HIGHER EDUCATION HORIZONS

Publishing Higher Degree Research

Making the Transition from Student to Researcher

Janice Orrell and David D. Curtis (Eds.)

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Edited by

Janice Orrell and David D. Curtis
School of Education, Flinders University, Australia

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SERIES INTRODUCTION

Higher Education Horizons

This series explores the current volatile context of higher education and examines ways that the higher education sector is responding to and driving these changes. The books in this series tackle challenges facing the sector and question the goals and strategies that researchers, educators and theorists are creating to address these challenges. They explore trends in stakeholder expectations, and evolving pedagogies and different horizons existing and emerging in higher education. The authors in this series bring a wealth of academic practice wisdom and experience to examine these issues. They share their practice knowledge, report research into strategies that address these challenges, and raise yet more questions. Through the conversations in this book readers can enter into the debates, visions and experiences of the agents of higher education.

Joy Higgs
The Education For Practice Institute

PREFACE

This book is the product of research in a School of Education that has well over 100 higher degree research students with highly diverse ethnic and cultural origins. The research found that graduates are catalysts for further students from their region to join the School to take up higher degree research, and that despite participating in interpersonal and intellectual engagement in regular seminars with other students and academic staff, many international students returned home never to publish their work. Each new wave of students often posed research questions similar to those already addressed by previous students, with little opportunity to build on this prior research merely because it had not been published beyond the thesis.

In recognition of this gap in practice, all recent graduates and current higher degree students were invited to submit a chapter on some aspect of their higher degree research, with their supervisors as co-authors. At the same time, they were invited to reflect on the process of becoming a published researcher and what it meant for them. A core sentiment is captured at the beginning of each chapter and the students' extended reflections form the basis of an exploration of the transition from student to researcher through publication of their chapter.

This book serves two distinct purposes. First, it gives higher degree research students and graduates an opportunity to present their research as a succinct chapter – a form quite different from the thesis they have written or are writing. It gives them an audience and presents their work to that audience in a more readily accessible form. The act of publication poses new challenges for the authors. Yet again, they must interact with their supervisors as mentors and co-authors, and make decisions about aspects of their research that warrant attention. Inevitably, this means omitting issues that have been important aspects of their thinking – yet another phase of challenge in their emergence as researchers. Second, the book gives editors and readers an opportunity to reflect on the transition from higher degree research student to researcher, and examine the pedagogy of higher degree research supervision. By exploring the transition, we reflect on the "product" – the accomplished graduate – as well as the process, and ask what we can do to facilitate the transition, and how we can do that most effectively and efficiently.

The first two chapters argue that adopting the notion of higher degrees as research training requires a new pedagogy of higher degree supervision. They seek to locate publication by higher degree students within the program to ensure that higher degree research, in addition to generating new knowledge and new insights, develops a wide range of high-level skills that graduates subsequently apply in the roles they pursue after graduation. Joy Higgs draws attention to the critical role of writing as an act of exploration and the vehicle through which findings are shared with a community of scholars for information and critique. She locates higher degree research as research training designed to prepare graduates for "…future complex and unpredictable situations". This preparation requires a model of mentoring that "liberates" students in their journeys from novice and dependent to accomplished and independent researchers.

The transition from graduate student to independent researcher entails change along several dimensions, which Orrell and Curtis track through an analysis of higher degree research students' and graduates' reflections on their research journeys; journeys that challenge individuals' self-concepts and identities. New identities and new conceptions of self emerge. A common experience is commencement of a higher degree research program with a clear objective driven by a strong personal commitment to improvement and an expectation of pursuing a particular line of investigation. Challenges arise as students interact with their supervisors and the literature of their chosen fields. They are encouraged to reconceptualise the issue they have chosen to investigate; a process requiring self-reflection and evaluation, and taking a critical stance in relation to the literature and their own conceptions of their chosen area of research.

These two introductory chapters provide an understanding of the context for the production of the next 14 chapters, which are testament to the students' transition process. Chapters 3-5, which explore "Learning with technology", locate different technologies in the values and requirements of the groups with which they are used rather than with their characteristics. Chapters 6-9, addressing "Professional learning and practice", illustrate that despite research contexts as diverse as rural teaching in Lesotho and skills development for mining technicians, professional learning has common drivers. Dialogue features prominently, as do commitment to learning and the impact of policy on formal training. In chapters 10-12, which explore "Student learning", the variety of different perspectives about what factors influence learning – from language learning strategies to problem solving theories to the affective dimensions of learning – emphasise the individuality of the learning process. The final section, "Curriculum change", demonstrates innovation as a characteristic of developing education systems. Chapters 13-16 explore attempts to improve curricula in diverse settings in Indonesia and Rwanda. An initiative to improve prospective teachers' English language skills as a way of improving the quality of teaching Mathematics and Science in English is investigated. The importance of generic skills and competence, balanced with local requirements, is discussed in terms of educational quality improvement, while working with, and around, government-decreed curriculum innovation is also examined.

We commend the contributions of the authors to future researchers in the expectation that future research will build on the findings reported here. The breadth of the research represents the diverse concerns of researchers who have embarked on a higher degree research journey with the aim of improving education delivery and outcomes through investigating and understanding everyday practice issues.

Janice Orrell and David D. Curtis

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SECTION 1: PUBLISHING HIGHER DEGREE RESEARCH

JOY HIGGS

1. RESEARCH TRAINING AND PUBLISHING

A Partnership Approach to Liberating Scholarship

Doctoral research programs have several core purposes. In many places these programs are labelled "research training" because it is through them that future researchers who are capable of independent and team research contributions are trained. Graduates from research programs enter a new realm of research participation that builds their performance capacity and that of the institutions, professional communities and societies that supported their training, and provide spaces for their postdoctoral research and work. Next, doctoral programs are places where research is performed with every expectation that significant benefits will be produced, particularly the addition of new knowledge to the field, and direct benefits to practice or recommendations for others to implement in practice. A key means to achieving many of these outcomes is the sharing of research findings. Researchers are accountable to those who fund, support and participate in research to publish and disseminate their findings.

