their home computer using their username and password.

Web 2.0, Moodle and Technological and Social Determinism

This action-research study was an attempt to go beyond the hype sometimes associated with the literature that focuses on the integration of Web2.0 applications in education. I argue that this hype can be categorised as either technological or social determinism (after Bigum, 2002). In contrast, the Moodle open-source courseware is based on identifiable pedagogical principles and has the potential to be put to the service of quality teaching and learning.

I am sceptical about exhortations to use Web 2.0 applications that are based on technological determinism. Technological determinism is the label given here to all of the arguments to use technology because it is there rather than for any pedagogical imperative (Bigum, 2002). This technological determinism in relation to Web 2.0 application is not a new phenomenon in education:

...earlier research on the introduction of computers to schools has shown that a technology-led mode of introduction is very likely to create problems, especially regarding teachers' take-up of the technology as a pedagogic tool (Dawes, 2000; Dawes & Selwyn, 1999 cited in Gillen, Staarman, Littleton, Mercer, & Twiner, 2006 p.1).

At present in NSW the latest technological fad is the provision of classrooms with Interactive Whiteboards. Whilst touch-screen technologies have been existent for over a decade in application such as Mimeo Boards, the packaging of this relatively simple technology into a complete Interactive Whiteboard package has been accompanied by waves of marketing redolent with technological determinism. This deterministic marketing discourse forces schools into taking positions (and decisions) that are not necessarily based on sound educational grounds.

The other type of deterministic argument for the adoption of digital technologies in education identified by Bigum (2002) is grounded in social imperatives. Nowhere is this social deterministic argument more prevalent than in Prensky's oft-cited metaphorical description of the current generation of students as being digital natives (Prensky, 2001). In this metaphor, the students that we teach are positioned as the confident users of digital technologies as opposed to the clumsy digital immigrants of their teachers' generation. So the argument for the integration of digital technologies rests on the assumption that if the students are using them in their social sphere than they must be incorporated into the educational world. This metaphor is as simple as it is beguiling and needs deconstruction and critique here.

At the most basic level, the beguiling arguments of social determinism might be rejected by the simple refutation that it is not completely desirable to replicate all of the students' social world in the classroom. The average teenager might have more digital gadgetry in their bedroom (Connell, 2007) than the average three-bedroom house had a decade ago but it is simply financially impossible for schools to resource this level of digital technology on the scale of a school. Possible school budget constraints form only a minor part of the critique of the digital native, digital immigrant metaphor. The more profound critique is of the suggestion that the type of informal communication register of the mobile phone text message, arcade game, *My Space* entry or email message is something that educators would want to encourage in the classroom. Success in schooling is related to students' mastery of formal discourses of academic writing and speaking. Until this correlation no longer pertains then the goal of teachers should be to concentrate on these socially privileged discourses. Of course, I am not ruling out the possibility that the advocates for the use

of Web 2.0 applications conceive of them as possible entry points into formal academic curriculum but the problem with socially deterministic argument is that it does not include the more complex process of pedagogical translation. One exception to this is Moodle, a Web 2.0 founded on sound pedagogical principles.

Moodle is online courseware developed with clear pedagogical principles. It is underpinned by social constructionist epistemologies (Dougiamas & Taylor, 2002 p.1) that emphasise the active construction of knowledge by the learner. The positioning of the student in Moodle pedagogy is analogous to the position of the enduser of the open-source software. Both student and end-user have an active role to play in either the course that they are enrolled in or in the emergent design of the Moodle courseware. Both of these features were attractive to me as an end-user. I wanted to move beyond a transmissive pedagogy of teach and test with the Moodle and its open source status (free) meant that the school could afford to use the software.

Action-Research Methodology

The action-research methodology employed in this study was founded on a practicebased evidence approach that positioned theory as being "the plaything of practice" (Carr, 2007). The theory that was the object of play in this study was virtual constructionism and the context (playground) was Moodle. This conception of actionresearch as play is beguiling as it encourages risk-taking in pedagogy. It also brings a different constitution of evidence to the research process. In this constitution, evidence is gathered in a forensic manner.

The forensic metaphor has been a useful guide for practitioners and researchers engaged in action-research and action-learning (Elliott, 2008). It is particularly useful for action research:

...the goal is to deal with the notion (evidence-based practice) in a forensic way, seeking to analyse and understand an educational practice in order to improve it. When working on a site of a crime, the forensic scientist does not seek to prove who the culprits may be but to understand what has taken place (Groundwater-Smith, 2007, p.303).

