ALIGNING ICT IN ASSESSMENT WITH TEACHING AND LEARNING: ENHANCING STUDENT ACHIEVEMENT IN THE MIDDLE YEARS

Mary Lincoln
Queensland University of Technology, AUSTRALIA

PEER REFEREEING REQUIRED

Student underachievement in the middle years (typically Years 4 to 9) is a concern in education. Incorporating Information and Communication Technologies (ICT) in assessment that is aligned to teaching and learning has the potential to engage students in higher cognitive processes that lead to increased student achievement. To examine this proposition an investigation was undertaken into *teachers' perceptions of alignment and the implications of those for student achievement in ICT enhanced middle years assessment tasks.* This investigation used a collective case study design underpinned by socio-cultural theory. Two methods were used for data collection, namely, semi-structured interviews with individual teachers and a focus group discussion with teachers and another with students. Findings revealed teachers' perceptions that alignment: assists in mediating achievement of learning outcomes in quality middle years assessment tasks, assists in creating a challenging but supportive environment in which positive learning dispositions and success is encouraged for all students, and contributes to more rigorous use of ICT in assessment. The process of implementing alignment was found to be complex but assisted through prioritising particular practices. These findings enabled the development of eight steps which serve as a guide to the effective implementation of alignment in middle years assessment tasks.

Keywords: Education in the middle years, middle years of schooling, alignment, Information and Communication Technologies, assessment

INTRODUCTION

The performances of middle years students (typically years 4-9) in international and national assessment programs have demonstrated that limited progress has been made in improving student achievement. Various terms such as the middle years "slump" and "year 8 slump" have been used to refer to the lack of progress in student performance (Hill & Russell, 1999). Hence, the middle years of schooling are a priority in educational policy and practice. For many educators, reshaping middle years programs has included a focus on improving the quality of assessment practices. To be successful in improving learning for all students, assessment must be closely aligned to instruction (Black, Harrison, Lee, Marshall, & Wiliam, 2003; Marzano, Pickering, & McTighe, 1993). Alignment means that what is assessed is what is taught and that how it is taught is meaningful and connected to the learner's needs and interests. Alignment is thus a strategy that could contribute to enhancing student performance in the middle years. However, this strategy alone does not address general student disengagement with learning. Incorporating Information and Communication Technologies (ICT) in education programs has the potential to motivate and engage students in higher cognitive processes that lead to increased student achievement, under the right conditions (Schacter & Fagnano, 1999; Wegerif & Dawes, 2004). In this paper, ICT is broadly defined as encompassing hardware; computer programs; electronic devices; and Internet connections which enable production or communication of information and resources. However, the alignment of assessment with educational goals and the role of ICT in fostering student engagement are dependent on teachers' knowledge and beliefs. This study investigates the

question: *What are teachers' perceptions of alignment and the implications of those for student achievement in ICT enhanced middle years assessment tasks?*

This paper begins by outlining the context for the study, describing the − as yet relatively unexplored − opportunities offered by ICT in assessment that is aligned to teaching and learning. The paper then outlines the purpose of the study which explores middle years teachers' understandings of alignment. It also presents the research design, which uses case study methodology. Finally, the results of the study are provided and discussed. The paper concludes with a guide to implementing alignment, and final remarks about assessment using ICT.

BACKGROUND

The adoption of assessment for learning (AfL) can lead to improved teacher practice which in turn can lead to enhanced learning. While there are various definitions of assessment for learning, it generally represents an approach that views assessment as having more value than mere measurement of achievement (Assessment Reform Group, 2002). It refers to assessment that is ongoing throughout the learning process rather than at the end of it, with the main emphasis on motivating and improving student learning. One such definition of AfL states that it is "…all those activities undertaken by teachers, *and by their students in assessing themselves*, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged" (Black & Wiliam, 1998, p. 2, emphasis is original). In an extensive analysis of 250 research publications written over a nine year period, Black and Wiliam (1998) found evidence that improving AfL can inform instructional practices which in turn can raise standards of achievement. Their findings were supported in a later study by Black et al. (2003), in which 24 secondary teachers were supported in developing and implementing AfL practices. The teachers represented a range of expertise and experience and almost all of them made some improvement in their assessment practices. However, teacher knowledge and expertise is critical to adopting and implementing AfL practices that lead to enhanced student outcomes (Moreland & Jones, 2000).

Optimising opportunities for quality learning in the assessment process also requires attention to alignment with pedagogy and curriculum (Lingard et al., 2001). Although "curriculum" is often referred to as encompassing all that occurs in the classroom (e.g. middle years curriculum), it is defined narrowly in this paper to enable a differentiated discussion of curriculum and pedagogy. Thus, the term curriculum is used primarily to refer to the concepts, skills and procedural knowledge required to achieve certain outcomes. Pedagogy refers to the approach and practices adopted by the teacher in designing and implementing teaching and learning experiences to realise the desired learning outcomes. Curriculum, pedagogy and assessment are components of a whole system and when they are attuned can optimise high level learning (Biggs, 1996). For example, in an aligned system what is actually taught and the teaching methods used support the learning that is required for the assessment task. However, for alignment to be effective for all students, it must be used in conjunction with a constructivist approach, according to Biggs' (1996) concept of constructive alignment. The "constructive" element refers to the process whereby students actively construct meaning from their relevant learning experiences. He posits that in a poor system where the three components (curriculum, pedagogy and assessment) are not well aligned to support achievement of the learning outcomes, only the more academically capable students: "spontaneously use higher-order learning processes" (Biggs, 2002, p.1). Throughout this

paper the term "alignment" refers to the concept as described by Biggs (1996). He suggests four major steps to setting up alignment:

> "1. Defining the desired learning outcomes (DLOs)
> 2. Choosing teaching/learning activities likely to lead to the DLOs
> 3. Assessing students' actual learning outcomes to see how well they match what was intended
> 4. Arriving at a final grade" (Biggs, 2003, p. 2).