This chapter focuses on the connection between doctoral training programs and building capacity for publishing. This can be viewed as the research candidate learning to be a scholar and learning how to publish as well as the research program embedding publishing of research findings within, and arising from, the doctoral research candidature. Scholarship (as capacity and research outcome) can be liberated through partnerships inherent in doctoral programs, including supervisor(s)/candidate interactions and peer collaborations among doctoral candidates. Scholarship is also a liberating process in that beyond publications being seen as records and artefacts of research, they are also conversations and negotiations among co-authors and critical friends. Further publications are launching points, through the review phase and after publication, for wider academic communities' critique and discussion of the research and knowledge claims. Finally, publications are a means of liberating change in the knowledge and practice spaces they illuminate.

To illustrate these arguments, I have structured this chapter around two partnership approaches to liberating scholarship with doctoral students. During the past 30 years I have supervised to completion 40 postgraduate research students. Throughout this journey, I have evolved an approach to supervision that includes writing as a core ingredient (Higgs, 2006). This approach is built firstly on my own doctoral research (Higgs, 1989, 1993), which examined the partnerships that can be

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fostered between research students and their supervisors, and secondly on what I have learned from experiences, critical reflections, and conversations with my students and research supervision partners. This learning has resulted in the iterative development of a model of liberating program systems for research candidatures (see Higgs, 1999, 2011), that is presented below in relation to research candidatures and liberating scholarship.

The second liberating approach to scholarship involves the publication of books with current and recently graduated research candidates, both my own students and other early career researchers who are part of my working and academic networks. In the second part of the chapter, I explore the strategies adopted within this partnership and team building endeavour.

LIBERATING RESEARCH CANDIDATURES

The *liberating program system model* (Higgs, 1989) is based on four core arguments and theoretical perspectives:

- Postgraduate research students enter their research candidatures with different levels of readiness for the research challenges that await them, including publishing. Learners (in this case doctoral candidates who are early career researchers or emerging researchers) can have different capabilities across different tasks and situations within their doctoral research and publishing. I developed the term *learner task maturity* (Higgs, 1989) to refer to:

  > the learner or novice's capability and readiness at given times and situations to learn, grow and deal within the demands of their learning arena, such as research tasks and learning to do academic writing. This term recognises that novices not only have different abilities (in comparison to other novices) but also different abilities (within themselves) across different situations, and different levels of confidence with particular tasks and different context challenges.

- Roles like teaching, mentoring and supervision ideally involve flexible adjustment to the novice's ability and needs, both in general and in relation to specific tasks (and the learner's task maturity). This argument is built on situational leadership theory (see Hersey & Blanchard, 1993).
- Learning programs can be thought of as *open systems*. Coming from systems theory, the notion of open systems provides for interactive subsystems or agents working interactively to achieve collaborative goals. In research mentoring situations, this involves pursuing a co-management strategy between research mentor and novice. Ideally they co-manage the mentoring process through negotiation, communication and shared responsibilities. To be successful and liberating, the facilitated or co-managed system for research mentoring needs to be dynamic and individual, adapting to changing task demands, contingency factors, and the novice's changing perceptions and goals.

- Learning programs (like research training) that aim to build independence, confidence, and capabilities for future complex and unpredictable situations need to incorporate a range of approaches to help students learn under guidance as well as through self-direction. This requires a blend of teacher/mentor management and learner/novice management of learning situations. Achieving these goals requires a dialectic liberating system (Higgs, 1989) that blends *freedom* for the novice to explore and take risks with the *control* or structure provided by the mentor, and increasingly by the novice through the use of scaffolding methodological and conceptual frameworks.

Structure can be provided (by supervisors) and pursued (by students) in research training through contracting activities such as negotiating, advising and collaborating on the development of the student's research proposal. It involves planning schedules and timelines, and regularly reviewing and presenting the student's work for critique and feedback. The community of research practice, such as a group of supervisors, other researchers, visiting scholars and the students, also helps to scaffold the student's research by creating expectations, norms, shared language and research cultures. Such communities frequently share research paradigms (see Higgs, Trede, & Rothwell, 2007) and thus induct novices into the community through peripheral participation, moving to core participation, and from entry skills and knowledge to increasing levels of ability. Writing in ways that match the research strategy, and framing justifiable research questions and approaches are also valuable scaffolding strategies (Trede & Higgs, 2009).

Freedom can be facilitated and sought by allowing and pursuing risk-taking, by learning about the learner's capabilities and matching task demands and goals to these capabilities, by self-directed learning and reflection to consider what the student wants to achieve, and by seeking help when needed. Freedom as liberation of ideas and choice of strategies, even construction of new research strategies, is an important part of the "stretch" of students in research training programs. To become independent and to earn a doctoral award, a student needs to demonstrate that the thesis produced is the product of their work. Liberation is necessary to claim such achievements. Liberation of ideas, and the confidence that flows from such success and raised awareness, are inherent and vital to successful doctoral training. If we distinguish scholarship as academic writing and communication from the research process of producing knowledge, then scholarship is both a part of research and a means of communicating it. This book is the product of scholarship and research. This chapter provides a way of realising research and scholarship as training and achievement.

The *liberating program system model* presented here incorporates four broad approaches to mentoring (Higgs, 1989). These freedom-control blended approaches can be utilised to promote novice researchers' growing research and scholarship capability, and to respond flexibly to students' current learning and mentoring needs. The approaches are described below (with examples of how they can promote scholarship ability), then incorporated into the model in Figure 1.1. Each approach has two titles, which reflect the perspectives of the mentor and the novice.