In this study, I sought to analyse and understanding the pedagogical value of online learning activities as assessment scaffolds. The evidence was the students' interaction with these online materials as they progressed through the course. In the spirit of heutagogy, it is not appropriate to present the findings of this study as conclusive evidence of the value of these online activities to student's results for example. Instead, the intention was to build a preliminary understanding of some of the pedagogical possibilities for the online Moodle environment.

Research Methods

The data for this study were generated through online activity logs and two different types of online surveys from the Moodle course. These data represented students' usage of the online activities as well as their evaluation of their effectiveness.

The Moodle software allows the course administrator to generate activity logs that report on activity frequencies on any part of the site. The administrator is also able to place time parameters on the log so that data can be collected from specified time periods. An example of one line of data (with student's name changed) from the activity logs was:

2007 June 6 4:00 172.16.178.114 Jenny Li wiki view Complete Survey: Complete Survey (Complete Survey Wiki Log May-June 2007)

As can be seen from the excerpt above, the log details the date and time of the activity, the IP address of the computer from which it was generated, the name of the student, the type of action (in this case a view) and the area of the Moodle (the survey files). Ten of these activity logs were generated from the Moodle course by the author. These logs constituted the raw data of this study. The three critical data entries from the log for the purposes of this study were the IP address, the students' name and the area of the Moodle visited. The computer IP address was important because it indicated whether the student had accessed the Moodle inside or outside of scheduled class hours. The identification of the student was also important as the independent variable for the study was students' marks. Finally, the area of the Moodle visited was

important because it generated data on the types of assessment task most frequently accessed by the students.

The next step in the method was to collate the data from these logs into the dependent variables and assign these data to each student in the class. The following table details each dependent variable and the associated area of the Moodle log data from which data was generated for this variable.

Type of Data	Source of Data
Total individual student interactions	All activity log data separated by student
	name
Total in-class interaction	All activity log data separated by student
	name and IP address
Total out-class interactions	All activity log data separated by student
	name and IP address
Survey data	UHD_Surveycomplete.xls
Lecture notes	cognition presentation views.xls
	validity and reliability presentation Log
	June 2007.xls
Referencing guide	Referencing Help Log July 2007.xls
Technical help	Data Analysis Part 1 Log June 2007.xls
	Data Analysis Part 2 Log June 2007.xls
Assessment rubrics	wiki rubric.xls

Table 1 Type and Source of Data from the Moodle Course

These data were collected from February 2007 to July 2007. During this time the students completed four separate assessment tasks. These assessment tasks are described in the following three paragraphs.

The first assessment task required students to work in groups of four to construct a Wiki on the Moodle site on a selected stage of child development. The assessment task was presented online so it required students to access the Moodle site both inside and outside of class hours. The second and third assessment tasks were online quizzes based on course material that was presented in class and supported by online presentations. The students completed the quizzes in scheduled class hours.

The fourth assessment task was a small research project that was designed and implemented by the whole class. The students were assisted to collate and analyse the data using basic research methods. This involved the use of the Data function in Microsoft Excel, in particular the pivot table/chart option. To expedite this process, the completed survey data workbook was placed online as well as web pages that demonstrated the technical steps using images captured from computer screen dumps.

Survey Data

Student survey data was collected using two instruments that are packaged with the Moodle courseware. These instruments were the Constructivist On-Line Learning Environment Survey (COLLES) and the Critical Incidents Survey.

The COLLES was an appropriate instrument to employ in this study as it was designed to assess the quality of an online learning environment from a social constructivist perspective (Taylor & Maor, 2000). The COLLES instrument consists of 24 questions that focus on students' evaluation of the actual and preferred states of these 6 scales:

1. Relevance - how relevant is online learning to students' professional practices?

2. Reflection - does on-line learning stimulate students' critical reflective thinking?

3. **Interactivity** - to what extent do students engage online in rich educative dialogue?

4. **Tutor Support** - how well do tutors enable students to participate in online learning?

5. Peer Support - do fellow students provide sensitive and encouraging support?
6. Interpretation - do students and tutors make good sense of each other's communications? (Dougiamas & Taylor, 2002 p.2).

The students completed the COLLES survey after the midpoint of the course, i.e. after

20 weeks of instruction. I chose this point to administer the survey, as I wanted to get some formative evaluation from the students of the course pedagogy.