The assessment task can bring all these components together and demonstrate how effectively students have attained the anticipated outcomes. Assessment developed in this way serves a double purpose: for the students it defines what they are to learn, and for teachers it helps determine the quality of the learning.

The quality of the teaching and learning experiences can be enhanced through ICT use in engaging students and harnessing their enthusiasm for learning (Schacter & Fagnano, 1999; Wegerif & Dawes, 2004). Nevertheless, there is still much to be done in fashioning how we engage middle years students in "assessment" using ICT. Given the fast paced growth in the use of ICT and the generation of information, the ability to engage in higher order thinking and to learn will be crucial for students throughout their lives. The use of ICT in middle years assessment is appropriate. It can lead to enhanced student engagement and achievement and support higher order thinking, when accompanied by effective pedagogical practices (Schacter & Fagnano, 1999; Wegerif & Dawes, 2004).

The use of tools, such as ICT, can be enhanced when used in conjunction with social interaction, according to Vygotsky's (1978) socio-cultural theory of learning. He posits that learning occurs through social interaction where individuals internalise the effects of working together. Vygotsky's (1978) theory has contributed to understandings of the role of social interaction in supporting higher order processes when using ICT in education. Hence, the study's conceptual framework emphasised social interaction and the use of tools and signs to mediate learning and foster intellectual growth. ICT provides a shared focus contributing to sustained engagement, and resourcing collaboration (Roschelle, Pea, Hoadley, Gordin, & Means, 2000; Teasley & Roschelle, 1993; Wegerif & Dawes, 2004). For example, ICT provides learners with a means to easily capture, manipulate and re-organise information as they construct, exchange and test ideas (Jonassen, 2000; Teasley & Roschelle, 1993). Hence, providing opportunities for students to interact with others as they engage in learning and assessment with ICT could contribute to improving the quality of the learning. However, little is known about how teachers view alignment and the kinds of socio-cultural environments they create when incorporating ICT in assessment. If educators are to understand how to assist teachers optimise the benefits of using ICT in assessment, they need to examine teachers and the perceptions or beliefs they hold about teaching, learning and technology (Ertmer, 2005).

DESIGN AND METHODS

The aim of this study was to describe, analyse and theorise middle years teachers' understandings of alignment and the implications of that for student achievement when engaging with middle years assessment tasks that incorporate ICT. This investigation was underpinned by socio-cultural theory and used a collective case study design (Merriam, 1988; Stake, 1995). Two methods were used for data collection. These methods were semi-structured interviews with individual teachers and two focus group discussions, one with teachers and the other with students. The use of multiple methods (Flick, 1998) was

appropriate because it "adds rigor, breadth, complexity, richness, and depth to any inquiry" (p. 231). A case study database was developed for storage of participant information and to organize the data.

The study participants were six middle schooling teachers from a cluster of schools (two primary schools and a secondary school) and twenty-five of their students. Five of the teacher participants were classroom teachers and the other was a member of the school administration team. The latter performed the role of cluster facilitator, providing guidance and support to the teachers. Prior to the study, the teachers had jointly participated in a six-month middle schooling professional development program. During the program the five classroom teachers developed and implemented an assessment task that incorporated the use of ICT. The twenty-five students completed the assessment task over a four to six week period. Participants were invited to be part of this study after the program was completed. In the study, each of the teachers participated in two individual interviews in which they discussed their views of alignment, its role in teaching, learning and assessment with ICT, and their perceptions of student outcomes. Sixteen of the students from two of the Year 6/7 classes at one of the schools participated in a focus group discussion about their assessment experience. Both classes did the same task and jointly participated in some activities when the task was introduced. Five of the six teachers also participated in a focus group discussion which concluded the data collection activities. This selection of participants provided the scope needed to collect an appropriate amount of evidence.

Data analysis commenced with repeated readings of the interview and focus group transcripts. These were analysed and annotated to explore possible underlying intent. Initial categories were developed and data were coded. These categories were then reviewed and refined once all the data were analysed, modifying and combining categories until unique themes were apparent (Miles & Huberman, 1994). Categories and themes drawn from the analysis of the data aided the development of explanations and interpretations of the data. Throughout this paper in reporting findings, teachers are referred to by their pseudonyms or the first letter of their pseudonym. These are Alice (A), Bella (B), Clare (C), Daisy (D), Emily (E) and Faith (F). The letter I is used in excerpts of transcripts to denote the interviewer who is the researcher. Alice, Bella and Clare were primary school teachers and the other three were secondary school teachers. All were teaching in the middle years of schooling. Clare was unavailable at the time of the focus group discussion and did not participate. The sixteen students who participated in the student focus group discussion were from Alice and Clare's classes. The analysis process resulted in the formulation of a number of assertions which explain teachers' perceptions.

FINDINGS

Data reporting teachers' perceptions of alignment and its role in teaching, learning and assessment with ICT are presented in this section. Worthy of note are teachers' perceptions that: (1) alignment, assisted by planning assessment before teaching begins, helps mediate learning; (2) alignment is strengthened through explicitness in task documentation; (3) alignment supports more rigorous use of ICT in assessment tasks; and, (4) alignment helps create a challenging but supportive environment. Each of these is discussed in turn, while acknowledging they are not necessarily independent.

Alignment, assisted by planning assessment before teaching begins, helps mediate learning

Teachers indicated that alignment assists in mediating achievement of learning outcomes in challenging middle years assessment tasks. Furthermore, they perceived that alignment was strengthened by planning the assessment before beginning to teach what students needed to learn to complete it. The concept of alignment was referred to by all teachers, to some degree, during their first individual interviews and at the focus group discussion. For example, Faith noted that in the classroom "[you're] talking a lot about the task and aspects of it because it's aligned with the learning and embedded in it". A notable emphasis in the responses from five of the teachers (A, B, C, D, F) during their first individual interviews was their reference to the usefulness of front-ending assessment in strengthening alignment. Teachers explained how they front-ended assessment by adopting a process of planning the assessment task with accompanying criteria and standards first, then aligning teaching and learning experiences to support students to accomplish the task. Front-ending assessment contrasts with the traditional view of assessment in schools where the unit of work is planned and implemented before the teacher designs the assessment. The traditional approach generally focuses assessment on only selected elements of the unit. The details of which elements will be assessed and the assessment criteria for those elements are generally not shared with students at the beginning of the unit. Front-ending assessment also contrasts with "teaching to the test". The latter approach generally focuses on students acquiring a predetermined body of knowledge against which they will be assessed in a one-off test. In contrast, the approach referred to by the teachers in this study emphasised supporting students to develop and refine understandings as they completed a challenging assessment task. The task documentation included criteria and standards against which students' performances were to be assessed. This approach is consistent with Biggs' (1996, 2003) concept of alignment and also with the philosophy of outcomes based education which underpins the syllabuses that the participant teachers used in planning their programs (Spady, 1994).