Approach (a) Mentor-managed open-ended inquiry
Novice pursuit of guided risk-taking and experimentation

The situation:	Learner task maturity (experience and capability) is low due to lack of experience/capability/familiarity with the task. The task has limited structure, is non-prescriptive, open-ended.
Mentoring style:	Provide guidance but promote open-ended inquiry.
Novice response:	Being liberated/encouraged to take risks, comfortable to be adventurous, feeling free to experiment. Pursuing multiple ideas and strategies without pressure to find a particular answer or reach imminent deadlines.
Writing example:	Students are asked to bring a range of papers they enjoyed reading to discuss in group why they liked the writing style.

Approach (b) Mentor-managed structured challenge
Active novice pursuit of goals and quality

The situation:	Learner task maturity (experience and capability) is low due to lack of experience/capability/familiarity with the difficult task.
Mentoring style:	The mentor provides a clear framework to promote focus and structure, guides/assists with decision making and task framing, and encourages the novice to work independently within the boundaries/scaffold provided.
Novice response:	The novice actively pursues the goals and is task-focused. The quality of the work is a particular, strong consideration. Limited risks are taken. Learners are "on-task". Deadlines are important.
Writing example:	Students asked to present their draft findings to other research students and supervisors in a student workshop. Mentor organised a master class on writing for publication.

Approach (c) Novice-managed organised challenge
Novice pursuit of focused inquiry and goal pursuit/attainment

The situation:	Learner task maturity (experience and capability) is high due to greater experience/capability/familiarity and confidence with the task.
Mentoring style:	Learners/novices are encouraged to identify and articulate the goals, structure and boundaries of their task, and then pursue the task independently of their mentor.

Novice response: Novices rise to the (high) challenge of the task within their clearly constructed framework and actively pursue focused inquiry and goal attainment. The focus is on search for meaning.

Writing example: Students as a team prepare a writing group where they share written drafts of papers for feedback by peers and invited academics.

Approach (d) Novice-managed open-ended inquiry
Novice pursuit of independent exploration and reflection

The situation: Learner task maturity (experience and capability) is high due to high degree of self-confidence and experience/capability/familiarity with the task. The task is non-prescriptive, open-ended and non-threatening without imminent deadlines.

Mentoring style: The mentor leaves the novice to set goals and construct boundaries independently.

Novice response: Novices pursue independent exploration and reflection in an open-ended and time-rich manner. They can adjust boundaries and timelines as they pursue deeper understanding and meaning making.

Writing example: Research students, after a number of writing experiences, aim to submit a paper to a high ranked international journal. They investigate journal options and relevance, seek critique before submission and learn to deal with peer review.

Looking at each of these approaches in relation to their position in the model (Figure 1.1), it can be seen that approaches (a) and (b) are advocated when the learner's task maturity (LTM) is low. Importantly, low LTM is not a phase that occurs only early in the candidature; later year candidates also encounter tasks (such as presentation at an international conference) that they have not encountered before, and they frequently benefit from extra mentoring and support. By comparison, approaches (c) and (d) can be adopted when LTM is high.

Approaches (b) and (c) occur in situations of high task demand and respond better to increased structure. Where the LTM is low, this structure is usefully provided by the mentor. Where the LTM is high, students can, and ideally, do, provide their own increased structure and focus; they are more goal-directed and less exploratory. When the demand of the research task is low, greater freedom (and less structure) is feasible and desirable. Approaches (a) and (d) are used in these circumstances, matching mentor management to low LTM and student management to high LTM.

The focus of this section on liberating research candidatures was on the research candidature as a place for training, which includes helping students to write for publication of their theses as well as papers and chapters. While different disciplines and professions have different cultural norms in relation to authorship

of publications, and different countries and institutions range in their expectations concerning whether publication is required or optional during the candidature, some key points are relevant. First, writing is a learning process and a way of shaping research arguments. Students develop their theses by writing them, rather than having everything clear in their head and writing it down like transcribing a lecture after the research is finished. So, writing should be encouraged as a way of meaning making, not just an end (task). While theses are typically required of research candidates, journal papers or chapters that help the research argument develop or the student polish their academic writing ability clearly help both the process and outcome of the research candidature.

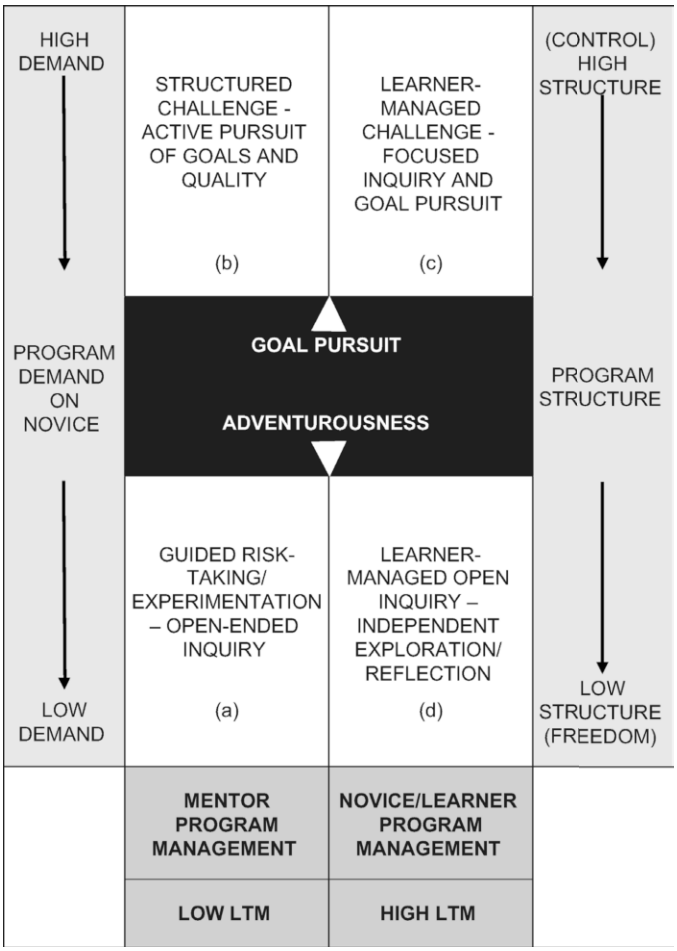

Figure 1.1. Model for liberating program systems

Second, writing for publication is an act of sharing intellectual property with the wider academic and practice communities. As such, a key element is to recognise, through attributed authorship, where shared endeavour has occurred in relation to ideas development and writing of the work. In my experience, this outcome is usually achieved by the research candidate being the first author and supervisors who have contributed to the paper being subsequent authors. In the preceding pages, there are many links to this idea of the candidature in general and writing linked to the candidature being a partnership. Writing partnerships involve overt, contextualised and empowered decision making.