The other survey instrument that was employed to gather evaluative data was the critical incidents survey. The students completed this survey in the last two weeks of the course. The Critical Incidents Survey consists of five questions that ask respondents to reflect on what were their critical incidents in the course. The questions are:

- At what moment in class were you most engaged as a learner?
- At what moment in class were you most distanced as a learner?
- What action from anyone in the forums did you find most affirming or helpful?
- What action from anyone in the forums did you find most puzzling or confusing?
- What event surprised you most?

Ethics

Ethics approval was granted by the school principal for this research project to be conducted in her school. The principal is permitted to grant this approval, in lieu of systemic approval, because of the researcher's position as academic partner to the school. Informed consent to analyse data from the course Moodle was sought from the students. The consent process was intertwined with the class discussion on the ethics of research to enhance the students' understanding of what they were giving consent to.

Findings

The findings of the study are reported in this section. Each of the findings is represented in a data chart that is followed by some interpretation of the finding. A

more in-depth discussion of these results is conducted in the following section of this paper.



Chart 1 Total in-class and out-of-class student interactions on Moodle

This first data chart shows that in-class interactions slightly outnumber out-of-class student interactions. These data suggest that out-of-class interactions were not a high priority for students enrolled in this course. It would be difficult to make a claim that out-of-class interactions were a strong feature of the students' participation in the course based on these data.

Chart 2 Type of Student Interactions on Moodle



Chart two clearly shows that the areas of the course Moodle that relate directly to the assessment tasks generated more student traffic. It is not surprising to me that the students frequently interacted with the report data as this area of the Moodle was crucial to the completion of the assessment task. This relationship between assessment tasks and interactions seems to be also reflected in the number of student interactions recorded with the assessment rubrics. This demonstrated to me the efficacy of having rubrics published online for easy access to students. The interaction with more static information such as lecture notes might suggest that other pedagogical devices need to be employed to make this information more useful for students.

Survey Data

The results from the COLLES survey are shown first followed by the data from the Critical Incidents survey.



For each of the six scales in the COLLES survey, students' preferred states exceed their evaluation of the actual. An interpretation of these data was that the students were benefiting more from their pedagogical interaction with the tutor than their interactions with their peers. I investigated this emergent finding further by examining two of the questions from the survey that relate to the Peer Support scale. This examination is represented by the following two charts.



other students ask me to explain my ideas.



Despite the fact that I was operating with a small sample size of 12, my interpretation of the results was that the students would appreciate more opportunities for student-student dialogue. This interpretation was supported by one response from the Critical Incidents survey: "**At what moment in class were you most engaged as a learner?** when we had class discussions". The majority of responses to the Critical Incidents Survey supported face-to-face rather than virtual discussions, as expressed in this response: "**What action from anyone in the forums did you find most affirming or helpful?** Group explanations and analysis". This preference for learning communities was reinforced by this response : "**At what moment in class were you most distanced as a learner?** Trying to comprehend texts beyond my understanding". The only support for the Moodle interaction came in this response: "**What action from anyone in the forums did you find most affirming or helpful?** the marking criteria".

Discussion

The results from this action-research study demonstrate that I have much to learn on this quest to explore the pedagogical possibilities of Moodle courseware. However, there are particular insights that I have gained from this study that are worth discussing here. These findings are the students' preference for face-to-face rather than online discussion and the concentration of student online activity on assessment resources.

The students in this class favoured face-to-face discussions over virtual discussions. This was evidence in the activity log data that showed that most of their online interaction occurred with materials rather than discussion forums. This was also supported by the critical incident survey data that suggested that students valued class discussions. This finding suggests that online learning environments, where feasible, should not constitute 100% of the course interactions. This is consistent with the research literature that advocates a blended learning environment that is comprised of a variety of student-student and student-teacher interactions (Bonk & Graham, 2006). A blended learning environment might be especially important for younger students, such as the 16-18 year olds in this study, who are less accustomed to the pedagogy of online learning environments. In this respect, online courses in the senior secondary might be regarded as an intermediary step from the face-to-face classroom focus of schooling to the more flexible learning environment of the tertiary sector.

The students as evidenced by the activity log data preferred online components that were directly related to the assessment tasks from the Moodle. In particular, the assessment rubrics that were constructed as a whole class group were well regarded by the students as evidenced by their survey comments as well as by the number of their online interactions. This is hardly a revelation given that students in senior secondary are, by necessity, motivated to complete the assessment tasks in any course. The revelation here is for course designers who might wish to use the students' assessment motivation as a starting point for introducing online courses to students in senior secondary. This focus on assessment can also be justified or theorised in terms of respected curriculum theories. A design approach to Moodle that embraces assessment for learning as a fundamental assumption might be a worthwhile curriculum standpoint for a teacher.