The notion of aligning curriculum, pedagogy and assessment through front-ending assessment was referred to by five of the six teachers in their individual interviews (A, B, C, D, F). For example, Clare highlighted that the primary school teachers (A, B, C) planned their assessment tasks together. She indicated that this process assisted them to identify and align relevant teaching and learning experiences with the assessment before teaching began. Clare's Year 6/7 task required students to research a topic related to life's events or natural phenomenon and explain the science concepts that underpinned them. Students had to independently write a script and storyboard to present their information. In small groups of three to four, students then used a combination of their scripts to create a video production of a children's news program, suitable for a Year 4 class. In preparing their programs, students were required to collaboratively edit their video, add voice over and put backgrounds into their final group productions. The assessment task was developed and teaching and learning activities planned before the topic was introduced. The importance that Clare placed on alignment between the assessment and learning experiences is highlighted in the following excerpt.

Clare:	Yeah, so [it's] how we plan our entire term. So we do the front-end assessment. So we plan the assessment first, then we plan the learning activities from that.
I:	Right, so you make it align?
Clare:	Yeah, so I think it kind of just happens all year, like not all year but all term in the one task.
I:	It brings it together in the task?

Clare: Yeah, like it's all just wrapped up in a little bundle by the end. And the kids love it. They're like what's our next assessment because they get involved in it too. (Interview 1, Section 1)

Similarly, Alice aligned her curriculum and pedagogy to help mediate student achievement of learning outcomes in completing their assessment tasks. However, she provided more in-depth information about the aspects of alignment that she considered to be important. The assessment task provided a focusing device for aligning and mediating teaching and learning experiences in her middle years classroom. Figure 1 demonstrates that Alice aligned her curriculum and pedagogy with the assessment to help mediate achievement of learning outcomes through a range of strategies. These strategies included discussing the task, identifying problems, drawing on students' background knowledge, and providing constant feedback. Alice's diagram also illustrates the complexities that Alice considers need to be accommodated, including alignment with: students' needs, abilities and interests; feedback; resources; and teaching and learning approaches that are dependent on social interaction. The importance that Alice placed on alignment and front-ending assessment is also evident in her definition of academic rigour. Her definition explains the linkage between the elements in her diagram.

Alice: Academic rigour is making an authentic task for the students where the task is designed for every child to succeed in some way with a lot of teacher explaining the task and constant discussion throughout the task of what's going wrong and what needs improving and where to go from now. It's also making the task interesting and purposeful and drawing on students' outside knowledges as a background before completing the task. It involves students sharing a lot of samples and peer assessing their own tasks and getting constant feedback from peers and the teacher and also using a wide variety of different resources and just making the task interesting to the students or making them use things that they are not necessarily familiar with or used to. (Interview 1, Section 1)

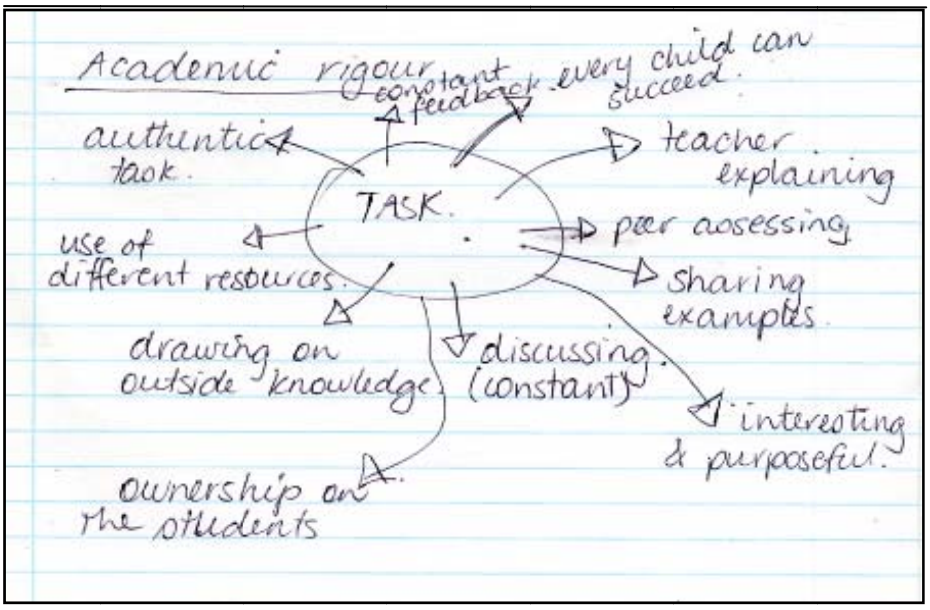

Figure 1. *Alice's diagram demonstrating her emphasis on alignment*

In contrast to the other teachers, Emily was less explicit about aligning assessment with curriculum and pedagogy. However, she referred to using assessment for learning principles when describing how one of her students whom she considered to be at risk of disengaging "learnt new things" as a result of his engagement with the assessment task. She also explained

that the way the task was set out made it easy for students to understand. However, she ensured that the task had components that were "challenging for those students who have difficulties" and "was challenging enough for higher end students as well." Emily's comments indicate that she perceived aligning the level of challenge in assessment tasks to the needs of individual students to be important. Hence, she may, in fact, differentiate her pedagogy to support students who display difficulties in completing the task or stretch those who find the task less challenging.