BUILDING WRITING ABILITY AND WRITING TEAMS

A key aspect of the current research training era (such as with the Research Training Scheme for postgraduate research students in Australia) is that there has been a shift from PhDs involving individual students being supervised in isolation from other students to situations where teams of students and supervisors create a community of research practice. Apart from writing directly from the thesis during and after completion of the doctoral candidature, it is desirable to consider research and scholarship training and mentoring as an ongoing journey flowing into postdoctoral work, early career research phases and on to advanced performance, mentoring and leadership in scholarship. In this section I present three examples of strategies to foster the ongoing building of writing ability and teamwork: "join the book authorship team", "writing up" and "writing retreats". Each of these has dimensions of liberating scholarship and partnerships.

I am currently completing my thirty-third academic book. Of the over 400 authors who wrote chapters in these books, many were my doctoral students, doctoral graduates, junior staff members and researchers in my work teams, and research colleagues. Three book series are part of this book collection. In saying these things I am illustrating my belief in building teams and mentoring emerging researchers through inviting them to be part of scholarly projects. My two current series with Sense Publishers in the Netherlands are "Practice, Education, Work and Society" and "Higher Education Horizons". This book is part of the second series.

Join the Book Authoring Team

One of the advantages of writing a book instead of a single journal paper is the creative process of producing the whole-of-book message and the capacity to draw a team together to produce a marketable product that people want to buy (see Higgs & Ajjawi, 2009). Book purchasers want to buy a work that is interesting or useful, which is why book planners (editors or authors) need to consider all of the following factors. The book will need a content scaffold, a large purpose and message, and an organisational framework. Within the book structure, the book editors also need to make choices about voices, messages and content they want to feature, and whether these will generate, critique or be directed by the overall theme. Another decision is whether this is a book written by highly experienced scholars and/or whether there is a place for emerging research, an opportunity for

novices to grow into the demands of book writing and production, and a place for conversations involving practitioners and questioners as well as polished writing.

This book provides such an opportunity for inviting doctoral students nearing completion or recently completed to write about their theses and, at the same time, reflect on their theses experiences. Some of this is reported in the next chapter. Each voice and book chapter contributes to the book's overall message – the place of publication in doctoral research training.

An example of books produced by my teams is the third edition of *Clinical reasoning in the health professions* (Higgs et al., 2008). This international book featured leading researchers and authors in this field from around the world and spanned key health professions. On the face of it, this was a daunting book to draw doctoral students and recent graduates into. Their research was on the cutting edge of the field; it had something important to say, extending understanding of the phenomenon beyond the status quo. Their research candidatures had involved intensive training in writing their theses and publications, so they were ready to write at an advanced level. Their work had been presented for critical feedback at national and international conferences, so they had confidence that their research had merit and their research arguments/theses were strong and credible. As a result, they entered this strong international field of returning authors as valued and capable members of the team. Two of the editors were derived from the PhD contingent; one two years post graduation and the other about to submit. As well as joining the ranks of experienced authors, they admirably met the extra challenge of editing. The book provided an excellent opportunity for a liberating structure that featured a mentor-structured challenge while empowering the emerging scholars to co-create the writing targets and actively pursue the joint writing goals.

"Writing Up" and Sometimes Writing Out of Our Comfort Zone

In paper and chapter writing, there are times when liberation, in terms of helping emerging scholars rise to the next level of challenge, is just what is needed. Following their early scholarship *highs* (successful publications) and dealing with the *lows* (harsh critiques, rejections) of publishing, what is needed for these emerging scholars to take the next step? "Writing up" is one of the strategies that assists these people who are ready for the next challenge. It can take the form of pairing an emerging writer with a highly experienced writer. By co-authoring, the novice can learn from the expert. The expert typically benefits also. In the following example, Rola Ajjawi, who graduated in 2006, contributed significantly from her doctoral journey and writing, and also learned a great deal from writing with Angie Titchen, a very experienced author, to produce *Writing contemporary ontological and epistemological questions about practice* (Titchen & Ajjawi, 2010). Another example in this mentoring approach is to invite people who have not written together before and perhaps do not know each other to co-author. This can benefit the publication by having competing viewpoints brought together in dialogue or asking people from different disciplines to write about a topic from their different discipline backgrounds. A delightful example of this was when two

exceptionally creative and courageous writers met for the first time to write in a book about multiple perspectives on professional practice. Their writing synergies led them to produce an exquisite chapter called *Finding the fifth player: Artistry in professional practice* (Andresen & Fredericks, 2001).

Writing Retreats

Writing retreats can be magical, but require considerable work in orchestrating writing synergies and inspirations. For current and recent research students as well as supervisors and experienced scholars, they provide the opportunity for time out from regular work (preferably with phones and Internet turned off to avoid work interruptions) and opportunities for intense engagement with writing. This could be a mix of quiet writing time, collaborative writing (pairs and teams), think tanks, and debates to shape ideas and structure writing tasks (papers, chapters, books) or student thesis writing and training. An example of such retreats is as follows.