The bigger issue for my action research methodology is the need to generate a greater variety of evidence. In the same way that quality curriculum design can be compromised by the haste to incorporate new technologies, my data collection in this study was too reliant on the Moodle software. Whilst the online survey instruments and activity log functions are very convenient methods to collect data they still do not give a complete picture of the blended learning environment that was the reality of this classroom. In future studies of this type, I would seek to gather a wider range of data from student focus groups or interviews. Alternatively, I would like to explore the potential of using the COLLES scales as a design as well as an analytical framework.

Conclusion

There was not overwhelming evidence from this small-scale action-research study to support the use of Moodle as a learning scaffold for senior secondary students. Instead, the findings have generated a few insights that will be employed in my ongoing use of the Moodle courseware in my teaching, particularly with larger university cohorts. There is enough forensic evidence from this small study to provide a few possible pedagogical pathways. These are the further exploration of virtual constructionism in the design of online learning environments, the incorporation of the evaluation frameworks that are within the Moodle to online course pedagogy and the creation of blended learning environments that employ the best of face-to-face and virtual learning environments.

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Invasion Games in Physical Education: Assessing Knowledge-in-Action in using the Team Sport Assessment Procedure

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Introduction

This paper examines the capacity of an assessment instrument, the Team Games Assessment Procedure (TSAP), to meet the challenges of providing authentic assessment of learning as enacted knowledge within the context of invasion games. The TSAP employs a peer assessment approach and research suggests that it can form a valuable aspect of the learning process when used in conjunction with constructivist approaches to teaching such as Game Sense (Gréhaigne, Godbout, & Bouthier, 1997; Richard, Godbout & Gréhaigne, 2000) The development of student-centred, inquirybased pedagogies in team games such as Teaching Games for Understanding (TGfU) and Game Sense (for example see, Gréhaigne, Richard & Griffin, 2005; Griffin & Butler, 2005; Light, 2005). Provide welcome developments in physical education pedagogy. In NSW they offer an ideal means through which physical education teachers can meet the expectations of the Quality Teaching Framework. As one of the most significant recent developments in pedagogy in NSW it provides a valuable framework for the provision of high quality learning across the curriculum but presents serious challenges for physical education teachers whose practice in the teaching of sport and games has been has focused on the mastery of technique, guided by the idea of learning as the acquisition of skill. This is a challenge that can be met by the pedagogy of TGfU and its Australian version, Game Sense (Curry & Light, 2007; Pearson, Webb & McKeen, 2006). Directive, technical teaching that emphasises the mastery of isolated technique typically requires assessment of game techniques but when the focus is placed on tactical understanding, decision-making and the performance of appropriate skills within the game new assessment approaches are clearly needed. As Light and Fawns (2003) argue from a constructivist perspective, to know the game does not mean having knowledge *about* the game but, instead, enacting knowledge in the game: knowledge-in-action. Assessment, therefore, needs to provide a measure of learning performed in the context of games.

The Game Sense Approach

Game Sense and TGfU lie in stark contrast to traditional, technique-focused approaches to physical education teaching. Based on the notion that technique needs to be learnt before playing the game, traditional approaches focus on the mastery of technique outside the game. This is typically achieved through direct instruction as a process of correcting errors until the technique is seen to be good enough to play the game. Conversley, Game Sense teaching focuses on the game as a whole and uses student-centred, inquiry-based pedagogy. It is an Australian variation of Bunker and Thorpe's (1983) TGfU model developed through collaboration between Thorpe, The Australian Sports Commission and Australian sports coaches in the mid 1990s (Light, 2004). In Game Sense the teacher works as a facilitator of learning rather than an instructor transmitting a set body of knowledge. Physical education in Australia, and elsewhere, has been slower to adopt student-centred, inquiry-based approaches than most other subject areas (Light & Georgakis, 2005). In physical education there is more entrenched resistance and a conception (from inside and outside) of physical education as being located outside the academic curriculum due its concern with the physical aspects of learning and an apparent neglect of the intellectual (Light & Fawns, 2003). Game Sense classes typically begin with games modified to reduce skill demands enough to allow all students to engage in play and focus on the tactical dimensions of the game while developing skill in context. The skills required to play the game are seen as being 'enabling skills'-skills that are good enough to enable the game to be played. By doing this, students develop basic game appreciation and are immediately confronted with the basic problems that characterize play in its full version: the manipulation of space and time. As students performance develops the games used are progressively increased in complexity. In this way, students learn to play games by playing games in which they simultaneously develop tactical knowledge, decision-making ability and skill within games.