In summary, all the teachers perceived that alignment of curriculum and pedagogy with assessment is an important component of quality assessment practices in middle years classrooms. Furthermore, front-ending assessment was seen to assist in strengthening alignment. However, teachers placed varying levels of importance on alignment. This extended from a minimal level of emphasis provided by Emily to the complex array of alignment of a myriad to elements by Alice. The latter included aligning the assessment task with: students' needs, abilities and interests; feedback; resources; as well as teaching and learning approaches that incorporate social interaction.

Alignment is strengthened through explicitness in task documentation

The task documentation was seen to be a useful device not only in planning for alignment but also in supporting students' engagement with the task. The task documentation incorporated a task sheet, criteria and standards and an example or model for how the task should be structured. Teachers indicated that this documentation assisted students to understand task expectations. The criteria and standards also provided a reference point from which teachers planned their teaching and learning experiences. Teachers referred to setting out the task in a manner which was easy to follow and assisted students to understand what was required. For example, when describing what rigorous assessment is Alice indicated that this involved structuring teaching and learning experiences around task requirements and helping students to understand expectations.

> Alice: Well having your criteria, well not just even a criteria sheet but a task sheet and giving the kids a task sheet with what they're expected to do, what the actual task is and then the outline of sort [of] what they're expected to do. And then we usually give them an example of how it's done. (Interview 1, Section 1)

Likewise, Faith indicated that she perceived the assessment task documentation to be important in assisting students. Furthermore, she emphasised the need to align "the structure of the learning experiences" with the task requirements. Similarly, Bella emphasised the usefulness of the task documentation for designing learning activities in line with task criteria. In addition, she highlighted another benefit of this approach for the students. She highlighted that the task documentation assisted students to be more prepared for secondary school. This indicates that she also considered it to be important to not only align task documentation to meet the immediate needs of her students but also to enhance their engagement in future learning contexts. Bella explained how she would describe her approach to a novice teacher.

> Bella: So design the task so that when you give them their worksheet. "Yes, this is what you need to put in. This is what you need to do." Combine that with your criteria sheet [and] teach them those skills so that they can do it themselves ready for high school, rather than stepping it out the whole way. (Interview 1, Section 1)

As exemplified by Bella, explicitness of alignment in the task documentation enabled students to have a more in-depth understanding of task requirements and at the same time provided a support strategy for teachers.

To enhance student use of the task documentation, half of the teachers referred to making active use of the documentation when engaging with the students (A, B, C). These teachers referred to an array of teaching and learning strategies they perceived to be important in ensuring students clearly understood what was required in producing a successful performance. All three teachers referred to explaining the task criteria and standards, clarifying assessment requirements, and getting students to assess teacher demonstrations. They also focused on ensuring that students were able to judge the difference between a low and high quality standard of performance. For example, Alice explained that she usually clarifies "what they need to get an A (high mark) and then what they need to get a C (passing mark) and we look at the comparisons".

These three teachers (A, B, C) also considered encouraging students to use the task criteria and standards to evaluate themselves and determine how they could improve their work to be important for their learning. Bella highlighted how her students were able to refer to the task requirements and support each other in refining their performances. She said that when video cameras were unavailable for students to use in refining their science show performances, they "decided [on] working with their buddies [and] that buddies could give them warm (positive) and cool (highlighting problems) "feedback". Bella indicated that she also prompts the students to identify where they are in the criteria sheet and pushes them "that little bit more". Furthermore, Alice explained that it's important that students know that the task is "designed to assist them, not to make them fail". She indicated that she prompts her students to go through the task and criteria sheets and evaluate themselves. Alice indicated that this helps students take ownership for their learning.

> Alice: I think [kids need to think for themselves] because a lot of the time they come to me and say is this good enough and I'd say go back and check your criteria sheets or go back and read the task. "Have you included everything?" So the ownership was on them more than them just coming to me and thinking well she'll fix it for me. (Interview 1, Section 1)

In summary, teachers perceived that alignment which was strengthened through explicitness in the task documentation. Furthermore, active use of assessment task documentation was seen to provide opportunities for productive approaches to mediating student learning and achievement, according to three of these teachers. However, teachers placed varying levels of emphasis on the use of the documentation in mediating student learning and achievement.

Alignment supports more rigorous use of ICT in assessment tasks

Teachers who participated in the focus group discussion indicated that when the use of ICT was aligned with teaching, learning and assessment activities it was used more rigorously. This perception was also revealed in individual interviews (A, B, C, F). For example, Alice indicated that the use of ICT is more rigorous when it is "integrated with whatever else you're doing." She perceived that when the use of ICT was integral to what students needed to do to complete their tasks it helped engage them in using a range of skills and higher order thinking processes.

Alice: Like, they're not just focusing on writing the news report. They had to, firstly, they had to research something like a weather phenomena, then they had to write their script, then they had to film it, then they had to go back and edit on the computer. So it was all of those different stages [that engaged them in using various skills] and they were using different parts of their brain all the time.

As the excerpt above demonstrates, alignment was seen to enhance the use of ICT to support students to achieve the learning outcomes, including engaging them in complex and higher order processes.

The way in which the teachers used ICT was also aligned with the task expectations and requirements. For example, Bella referred to making assessment expectations obvious through using ICT, such as video that could be paused and restarted when particular concepts needed to be accentuated. She conducted a class discussion focused on a video of a similar performance to what the students were being expected to create. Bella highlighted how she had stopped the video at key points to explore concepts more thoroughly with the students. Bella also aligned her feedback and scaffolding with the use of ICT. For instance, she explained that as she gave feedback to one of her students on her draft assessment task, she prompted her student to reflect back on the demonstration video and consider strategies used there that she may want to consider using. The richest description of conscientiously aligning the use of ICT with curriculum, pedagogy and assessment was provided by Faith. In describing what she considered to be important strategies for ensuring rigour when students learn with ICT, she referred to "checking back and forth to ensure thinking processes were aligned right throughout the task". For example, she indicated that after having planned an assessment task it is important to check back over the task, the planned learning outcomes and the teaching strategies to ensure that the use of ICT to support thinking processes was embedded throughout. Faith's perception of how the use of ICT should be aligned with complex higher order thinking processes throughout assessment tasks is illustrated in the following excerpt from her first interview.