Two doctoral supervisors and eight doctoral students headed off for five days to a retreat venue in the New South Wales Southern Highlands. Well away from other people in a lovely bushland retreat, each student gave presentations on their thesis writing and research to the group and spent time writing their theses, sometimes in the shared lounge area or on a shady veranda, in the garden or a small open picnic building. The value for each person was immeasurable. They achieved epiphanies and quantum leaps in understanding, and overcame writers' block.

CELEBRATIONS AND CREATIVITY

Writing for publication can be very challenging. It can bring disappointments and angst. I end this chapter by encouraging writers and those who are mentoring emerging writers to take time to enjoy the creative process and to celebrate writing achievements. To learn more about this, I invite you to read our reflections on *Celebrating writing* (Grace et al., 2009) and to read how five inspired and inspiring graduates wrote about their doctoral journeys in: *Journeys from philosophy and theory to action and back again: Being critical and creative in research design and action* (Higgs, Trede, Ajjawi et al., 2007). In the end, we have liberated valuable writing, and liberated research and practice through taking on the challenges and opportunities presented by academic writing and writing partnerships.

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Joy Higgs AM PFHEA PhD
The Education For Practice Institute
Charles Sturt University, Australia

JANICE ORRELL AND DAVID D. CURTIS

2. TRANSFORMING IDENTITIES

From Students and Reformers to Researchers

This chapter considers the place of publication of research in higher degree training programs. The following chapters in this book are the result of an exploration of what transformative processes might be entailed in higher degree research supervision and education to assist candidates to make a transition in identity and practice from being a student to being a researcher. This transition is examined from two perspectives. The first is a reflection on this transition of the higher degree students and graduates who are the first authors in the subsequent chapters in this book. The second perspective arises from contemporary scholars researching and theorising the impact of common and innovative approaches to doctoral studies and doctoral education. These two perspectives form the basis of a discussion of the implications for the supervisor's role in supervision and training, and for a more deliberate and enabling doctoral pedagogy.

Entering into studies as a higher degree candidate marks the commencement of a lengthy and transforming process. A candidate's identity as a student undertaking a higher degree is replete with novel connotations and identity challenges. In their new role, higher degree students are cognisant of expectations of them to undertake largely unfamiliar tasks, namely, to pose astute research questions that will challenge the status quo and the taken-for-granted understandings of some aspect of the world and its people, and to execute a systematic and scholarly inquiry to address them. At the same time, they will be required to establish a relationship with research supervisors. In the best circumstances, over time this relationship changes from one of a guiding research mentor and novice to one of collegial partnership that is often expressed in shared authorship in the dissemination of the research. The subsequent chapters in this book are examples of such a process. This incremental transition from student to independent researcher and scholar occurs in a context of personal, cultural and ethical challenges where there are few guideposts for the uninitiated and many influential, yet tacit, taken-for-granted assumptions. This chapter places the act of publication of the outcomes of higher degree research at the centre of its exploration of this transition from student to researcher.

As noted in the Preface, the first authors, who in all cases were higher degree candidates or graduates, were invited to reflect on their experiences of undertaking research and the process of becoming a published researcher to give some

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 13–22.

indication of what it meant for them, and to submit this reflection along with the chapters they produced with their supervisors. A core sentiment from these reflections is captured at the beginning of each chapter. In this chapter, we analyse these first authors' reflections and identify core themes to give some understanding of what changes occur as the students transition from student to researcher through the publication process. We relate this analysis to reports from research on higher degree students' learning and the supervisory practices involved in co-publishing with students. In the final section, we propose a tentative pedagogy for higher degree supervision that includes co-publication.

PUBLICATION IN PHD RESEARCH

Globally, research performance is a common primary measure for ranking universities. Governments and institutions are increasingly imposing minimal research performance standards by which to measure the research achievements of institutions, faculties and departments, and ultimately individual academics. Publication rates in high quality journals as well as research candidature completion rates are typically significant measures of research performance. In this climate, the agenda of higher degree participation and supervision is changing to include not only the completion of a thesis but also research publication within the term of candidature. Conceptually, this change in research candidature expectations expands and refocuses the supervisory role. No longer is it restricted to one of expert guidance related to a particular field of study with the aim of successful completion of a piece of research. Notwithstanding the importance of thesis completion, supervision is fast becoming a process of educating candidates to be enterprising researchers, which includes becoming successful future publishers of research (Johnson & Broda, 1996). This increased expectation of research publication within candidature is not a simple additional supervisory task. Rather, it constitutes a challenge to common, taken-for-granted assumptions regarding pedagogical and interpersonal practices within the supervisory role. These implications regarding the delineation and expansion of supervisory practices have become the focus of considerable scrutiny (Catterall et al., 2011; Grant et al., 2014; Thein & Beach, 2010). This research has found that the supervisory relationship between supervisor and student is significantly impacted by the higher degree research candidature experience, which is found to be replete with transitions and transformations, not only in terms of knowledge and skills gained, but also in identity formation that is deeply intrapersonal and interpersonal.

BECOMING A PUBLISHED RESEARCHER

The 14 first authors (PhD candidates and graduates) of the subsequent chapters reflected on the transitions and transformations they experienced as a result of their higher degree and publication experiences and the meaning they made from them. Unsurprisingly, these authors were from quite diverse backgrounds. Many were international students from developing nations. Importantly, in return for their scholarships, most were expected to publish their research findings before their

home institutions and sponsoring organisations would acknowledge their higher degree. Many of these candidates had to interrogate, overcome or reconsider cultural understandings in the interpretation and discussion of research findings. They were charged with a mission to help their developing nations answer pressing research questions and to establish themselves on return as research experts who could enable change.

In a discipline such as education, it is not uncommon to find that students enter higher degree candidature as mature, experienced practitioners who are highly knowledgeable experts in their own field of practice. Often, strong personal dispositions as reformers drive their participation in higher degree candidature. These candidates possess passionate and pre-emptive convictions about the answers to the pressing problems they intend to research. Such personal convictions can be impediments to exercising the kind of open-mindedness expected of researchers and their utilisation of appropriate academic discourse within the thesis and their publications.