One of the distinguishing features of Game Sense is its reliance on teacher questioning to stimulate thinking. Instead of telling students what to do the teacher asks them to work collaboratively to develop their own solutions to the range of problems that arise in games. In between periods of activity, students reflect on ideas and concepts through group discussion drawing on existing student knowledge that they bring to the games lesson to inform team play. Students have ownership of the class, are responsible for their own learning and are able to explore a range of possible solutions to the problems that arise in game play. As Light and Fawns (2003) argue, games and team sport teaching has been 'dumbed down' by dominant coaching and teaching approaches that obfuscate their inherent complexity and intellectual dimensions. The idea that successful play in sport requires the mastery of discrete, 'fundamental' skills reflects what we see as an impoverished conception of learning that is out of step with contemporary approaches to learning across all subject areas. Games are far more complex and intellectual that a purely technical and directive approach implies. Learning to play any game involves a range of cognition including perception (pre cognition), problem solving, decision-making and responding to cues (Kirk & MacPhail, 2002). Highlighting these intellectual dimensions of games also provides opportunities for collaborative problem solving and the social interaction from which meaningful and lasting learning emerges (Light & Fawns, 2003; Vygotsky, 1978).

Alternative approaches to teaching games and team sport such as Games Sense offer a means through which teachers can, at the same time, highlight the intellectual dimensions of games while providing stimulating and satisfying learning experiences for their students. Underpinned by socio-cutural constructivist learning theory they have made an impact upon teaching in schools and clubs across a range of cultural settings such as in the UK, New Zealand, France and Singapore. In Singapore a variation of TGfU known as the Games Concept Approach (GCA) was mandated by the Ministry of Education in 1999 (Tan, Wright, McNeill, Fry, & Tan, 2002). Its impact upon teaching in schools is, however, limited due to resistance from established teachers and the difficulties faced by graduating teachers facing the challenge of initiating change (Tan, et al.). First developed in 1997 (den Duyn, 1997) Game Sense has influenced coaching across a range of sports in Australia (Light, 2004) but its impact upon physical education teaching in NSW has been limited. In NSW teachers have struggled to meet the expectations of the NSW Quality of Teaching Framework and Game Sense pedagogy also offers an ideal means of achieving this (Curry and Light, 2007; Pearson et al, 2006). The Quality Teaching Framework is having a strong influence on teaching in NSW schools across all

subject areas and recent research (Curry & Light, 2007) suggests that it offers a wonderful opportunity for the development of physical education pedagogy.

Assessing Learning in Game Sense

Game Sense teaching focuses on learning to play the game as a whole and not on discrete parts of the game such as technique. There has been a long running debate in the physical education field over the relationship between skills and tactical knowledge that reflects a misunderstanding over this relationship. This arose from a view in the 1990s that suggested having to choose between skill and tactical knowledge in a division of physical and intellectual learning. In Game Sense, skills are not privileged but neither are they neglected. They are seen as part of the game developed in conjunction with tactical knowledge and decision-making at the same time and within the game to have meaning. This means that assessment has to be able to provide information and measurement of learning as an holistic process. Testing skills out of the context of a game is not an authentic assessment approach as it does not adequately measure or assess the aims or learning objectives of the lesson and does not assess performance in the game. Authentic assessment involves assessing performance – assessing knowing how to *do* something rather than knowing *about* it. As Wiggins (1993, p.229) suggests, authentic assessment should provide problems. "in which students must use knowledge to fashion performances effectively and creatively". Over a decade of research on TGFU and Game Sense shows how the ability to articulate tactical knowledge about the game develops well before the ability to enact this knowledge. That is to say, that students can say what they should do well before they can actually do it. In the physical education pedagogy literature this is commonly referred to as 'declarative knowledge' (as knowledge about the rules and tactics of games) and 'procedural' knowledge (the enacting of knowledge in the game). As Light and Fawns (2003) have argued, while learning in Game Sense can be seen as occurring (and being expressed) through the mind expressed in speech and the body expressed in action the two are interrelated in an ongoing 'conversation'. This suggests that knowing the game means being able to play it intelligently and merely being able to talk about it.