Faith: So it's actually where they're engaging the thinking and stuff like that [which contributes to rigorous use of ICT in assessment]. …
I: Yes, so what I took away from that is, it's more than a simple process with ICT, it has to be an integral part of the task itself?
Faith: Yep, yep
I: And I think I heard you say there has to be alignment throughout task in the use of ICT?
Faith: Yeah that's what I was [saying], yep, and **making sure that with all the alignment that it's not just the one step process so there's some depth to it.**
(Emphasis added; Interview 1, Section 1)

It is, therefore, apparent that teachers perceived ICT use to be enhanced through alignment with curriculum, pedagogy and assessment. The concept that teachers referred to was most explicitly described by Faith when she referred to the use of ICT being more rigorous when it is aligned with, and integral to, engagement in complex higher order processes.

Alignment helps create a challenging but supportive environment

The teachers conveyed the view that a focus on alignment assisted them to create an environment in which they challenged students but also encouraged success. During the focus group discussion, teachers emphasised that all students need to be encouraged to "do their best". Furthermore, during their first individual interviews, teachers referred to interactions with the students which focused on challenging them at a level that was aligned to their needs

and abilities. Findings revealed that in creating such an environment, teachers emphasised *encouraging success on challenging tasks*, and *fostering positive learning dispositions*.

Encouraging success on challenging tasks: Encouraging success on challenging tasks was referred to by all the teachers. Assessment tasks devised by the teachers during the project had a common set of standards for all students. However, teachers indicated that they adjusted their pedagogy to provide support according to students' needs and interests. Four of the teachers referred to tasks having some degree of flexibility which enabled them to cater for all levels of ability (A, B, E, F). For example, Alice indicated that all students must be challenged and encouraged to be successful in their assessment tasks. She suggested that students who struggle need to be encouraged to do their best and students at the other end of the scale "need to be encouraged to go further and [be] extended." Likewise, Faith suggested that the assessment task should give the students "the basic level so they know what the expected standard is and they can go from there." She further explained that "open" tasks allow more flexibility implying that they provide more opportunity for students to work in a manner which is aligned to their level of ability. She explained that when assessment tasks are not aligned to a rigorous standard, students are just showing you what they know but "they're not actually learning." This perception is further exemplified in Emily's description of what rigorous assessment is. She highlights the range of difference in ability levels that need to be catered for.

Emily: Well that would be something that would challenge them, it might be something for our special needs [students] that might make it a little bit harder for them but [tailored] so they can still be [successful]. And to give our brighter students, our top [Year 8] students that step up - maybe [we could give them] a piece of something that they might do in Year 9 or 10. We've got some students on that level that could achieve to that level. So it would be something that would **challenge all students across the board**. (Emphasis added; Interview 1, Section 1)

A slightly different perspective conveyed by Bella emphasised balancing the demands of the syllabus with students' abilities and interests. She emphasised finding a balance between what needs to be covered in the Key Learning Area (KLA) syllabuses and students' interests and abilities. This means covering syllabus requirements but including a range of modes of assessment in a task. It also means creating interesting, challenging and flexible tasks that will cater for all students' ability levels as well as motivate them to put in greater effort. Bella referred to tasks which had one set of criteria and standards for all students but that also had enough flexibility in them to enable students' some choice in how they achieved the outcomes. In addition, incorporating different modes of assessment in a task provided a greater range of ways for students to demonstrate their knowledge. This perception is illustrated in Bella's description of the nature of rigorous assessment.

Bella: It would be catering for ability levels as well as all the [demands of the] KLAs, trying to make an even, like a balance, mesh between the two. In terms of the kids it would be actually using all the resources that are given to them, like the criteria sheet, which has been what we've been focussing on lately. So that would be rigorous in that sense. Like there's more than one part to it and there's **more opportunities for them to improve their marks**, not just focussing on the writing. There could be a filming. There could be a science section. So all those combine together to improve their marks. (Emphasis added; Interview 1, Section 1)

Although Daisy and Clare were less explicit about alignment with ability levels, they referred to having a common set of standards in the task but adjusting pedagogy to provide appropriate

levels of support to enable all students to achieve them. For example, Daisy referred to the importance of scaffolding students' learning, saying that "if you've never done it before you need those [scaffolded] steps to get to that top level of high order thinking and obviously [you need] to have those set standards for them in their assessment criteria". Daisy appears to be implying that all students should have the opportunity for higher order thinking to achieve the learning outcomes to a set standard, but that she provides a higher level of scaffolding to those who have more limited previous expertise. Similarly, Clare indicated that she sets high standards and provides support for students to achieve them. In contrast to others, she also referred to involving the students in determining appropriate steps for them to follow to complete their tasks. In the process, Clare appears to attend to the emotional needs of her students. She indicated that she conveyed to students that managing feelings of uncertainty is part of working with challenging tasks and reminded students of the scaffolds that were available to them. Clare's approach is evident in the following excerpt.

Clare: And then they see the end product and go "Oh my God, we did that!" Because at the first they were like "how are we going to do [this]? We can't make a news segment. That's too hard." And then by the end they were like, "Oh it wasn't that bad after all'. Yeah, yeah so I think that's why.

I: So it sounds like you must have given them some support along the way, to sort of take them from that initial feeling of wow this is overwhelming?

Clare: I really broke it down into steps for them as well. And I gave, [rather] put a big check list up in the classroom and I said, "**If ever you're feeling lost, go and look at the checklist and see**, okay have I done that yet?" I tried to put it in steps for them. We came up with the steps like together. (Emphasis added; Interview 1, Section 1)

Accordingly, the notion of alignment was seen to assist in creating a challenging but supportive environment as students engaged in classroom assessments. Flexible tasks which were aligned to students' needs and abilities with the provision of appropriate support were perceived to be an essential element of the learning environment.