The two conditions – unique cultural values and tacit wisdom of experience – are not mutually exclusive. Many international students are respected authorities in their home countries. Similar to mature, experienced local professionals, they come to higher degree research with deeply entrenched work-based practices, professional values and worldviews. The transformational challenge of the PhD process requires them all to reconsider their personal cultural values and to exercise academic scepticism regarding personal accumulated workplace wisdom. Both conditions represent challenges that demand personal, perceptual transformation in the journey from student to graduate researcher.

Four themes were observed within the first authors' reflective discourse. First, they reflected on their motivations for engaging in PhD research and publishing, and the outcomes those endeavours would achieve. Second, there were reflections on the centrality and importance of their supervisory relationship and its role in both the research and publishing. Third, there was an identification of specific skills they needed to develop and maintain to be successful in reporting and communicating their research through quality publication. Fourth, there were some expressions of concern regarding the maintenance of their newly attained knowledge and skills in research and publishing once their candidature was over and they returned, unsupervised, to their own context.

Motivations and Purposes for Research and Publishing

The first authors in the following chapters identified personal purposes and motivations for engaging in higher degree studies and accepting the invitation to publish. A key themes was the value of a PhD and research publication in helping to achieve the learning and personal changes needed to establish their academic credibility within education and for their career advancement.

> To transition from a student to a published researcher is a bit like stepping back from the "finish line" and having to re-run much of the race. The thesis is merely a measure by which you are granted a standing in the academic

> community. Knowledge that remains unknown or without use is simply information. (Arrowsmith)

There was a recognition in the reflections that becoming a published researcher did not emerge merely as a result of doing the PhD. For some, it was a long-held but distant, even unattainable, ambition.

> I felt that my ambition to be a real researcher through pursuing PhD was very high, like a rainbow in the sky. It is very beautiful but could not be reached. But, with the support from important people around me – particularly my supervisors, family, and friends – I could still stand on my feet on the journey. They motivated me when I felt down, and held me up when I was very weak. (Rasyid)

Prevalent in their reflections was a discourse of reformers motivated by a desire to embark upon a PhD research project that would enable them to contribute to change. It was apparent that some had, very early in their candidature, embraced the challenge of research dissemination, motivated by their change agenda.

> As a PhD candidate I have used social media, given conference and video presentations, and published in journals and edited books for that purpose. My intention is to enable dissemination of the opinions of the participants in order to promote discussion, which might lead to changes in policy and practice. (Townsend)

In doing so, a number of our PhD authors regarded themselves as reformers and change agents. Publishing for them took on a moral obligation to their communities and wider society. They moved from knowledge consumers to knowledge creators.

> Publishing my research opened a new chapter in my life. I had the opportunity … to communicate and share my research findings with people in the same or different field. I believed that through research I could help others, and I feel it is my social and academic responsibility to contribute to the development of my community. (Alfian)

In particular, and not surprisingly given the discipline in which the research was conducted, concerns were commonly expressed about the relationship between research and practice, and research and teaching. In this regard, research, including its publication, was considered a tool for transforming educational communities, practices and, in particular, teachers and teaching.

> Rwanda's vision towards rebuilding and developing a knowledge-based economy led to the provision of open access to education to all the population without any more discrimination. Through my own studies as a student and career as a teacher, I realised the critical role of education and educational research in realising this vision, and I felt a strong need to play my modest part in rebuilding the country. … This part of research process has indeed given me a meaningful lesson and assisted me to transform myself from a student to a researcher. (Ngendahayo)

Intrapersonal transformation was a key factor in these authors' reflections. They reflected that research participation and authorship impacted on their identity and self-worth.

> As an international student who comes from a non-English speaking country, growing and being a real researcher is really challenging. … During my candidature, there were times I felt strong and saw myself like a strong eagle who was able to explore the universe but at many times I felt just like a powerless newly-born chick that could do nothing. (Rasyid)

At the same time, authors reported developing multiple identities during their time as higher degree candidates, shifting from being a PhD student to a published author.

> My reflection on transforming from a student/researcher to a researcher/ publisher brings to mind an image of a tadpole metamorphosing into a frog. I feel at this moment my tail is shrinking and I am developing my hind legs. The water that once supported me – the guidance of my supervisors – will soon hold less significance as I move from the watery environment of being a student to land in my role as published researcher. (Le Lant)

At the core of this insight was a revisiting of their early aspirations and comparing these with what they had achieved in the process of the PhD and then being published.

> After I published my research and I read a lot of publications, I encouraged myself to do more research and now I am not only experienced in the academic field, but also I could clearly understand the power of research in changing the world. (Alfian)

The Supervisory Relationship

The changing nature of the authors' relationships with their supervisors was important to them. They described the incremental development of the relationship that went from high dependence, to mentoring, to independence and co-authorship.

> My supervisors challenged me to work more independently to build up my competency and confidence to be an independent researcher and a prospective knowledge creator. I am aware that this PhD terrain has shaped my academic competence, elevating my research skills and self-esteem. (Habiburrahim)

The relationship with their supervisors and the supervisory practices was also regarded as significant in terms of the ways it provided them with links to important academic and social networks.

> Doing research is a joint venture. Students need to push themselves to expand their knowledge, become more inquisitive, critical, and reflective. Supervisors, on the other hand, should push and challenge the students to

> become better thinkers and help them use their knowledge and skills to their advantage. … I benefitted from the intelligent questions from my supervisors and the support and guidance they gave me. (Masakale)

Developing Skills for Research and Publishing

The PhD candidate and graduate authors in this book identified skills they believed they needed to achieve their goals. Central to their reflection on the new skills they needed to develop was the capacity to write in ways that would enable them to communicate with academic audiences, policymakers and practitioners. They regarded practitioners as their most significant audience because they held a common belief that their PhD research could have the most useful impact on their fellow practitioners. In saying this, they recognised the notion of audience and the complexity inherent in their audiences' diverse interests. There was considerable reflection on the challenge of having to reframe the content of their thesis to communicate to diverse audiences. This entailed knowing the purposes of their writing in order to manage it and to determine the appropriate focus for each publication. Writing for academic purposes was a particular kind of challenge.