The idea of knowledge-in-action requires measurement procedures and instruments that can adequately assess students' performance in actual game contexts and there have been two instruments developed. Griffin, Mitchell & Oslin (1997) created the Game Performance Assessment Instrument (GPAI) that is intended to "provide teachers and researchers with a means of observing and coding performance behaviours that demonstrate the ability to solve tactical problems in games by making decisions, moving appropriately, and executing skills" (p.40). Gréhaigne, Godbout, and Bouthier (1997), developed a second instrument known as the Team Sport Assessment Procedure (TSAP). This instrument's primary objective is to provide teachers with information on student performance in different invasion and net games. The body of the paper presents and examines the TSAP and its use in assessing game performance.

The TSAP Instrument

The TSAP is an instrument used to evaluate performance in games as the integration of tactical understanding, decision-making and skill performance. It provides information about student performance in games that quantifies an individual's overall offensive performance in selected invasion and net team sports, reflecting both technical and tactical aspects of game play (see Gréhaigne et al., 1997). It is based on two of the basic notions of, 1) How a player gains possession of the ball and, 2) How a player disposes of the ball. Player's behaviours are observed within a game and coded during game play on an observation grid. Two performance indexes and a performance score are then calculated from the collected data. The assessment procedure is a form of peer assessment in which small-sided games are used for assessing performance where students working in pairs with one playing and the other coding behaviour. There are a number of versions of the instrument that can be used to adapt to the age and experience of the students. During this procedure the observation and recording of player behaviour focuses the observer's attention on important aspects of play.

Observational variables: Operational definition

A. Gaining possession of the ball

1) Conquered Ball (CB)

A player is recorded as having conquered the ball if he/she intercepted it, stole it from an opponent, or recaptured it after an unsuccessful shot on goal or after a near loss to the other team.

2) Received Ball (RB)

The player receives the ball from a partner and does not immediately lose control of it.

B. Disposing of the ball

1) Lost Ball (LB)

The player is recorded as having lost the ball when he/she loses possession of it without having scored a goal.

2) Neutral Ball (NB)

A routine pass to a partner that does not put any pressure on the other team.

3) Pass (P)

Pass to a partner that contributes to the displacement of the ball towards the opposing team's goal.

4) Successful Shot on Goal (SS)

A successful shot on goal (or try) is recorded when it scores or results in possession of the ball being retained. The computation of performance indexes and performance score:

Volume of play index = CB + RB

Efficiency index = $\underline{CB + P + SS}$ 10 + LB

Performance score = (volume of play / 2) + (efficiency index x 10)

The information provided by the individual variables, performance indexes, and performance score are all reliable indicators of both technical and tactical performance (Table 3) related to successful game play (Gréhaigne et al., 1997). Analysis of psychometrical characteristics of the TSAP as applied to assessment in basketball, soccer, team handball, volleyball and rugby have shown it to be a valid assessment procedure (Nadeau, Richard & Godbout, 2008). It was also validated for ice hockey by comparing player rankings in a game of ice hockey arrived at by using the TSAP using assessment with rankings made by ice hockey experts (Nadeau et al.).

Observation Items	Information Collected
Received balls (RB)	Involvement of the player in play (availability, accessibility to
	receive a pass)
Conquered balls (CB)	The player's defensive capacities
Offensive balls (OB)	Player's capacity to make significant passes to his/her partners
	(offensive capacities)
Successful shots (SS)	Information related to the player's offensive capacities
Volume of play (PB= RB+CB)	General involvement of the player in the game
Lost balls (LB)	A small number reflects a good adaptation to the game

Nature of the information collected

Using the TSAP

From our experiences of using TSAP with pre-service PDHPE teachers at the University of Sydney, the full version can be difficult to use for the first time. This is likely to be more of a problem with school students until they, and the teacher, become accustomed to using it. Each observer receives an observation grid to fill in for each observed game, which is not a problem if they have clipboards. However, the calculation can be a little difficult to do on the field and, in some cases, it might be better done back in the classroom. To address this problem the TSAP has three versions available that are progressively more complex. These comprise the original full version and two modified versions. The full version is used to gain maximum information on player performance and would typically be used for students from year nine and up in secondary school. The 1st and 2nd modified versions can be used in situations where the teacher does not require as much information as the full version. Having two versions means that the teacher has options for adapting the instrument to the age of the students and/or their inexperience of using it.