Fostering positive learning dispositions: Fostering positive learning dispositions was seen by all the teachers to be facilitated by a focus on alignment. For instance, providing students with a clear understanding of task expectations and supporting documentation was seen to encourage greater autonomy, independence, responsibility or ownership according to three of the teachers (A, B, C). For example, Alice indicated that when students know what is expected of them and have the appropriate assessment tools, she can encourage them to take greater ownership of the task.

Alice: So I just put ownership on the students. Yeah, less reliance on me and less I'm still there just as much to help them through it but I wasn't you know like if you have a piece of writing and I'll go through and edit and put the spelling mistakes and that sort of thing in or go through like with their news reports they had to go through and fix up 'does it sound right'. (Interview 1, Section 1)

Bella also emphasised fostering positive learning dispositions but stressed a more extensive range of dispositions than her colleagues did. She referred to students needing dispositions such as self-belief, confidence, persistence, ownership, self-responsibility and independence. She indicated that when students knew what was expected of them and had the relevant task documentation it helped them to take more responsibility for their progress. Fostering positive learning dispositions was also emphasised by the other three teachers (D,E,F), although their focus was placed more on encouraging students to challenge themselves, apply what they had learned or to engage in metacognition. For example, Daisy referred to the importance of students being able to apply their knowledge "to different situations". Emily indicated that she considered it to be important that students have a rigorous learning environment so that they learn to "challenge themselves" rather than doing "the basic just to sort of to get by".

However, these three secondary teachers (D, E, F) were less explicit about how alignment and the assessment tools contributed to fostering those positive learning dispositions than the three primary teachers (A, B, C).

Findings indicated that students also perceived that a challenging and supportive learning environment was created through attention to alignment. This perception was conveyed by a group of students from Alice and Clare's classes during the class discussion. They indicated that the learning environment created during the project task was one in which they were able to be more autonomous and thus experienced greater trust. For the students, the sense of trust appears to be closely associated with the independence and responsibility they were given, particularly when using the video camera. Students indicated that the task was meaningful, flexible and gave them choice.

Student O: It [the project task] was more independent, like we could do it by ourselves. We could go into the withdrawal room and do it by ourselves. We could just do it by ourselves and when we finished just come back at the end.
I: Okay, so you had more independence on this task than others that you've done. What else was different on this task than others that you've done?
Student K: It was still the same because every time you do an assignment you get a task sheet but the only thing different than usual was that we used a video camera
I: Right so you still had a task sheet like you had before?
Student K: For every assignment
I: Right. Okay
Student J: The difference was using the video camera?
I: Using the video camera?
Student A: We got trusted to do stuff.
I: Was that an important thing?
Students: Yes (many students replied)
I: Yes, okay, Yes
Student P: With assignments, usually with assignments they tell you what to do but with this one you got to choose what to do. (Class discussion)

As highlighted in the excerpt from the class discussion, students also perceived that tasks that were aligned to their need for autonomy, choice and trust which contributed to positive learning dispositions.

In brief, a focus on alignment of curriculum, pedagogy and assessment in tasks which caters for students' needs and abilities was seen to assist teachers to foster student success. Fostering positive learning dispositions rather than spoon-feeding students − making them over-reliant on the teacher for direction, particularly in addressing more challenging aspects − or lowering standards to enable success was prioritised. Therefore, alignment was seen to assist teachers to create a challenging but supportive learning environment. Teachers' perceptions of alignment are summarised in Table 1.

Table 1

Summation of perceptions of alignment

	Perceptions	Identifying term
1	Alignment, assisted by planning assessment before teaching begins, helps mediate learning.	Front-ending assessment
2	Alignment is strengthened through explicitness in task documentation	Task explicitness
3	Alignment supports more rigorous use of ICT in assessment tasks	Aligned ICT use for rigour
4	Alignment helps create a challenging but supportive environment in which positive learning dispositions and success is encouraged for all students	Positive climate

DISCUSSION

Front-ending assessment (Perception 1): The teachers in this study hold the view that alignment of assessment with teaching and learning assists in mediating achievement of learning outcomes in assessment. In addition, alignment can be strengthened by front-ending assessment, that is, by planning assessment first and then organising teaching and learning activities to support achievement of the learning outcomes. There is limited previous research related to teachers' perceptions of the importance of alignment in an ICT enhanced middle years assessment task. Earlier independent studies related to the use of alignment in assessment have generally focused on alignment to high stakes testing (McMillan, 2003; Mitchell, 1999) thereby offering limited comparison to the findings from this study. For example, the latter study was a quantitative study that focused on standardised tests which more closely resembled the "teaching to the test" approach rather than "front-ending assessment" in the context of criteria-referenced assessment. Thus, findings from the study extend understandings of alignment. Nevertheless, it is useful to compare findings from other studies that have some aspects in common, particularly where there are contrasting results. For instance, one study that investigated teachers' implementation of alignment did not explore teachers' perceptions of alignment but did investigate where there was alignment in the program. The study reported that alignment was not optimised by elementary education teachers of physical education due to a lack of inclusion of criterion-referenced assessment (James, 2003). Thus, findings from this present study in which criteria and standards were integral to assessment expands our knowledge base of teachers' perceptions of aspects of alignment that assist in creating quality assessment practices.

Task explicitness (Perception 2): The teachers perceived that alignment was strengthened through explicitness in the task documentation. The task, including its criteria and standards, was seen to be a useful device for strengthening alignment. This finding corroborates that of an earlier study which highlighted the importance of clear articulation and transparency of assessment criteria to support the work of the teachers and students' understanding of

expectations (Lizotte, Harris, McNeill, Marx, & Krajcik, 2003). However, teachers in this present study further emphasised the benefits of a range of elements being made explicit in the task documentation to support alignment. For example, teachers referred to including a model or guide for what students should include in their reports. This suggests that making assessment requirements more explicit in the task documentation and using that information to support student achievement can strengthen alignment.