> It is about knowing what you are doing, and about communicating and acting, so as to learn in action. Perhaps it invites researchers purporting to be doing something relevant to professional practice to look at themselves somewhat differently. Writing as a teacher-researcher, one does not want to change identity from one to the other, but to retain the crucial link to practice, and demand from research networks some genuine joint operation, based upon communication – the communication that is at the heart of intelligent inquiry and action. To whom do researchers wish to communicate? If it is to those professionally engaged in real-life tasks, they need to talk to them and learn with them. (Nielsen)

In addition, they reflected that transiting from an academic into a researcher was challenging, especially if someone had little-to-no experience with research.

> The metrics for success in research are different from those in teaching. Shifting from rigid schedule in teaching to flexible schedules in conducting research is one instance. I need to be able to adjust managing time more than I used to. Building a strong social network to do research is another example. In short, the shift of focus requires me to fully adapt to the new role if I want to be a successful researcher. (Mirizon)

Retaining Research and Publishing Capability

Many of the reflections illustrated that once PhD candidates had finished their thesis, they were considerably challenged by personal commitments and obligations, which made publication difficult. Many expressed concerns that they would lose their new research knowledge and skills.

> I feel that to become a researcher I need the support and mentoring of my supervisors but being so far apart becomes a challenge. … Coupled with the pressures of work and family obligations and compounded by unavailability of funds to sponsor beginning researchers, my dream of becoming a researcher, using the skills I gained to become a change agent in my country, are a blur. (Masakale)

Interestingly, those who went into an academic role upon completion of their thesis expressed a converse perception. They felt that engaging in publication had become more feasible.

> Owing to the work/life/study commitments I faced during my candidature, I found it very difficult to publish, and now, as I attempt to create articles and chapters for publication from my thesis, I feel I am starting anew. (Le Lant)

Despite challenges, some graduates experienced considerable success as researchers through continuing collaboration with their supervisors.

> Continuing collaboration with my supervisor, together we have written chapters for books and journal publications, which has helped me overcome the barriers. With the experience gained from my PhD, I have published several journal articles, written a book, and I have been invited speaker for several conferences both nationally and internationally. I have also been appointed to work for the Quality Assurance Agency at university level (the focus of my research) and I have opportunities to implement the findings and inspire others. (Rasyid)

Impact

The impact of undertaking a research higher degree went beyond the production of a thesis to include a profound impact on self-image, and on the research engagement of those around them.

> Now I can be a motivator whose experiences and reflections motivate other young lecturers to study overseas, to be potential researchers and knowledge creators like my own supervisors have done for me. (Habiburrahim)

PEDAGOGY OF RESEARCH SUPERVISION

The transition from novice to accomplished researcher is needed to serve multiple purposes. Traditionally, research higher degrees were perceived as academic apprenticeships (e.g. Mobray & Halse, 2010) that would produce the next generation of university lecturers and researchers. However, many higher degree candidates have other career destinations due to increasing numbers of graduates and declining opportunities for employment in the academy. As economies become more knowledge intensive, there is a demand for research higher degree graduates who will work outside the academy, for example as high-level practitioners or leaders in their professions, or as policymakers and advisors (Department of

Innovation, Industry, Science and Research [DIISR], 2011; Edwards et al., 2011). This broader range of destinations has bred a demand for these graduates to have diverse skills. Certainly, they are expected to have extensive and deep disciplinary knowledge, but they are also expected to develop a range of generic skills, including advanced communication skills (verbal and written), highly developed interpersonal skills (teamwork and collaboration) and project management skills (Borthwick & Wissler, 2003).

One of the key issues governing higher degree practices in universities relates to how the function of higher degree research is conceived. Hughes and Tight (2013) examined the metaphors used to describe the doctoral education experience. Prevalent among them is the notion of a journey, which, when narrated as a story, has nuanced stages beginning with a call or motivation to engage in research, progressing to the challenges and frustrations of the research practice itself, and continuing until reaching the final goal. This, Hughes and Tight (2013, p. 771) argue, speaks of "neo-liberalism, where personal motivation is all that is required to succeed". They also argue that while this notion of the doctoral process has truth, an emerging metaphor of PhD research as work is ignored. They cite Barnacle's (2005) critique of the contemporary discourse that describes doctoral studies as work "with obligations to the economy" (Hughes & Tight, 2013, p. 772). This latter metaphor is reflected in knowledge work, skills and accountability in habits, as well as the practices and rigour that accompany doctoral studies. The notion of work is observable in, and arises from, increasing managerialism in research and higher degree candidature. Metaphorical depictions of doctoral research as either a personal journey recounted as a story of discovery or as managed work with contractual obligations and responsibilities for the primary purpose of the production of a thesis perpetuates a binary perspective that fails to recognise the diverse variants in a fusion of the two metaphors. Both metaphors, and their fusion, have implications for the nature of supervisory work.

Spiller et al. (2013, p. 833) argue against the isolated silos of supervisory partnerships of "student acolyte learning from expert supervisor" and advocate for conversational inquiry among supervisors to address the increasing external challenges to higher degree research. Conversational inquiry processes advocated by Spiller et al. reflect Wenger's (1998) notions of communities of practice wherein experienced supervisors' accumulated "wisdom of practice" can be captured, shared and reformed to meet new contexts and new needs. Buissink-Smith Hart and van der Meer (2013, p. 295) extend Spiller et al.'s concerns regarding the isolated, siloed relationship of supervisor and student, arguing the case for greater deliberateness in fostering "communities of practice" and enabling the formation of peer support programs for higher degree students. Their case is based on studies that have demonstrated the benefits for students who participate in peer communities of practice in research. Such students are more likely to complete their degree on time; have a more enjoyable, less stressful experience; internalise personal accountability; and gain publication support and thus entry to the academic world.