1st Modified version

Volume of Play (VP) = # of possessions (CB + BR) Efficiency Index (EI) = \underline{VP} 10 + LB

Performance Score $= (VP/2) + (EI \times 2)$

In the simplest version of TSAP the number of observational variables has been halved from the full version. In this version, no distinction is made between CB or RB in the volume of play with only the total number of possessions taken into consideration along with the number of lost balls. This modification was undertaken in response to the difficulty that younger observers had in differentiating between received and conquered balls. The differences between these two variables are not as important for the learning of game concepts for younger students such as at primary school as they are in years nine and ten in secondary schools. The modifications in this version allow teachers to progressively familiarise students with the observation of game play behaviours. It also allows for them to become familiar with, and provide their students with experience of, peer assessment. The variables that were retained for this first modified version still allow teachers and students to focus on important game play concepts such as getting free of a defender (represented by the volume of play) and passing the ball while maintaining possession for senior primary or junior secondary schools. The efficiency index is designed to encourage students to realize that from their volume of play (number of possessions) the goal is to lose as few balls as possible.

2nd Modified Version

Volume of Play (VP) = # of possessions (CB + RB) Efficiency Index (EI) = $\underline{P + SS}$ 10 + LBPerformance score = (VP/2) + (EI x 2)

The second version the efficiency index's numerator is comprised of the number of passes and successful shots on goal. The pedagogical emphasis in this version differs from the first modified version in that it doesn't only take into account the number of played balls. An emphasis is made in the efficiency index on what the teacher might want the student to do when he/she gets possession of the ball (pass or shoot on goal). With this added, this second modified version of the TSAP increases the number of observational variables to four. Consequently, this second version is an intermediate version between the simplest version and the full version of the TSAP. This version could be used for junior secondary school classes. Based on feedback from our students, we suggest that, if students work with this approach to assessment from year seven they should be very comfortable with it by the end of year eight and able to use the more complex version required for assessment from year nine. This progression in complexity means that both teachers and students unfamiliar with the TSAP can begin with the simplest version and move up to the others if there is a need for more complexity. In the senior secondary school there is usually a need for more detailed information on game performance that would likely involve students from year nine

and up using the full version of the TSAP. For junior secondary and primary school students the simpler versions are likely to be able to provide enough information.

Discussion

Pedagogical Implications

One of the biggest advantages of the TSAP is the way in which it can form an important part of the learning process. In articular, the refelction that it stimulates for the observer complements the emphasis placed upon reflection upon action in Game Sense. Fosnot and others (for example see, Dewey 1916/97) emphasise the role of reflection in learning. Dewey suggests that we learn through experience in two ways. First we learn through the experience itself and secondly we learn through abstract reflection upon that experience. This reflective process is central to the Game Sense approach. The TSAP provides another opportunity for students to reflect upon the aspects of game play that they are observing and using to arrive at an evaluation of the quality of play. This helps them make meaning and make connections across their experiences of games and assessment (Grehaigne, & Godbout, 1995). Fosnot and others (for example see Davis & Sumara, 1997) also suggest that, from a constructivist perspective, there are not necessarily 'correct' answers to the problems students have to solve in the learning process. In teaching informed by a constructivist perspective on learning, the teacher provides opportunities for self-directed inquiry and exploration and the "freedom of movement and the power to judge, evaluate, select and carry through" (Dewey, 1938/97: 64).

A Game Sense approach encourages students to collaboratively arrive at answers and solutions for problems that arise in games play that may not necessarily lead to the discovery of 'correct answers' pre-determined by the teacher (Light & Fawns, 2003). The teacher may well have some specific tactical solutions in mind in providing students with problems to be solved in TGfU/Game Sense but he/she needs to be open to the idea that there are not necessarily only 'correct answers'. In constructivist approaches to learning, mistakes can form a valuable part of the learning progress and teachers need to provide a positive and supportive socio-moral environment within which students are confident to experiment and try out ideas without fear of being 'wrong' (DeVries & Zan, 1996). This encourages critical evaluation of methods used

to assess tactical understanding in team games that shows video clips of sections of play in real games and asks students to choose 'the correct' response. They are also so distant from the complex, real context within which decision-making takes place in games that they lack authenticity. On the other hand, instruments like the TSAP provide an authentic assessment of game knowledge in action without setting any 'correct' answers.

Assessing off the ball play

The main limitation with TSAP (and GPAI) lies in its focus on what player does with the ball in offence and its lack of specific attention to movement off the ball. Time on the ball is very limited in any invasion game from rugby to basketball and soccer. For example, a soccer coach in Light's (2004) study on Game Sense coaches in Australia explained how in a 90 minute game of soccer the ball is typically in play for about 60 minutes within which the time an individual player spends on the ball is usually no more than two minutes. As the coach asks, what then are the players doing for the other 58 minutes? They are running and thinking in tactically informed ways. This then highlights a weakness of game performance assessment that focuses on what the player does with the ball. In the TSAP, off-the-ball movements and decisions made are not directly measured but the observer and player can infer these movements. Instruments that can accurately and authentically measure individual player behaviour off the ball are far more complicated to design and to administer and would likely be impractical for teachers. They would certainly be more difficult to use as peer assessment and while this is a limitation of the TSAP, it provides indirect information on player movement off the ball. Inferring behaviours based on the observation of other behaviors also has a constructivist connotation as it forces the observer and player to discuss and reflect on what actually happened (product) and what could have caused this to happen (process).