Aligned ICT use for rigour (Perception 3): Alignment supports more rigorous use of ICT in assessment tasks. This finding is insightful as there is a limited basis for comparison of teachers' perceptions of establishing alignment in assessment that uses ICT. The need for research in this area has been highlighted in the literature (Chadbourne, Kershaw, Leadbetter, & McMahon, 2006; McCormick, 2004). Although no attempt to ascertain teachers' perceptions of alignment when using ICT in assessment tasks was undertaken in the study by Chadbourne et al, findings provide an interesting point of contrast to the present study. Their study compared the results of two middle years open-ended tasks in both digital and print modes. The study reported that a focus on academic rigour resulted in both tasks displaying elements of high intellectual quality. However, academic rigour was not optimised in the digital mode. Findings from this present study provide further insight as they suggest that a focus on alignment could enhance academic rigour when integrating ICT in assessment.

Positive climate (Perception 4): Alignment helps create a challenging but supportive environment in which positive learning dispositions and success is encouraged for all students. This finding lends support to previous research which highlighted the importance of intellectual demand for all students, not just those who are more academically capable (Newmann, Bryk, & Nagaoka, 2001). Findings also align, in part to an international study which reported that teacher beliefs about learning, how they determine student needs and use these to improve student learning, underpins their ability to enhance their AfL practice (Black & Wiliam, 1998). However, this present study also highlights an approach to supporting all students to succeed without having to turn to interventions that do not foster positive learning dispositions. For example, a previous study of teachers' assessment decision making reported that teachers believed in using various strategies to help students be successful, sometimes including strategies that did not foster positive learning dispositions (McMillan, 2003). These types of strategies included allowing students to veto certain types of questions that they felt incapable of responding to, creating multiple forms of tests and in less extreme cases giving extra credit or earning points for trying. In contrast, teachers in this present study perceived that teaching interventions need to focus on supporting students to achieve high standards through clarifying expectations and adjusting pedagogy to support students to achieve those standards. Strategies highlighted in this present study include drawing on students' interests, using flexible tasks, making learning and assessment relevant, and adjusting pedagogy according to students' needs.

Teachers' attention to careful planning might, in part, explain their perception of the effectiveness of alignment for enhancing assessment practices. Careful planning involved developing assessment tasks in which goals, desired student learning outcomes, student needs, and teaching interventions are aligned. Consequently, careful planning assisted in the development of a high quality assessment task which contributed to the quality of the learning experiences and environment. Teachers emphasised ensuring students understood what was expected of them and the steps they needed to take to achieve successful outcomes. The quality learning experiences which stemmed from the task reinforced the learning and the assessment provided authentic and flexible opportunities for demonstrating achievement.

The approach taken by teachers extends on Biggs' (2003) four steps to implementing alignment. His system of alignment (see Table 2, Column 1) was primarily focused on improving instruction and student learning in a higher educational setting. Findings from this present study suggest that implementation of alignment in middle schooling classroom assessments might be enhanced by the explicit inclusion of four additional steps to those Biggs outlined. My revised version of the steps is included in Table 2, Column 2.

Table 2.

Guide to implementing alignment in middle years classrooms

	Alignment (Biggs, 2003)	Alignment in middle years classrooms
1	Defining the DLOs	Defining the DLOs, identifying the criteria and standards.
2		Planning assessment tasks that are challenging, flexible and in line with student abilities, needs and interests.
3		Develop the criteria and standards with the students.
4	Choosing teaching/learning activities likely to lead to the DLOs.	Choosing teaching/learning activities likely to lead to the DLOs.
5		Providing an example, modelling, and adjusting pedagogy to student abilities, needs and interests to optimise their opportunity to achieve high standards.
6	Assessing students' actual learning outcomes to see how well they match what was intended	Assessing students' actual learning outcomes to see how well they match what was intended.
7	Arriving at a final grade.	Arriving at a final grade.
8		Informing students of how to improve their performance.

The addition of Step 2 in the guide (see Table 2, Column 2), which emphasises careful planning, resulted from the emphasis teachers placed on planning assessment tasks that are challenging, flexible and in line with students' needs, abilities and interests. This planning proved to be an integral element of aligning curriculum, pedagogy and assessment. Careful planning and front-ending assessment also enabled teachers to make the use of ICT integral to the task and aligned to the steps students needed to take to achieve the learning outcomes. This process included using ICT for challenging task components that required higher order thinking. The inclusion of Step 3, which suggests developing the criteria and standards with the students, arose from the importance teachers placed on ensuring that the criteria and standards could be easily understood by the students and that it should be meaningful to them. Teachers also stressed the importance of encouraging positive learning dispositions, such as students taking ownership for their learning. Participating in developing the criteria and

standards would assist students to more effectively contribute to peer assessment and determine the quality of their own work.

The addition of Step 5 is needed because it highlights a particular approach to aligning teaching interventions with assessment. It emphasises the importance of modelling and providing examples for students. It also stresses the need for all students to be challenged at an appropriate level. These teaching strategies were seen to be important with ICT components of the task as well as with other activities. The addition of Step 8 is needed to highlight the importance of completing the assessment cycle by ensuring students are informed of how to improve their performance. Thus, the additional four steps enhance Biggs' (2003) original guide by tailoring it to support implementation of alignment in middle years assessment tasks that incorporate the use of ICT.

CONCLUSION

This case study revealed a group of teachers' perceptions that alignment of curriculum and pedagogy with assessment helps create a challenging but supportive environment and supports more rigorous use of ICT in assessment. Furthermore, the study highlights the benefits that can be derived from front-ending assessment and making task requirements, criteria and standards explicit and meaningful to students. Findings would indicate that a productive approach to improving student engagement and achievement in assessment is to involve students more in the assessment process, fostering greater understanding of requirements and expectations. Results of this study extend understandings from a socio-cultural perspective of establishing alignment when using ICT in teaching, learning and assessment in the middle years. Limited previous research on alignment has mainly focused on implementation of alignment in higher educational settings, in the absence of criterion-referenced assessment or in high stakes testing environments (James, 2003; McCune & Hounsell, 2005; McMillan, 2003; Mitchell, 1999). The findings of this study are timely given global concerns about student disengagement and underachievement in the middle years. It provides insight into a plausible avenue for enhancing assessment practices in the middle years through a focus on establishing alignment and making the use of ICT integral to assessment. Results enabled the development of an eight-step guide to implementing alignment that could inform the design of middle years of schooling professional development programs and future research.

REFERENCES

Assessment Reform Group. (2002). *Testing, motivation and learning.* Cambridge: Cambridge University Faculty of Education, Assessment Reform Group.

Biggs, J. (1996). Enhancing teaching through constructive alignment. *Higher Education, 32*(3), 347-364.

Biggs, J. (2002). *Aligning the curriculum to promote good learning presentation.* Paper presented at the Constructive Alignment in Action: An Imaginative Curriculum Symposium, Centre Point Conference Centre, London. Retrieved July 17, 2009, from http://www.palatine.ac.uk/files/1023.pdf

Biggs, J. (2003). *Aligning teaching and assessing to course objectives, paper presented at the International Conference on Teaching and Learning in Higher Education: New Trends and Innovations*. Retrieved May 3, 2006, from http://event.ua.pt/iched/main/invcom/p182.pdf

Black, P., Harrison, C., Lee, C., Marshall, B., & Wiliam, D. (2003). *Assessment for learning: Putting it into practice.* Maidenhead, Berkshire: Open University Press.

Black, P., & Wiliam, D. (1998). Inside the black box: Raising standards Through classroom assessment. *Phi Delta Kappan, 80*(2), 139-144.

Chadbourne, R., Kershaw, P., Leadbetter, B., & McMahon, R. (2006). ICT and academic rigour in middle schools: An Australian case study. *Meridian Middle School Computer Technologies Journal, 9*(1), 1-4.

Ertmer, P., (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development, 53*(4)25-39.

Flick, U. (1998). *An introduction to qualitative research: Theory, method and applications*. London: Sage.

Hill, P., & Russell, V. (1999). Systemic, whole-school reform of the middle years of schooling. In R. J. Bosker, B. P. M. Creemers & S. Stringfield (Eds.), *Enhancing educational excellence, equity and efficiency: Evidence from evaluations of systems and schools in change.* Dortrecht: Kluwer Academic Publishers.

James, A. (2003). *Elementary physical education teachers' and students' perceptions of instructional alignment.* Unpublished Doctoral Dissertation, University of Massachusetts, Amherst. Retrieved May 18, 2006, from ProQuest dissertations and theses database.

Jonassen, D. (2000). *Computers as mindtools for schools: Engaging critical thinking* (2nd ed.). New Jersey: Prentice-Hall.

Lingard, B., Ladwig, J., Mills, M., Bahr, M., Chant, D., & Warry, M. (2001). *The Queensland school reform longitudinal study*. Brisbane: The State of Queensland (Department of Education).

Lizotte, D., McNeill, C., Marx, R., & Krajcik, J. (2003). *Usable assessments aligned with curriculum materials: Measuring explanation as a scientific way of knowing*. Paper presented at the Annual meeting of the American Educational Research Association., Chicago, IL. Retrieved September 1, 2008, from http://hi-ce.org/AERA2003/docs/Lizotte_rubrics_AERA2003.pdf

McCormick, R. (2004). ICT and pupil assessment. *Curriculum Journal, 15*(2), 115-137.

McCune, V., & Hounsell, D. (2005). The development of students' ways of thinking and practising in three final-year biology courses. *Higher Education, 49*(3), 255-289.

McMillan, J. (2003). Understanding and improving teachers' classroom assessment: Implications for theory and practice. *Educational Measurement: Issues and practice, 22*(4), 34-43. Retrieved May 9, 2006, from ProQuest 5000 International database.

Marzano, R., Pickering, D., & McTighe, J. (1993). *Assessing student outcomes: Performance assessment using the dimensions of learning model.* Aurora, CO.: Mid-Continental Regional Educational Lab.

Merriam, S. (1988). *Case study research in education : A qualitative approach* (1st ed.). San Francisco, Calif.: Jossey-Bass.

Miles, M., & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks: Sage.

Mitchell, F. (1999). *All students can learn: Effects of curriculum alignment on the mathematics achievement of third-grade students.* Paper presented at the Annual meeting of the American Educational Association, Montreal, Canada.

Moreland, J., & Jones, A. (2000). Emerging assessment practices in an emergent curriculum: Implications for technology. *International Journal of Technology and Design Education, 10*, 283-305.

Newmann, F., Bryk, A., & Nagaoka, J. (2001). *Authentic intellectual work and standardized tests: Conflict or coexistence? Improving Chicago's schools.* Illinois: Consortium on Chicago School Research.

Roschelle, J., Pea, R., Hoadley, C., Gordin, D., & Means, B. (2000). Changing how and what children learn in school with computer-based technologies. *The Future of Children, 10*(2), 76-101.

Schacter, J., & Fagnano, C. (1999). Does computer technology improve student learning and achievement? How, when, and under what conditions? *Educational Computing Research, 20*, 329-343.

Spady, W. (1994). Outcome-Based Education: Critical Issues and Answers.

Stake, R. (1995). *The art of case study research*. Thousand Oaks: Sage Publications.

Teasley, S. & Roschelle, J. (1993). Constructing a joint problem space: The computer as a tool for sharing knowledge. In S. Lajoie & S. Derry (Eds.), *Computers as cognitive tools*. Hillsdale, Lawrence Erlbaum Associates, New Jersey.

Vygotsky, L. (1978). *Mind in society.* Cambridge, MA: Harvard University Press.

Wegerif, R., & Dawes, L. (2004). *Thinking and learning with ICT: Raising achievement in primary classrooms*. New York: Routledge Falmer.