Peer Assessment and learning

In France, where this procedure was developed, the TSAP was originally used to grade students' team-sport performance at the end of high school (Gréhaigne & Roche, 1993) but its conception is primarily oriented towards the 'regulation of learning' as a form of formative assessment and an essential part of the teaching-learning process (Richard & Godbout, 2000). With the consequent development of

two modified versions o the TSAP this means that it can be used from as early as grade five in primary schools but these settings it is even more important to provide enough time for students to learn how to use the instrument. The use of the TSAP with a constructivist approach to teaching and learning such as in TGfU or Game Sense offers an efficient means of, not only assessing, but also developing students' learning of game concepts (Gréhaigne & Godbout, 1998). For assessment to be authentic it requires the active participation of students in the assessment process as it is integrated to the teaching-learning process (Wiggins, 1993; Zessoules & Gardner, 1991). While the peer assessment in the TSAP would be too difficult for junior primary school students, a study by Richard, Godbout, & Gréhaigne (2000) found that students as young as 10 years of age (year 5) were capable of using the TSAP with precision. Different studies have looked at the use of TSAP with students from grades five to 12 (Gréhaigne et al, 1997; Richard et al., 1998; Richard et al., 1999; Richard et al., 2000), suggesting that it is a reliable instrument when used by students as young as 10 years old. Adequate reliability has also been established with older students (14-18 years) in soccer and volleyball (Gréhaigne et al, 1997). Successful use of the TSAP as a peer assessment proceedure requires providing adequate time for students to develop the required observational skills and familiarise themselves with it. Some teachers could be concerned with how this time might otherwise be used for physical activity but we see it as part of the learning process because learning to use the instrument invloves learning about game play and personal reflection upon performance. Given the learning about game play that is involved in peer assessment the time to prepare students for it is a worthwhile investment and one that will not have to be repeated for the class.

Conclusion

As we have suggested, new pedagogies informed by constructivist learning theory, such as TGfU/Game Sense, provide promising developments in physical education but are faced with the challenge of implementing assessment approaches that actually provide information on the learning that they aspire to. Assessment is not only important for teachers to provide information on their students' progress for the school and their parents but is also necessary for teachers to understand how their

students are progressing as a form of feedback on the effectiveness of their teaching. The TSAP should, however, not only be used as a form of formal, summative assessment but also as a form of ongoing formative assessment and as a valuable part of the students' learning process. Given that, as educators, we are concerned with learning more than ability it might also be used to measure improvement in game play over whatever period of learning the teachers chooses to focus on.

Assessment should form an integral part of the learning process (Zessoules & Gardner, 1991) and the TSAP meets this expectation. Using the TSAP focuses students' attention on the tactical aspects of games and encourages them to make connections between the tactical dimensions of games within invasion games and net wall games. While there is little skill transfer across different games there is a strong tactical transfer when a Game Sense approach is used. The TSAP also provides students with opportunities for reflection upon the performance of others and of themselves and to learn about themselves as games players (Richard, Godbout & Grehaigne, 2000). While assessment focuses on performance in games this knowledge in action is developed through an integration of the body expressed in action and the mind expressed in speech (Light & Fawns, 2003). The reflection involved in assessing peers represents an intellectual dimension in the Game Sense learning process that contributes toward better game play.

In this paper we are not prescribing TSAP for teachers wanting to use a TGfU/Game Sense approach but merely suggesting that it is one assessment instrument that can provide useful and accurate information on student performance/learning in invasion games. We have not, for example, examined the GPAI (Griffin, Mitchell & Oslin, 1997) nor looked at the TASP instrument for assessing net/wall games. We have, however, highlighted the need for authentic assessment in the ongoing development and implementation of constructivist approaches in physical education with a focus on games teaching such as TGfU and Game Sense. Whatever assessment is adopted, it not only needs to be authentic but also be an integrated part of the learning process. It also needs to be practical and easy enough for teachers to use so that it does not become a burden. We suggest that the TSAP fulfills all these requirements and is well worth consideration by physical education teachers developing a Game Sense approach to teaching.

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