Our answer to the insights gained from the higher degree research authors' reflections on attaining authorship is to suggest that a sound pedagogy for

supervision includes pedagogy of publication that evolves from departmental mindfulness of the higher degree research journey, recognising the PhD process as both an individual journey of self- and academic discovery, and as work that has obligations. Central to a pedagogy of supervision is building productive networks among academics and students, reducing the isolation that is traditionally present in social Science research. Pare (2010), cited in Aitchison et al. (2010), argues persuasively that good pedagogy within the supervisory role includes an obligation to enable authorship. This requires supervisors to teach writing for publication and to model the rhetorical turn of the disciplines within which the higher degree thesis is located. Furthermore, like all profound learning, the intrapersonal and the interpersonal impacts are critical factors that need to be acknowledged. Our authors have ably and colourfully reflected this in their explanations of their higher degree research and publishing experiences.

CONCLUSION

A significant issue here is that those who consume the extant theoretical literature and research on academic practices are largely scholars of higher education rather than everyday academics whose primary allegiance is to their discipline. The question is, however, who is attending to these grounded scholarly arguments for greater deliberateness in doctoral supervisory practices and management? All too often the outcomes of studies on effective supervisory pedagogy are consumed by those with a scholarly interest in the field of higher education itself. We would argue that this limits everyday supervisory practices to a reliance on common practice and the supervisor's own experience as a higher degree candidate. Such supervisory practices, reliant largely on tacit wisdom of practice, are open to untested and unchallenged, even erroneous assumptions that fail to align with the contemporary needs of students. Past supervisory practices also risk failing to support the research goals and targets of departments, faculties, universities and governments in a neo-liberal climate. Less isolation of participants and greater intentionality in evidence-informed practices are the cornerstones that are needed. In particular, higher degree candidates need to be supported in developing self-critique to assist them in making the required cultural shifts in terms of refocusing their cultural values and managing their desire to be catalysts for change to enable them to adopt the stance of openness in research inquiry that will see their commentary on their fields of expertise taken up in high quality journals and other respected publications.

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Janice Orrell PhD
School of Education
Flinders University, Australia

David D. Curtis PhD
School of Education
Flinders University, Australia

SECTION 2: LEARNING WITH TECHNOLOGY

PHILIP TOWNSEND, R. JOHN HALSEY AND JOHN GUENTHER

3. MOBILE LEARNING CONGRUENCIES WITH ABORIGINAL AND TORRES STRAIT ISLANDER CULTURAL PHILOSOPHIES

> I believe that qualitative research with living people should be a phronetic relational endeavour that occurs with an iterative collaborative approach between the researcher, participants, and the researcher's supervisors and peers, leading to the co-construction of knowledge. Over time, researchers and research participants are likely to move through several activities, such as practice, reflection, research, reform and newly-established practice. These steps can repeat as loops. The researcher has a primary responsibility to listen to the participants, valorise their voices and seek opportunities in different media to broadcast those voices. As a PhD candidate, I have used social media, given conference and video presentations, and published in journals and edited books for that purpose. My intention is to enable dissemination of the participants' opinions to promote discussion that may lead to changes in policy and practice. (Townsend)

ADOPTION OF MOBILE DEVICES

There has been a rapid and extensive uptake of mobile phones in remote Aboriginal and Torres Strait Islander communities, regardless of mobile phone coverage or Internet access (Brady et al., 2008; Featherstone, 2011). Kral (2014, p. 6f) stated "people, predominantly young people, [are] buying laptops, mobile phones and even iPads or Tablets". Recent figures indicate Australia wide, 70% of Aboriginal and Torres Strait Islander people own a smartphone, and in remote communities 43% of Aboriginal and Torres Strait Islander people own a smartphone (MIR, 2014). What fosters and nurtures this embracing of mobile technologies?

Some authors have drawn attention to alignment between the use of mobile phones and aspects of culture. It has been noted "the use of mobile phones fit[s] with the strong oral tradition of the Islanders…" (Brady et al., 2008, p. 396). The use of icons in software aligns with Aboriginal and Torres Strait Islander people's use of visual and spatial cues in daily life (Kral, 2011). Sharing devices and content fits with practices of collaboration and cooperative learning (Kral & Schwab, 2012). Given the diaspora of people away from their home communities for schooling, work and training, use of mobile devices strengthens relationships and, for those absent, maintains a sense of locality and belongingness (Brady et al., 2008). Donovan (2007) compared Aboriginal pedagogical systems and Information

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 25–32.

Communications Technology (ICT) pedagogical systems, and observed some commonalities. Guenther and McRae-Williams (2012, p. 92) suggested "it is possible to see a match between the ICT approaches (and teaching and learning processes more generally) used and elements of ontologies, epistemologies, axiologies and cosmologies". Johnson and Oliver (2013, p. 4) proposed "there is reason to infer compatibility between Indigenous learning style and life circumstances, and web-based mobile applications". Attention has also been drawn to alignments between Yunkaporta's "8 way" model of Aboriginal pedagogy (Yunkaporta, 2009) and social media (Huijser & Bronnimann, 2014, p. 106). How then might alignments with culture and use of mobile technologies be theorised? This chapter explores this question by drawing on the first author's PhD research about the opinions and behaviours of Aboriginal and Torres Strait Islander pre-service teachers in Very Remote communities regarding the use of mobile devices in their tertiary studies towards an Initial Teacher Education (ITE) qualification. It then proposes some congruencies between features of mobile learning and aspects of cultural philosophies.

ABORIGINAL AND TORRES STRAIT ISLANDER SCHOOL EDUCATORS' OPINIONS AND BEHAVIOURS REGARDING THE USE OF MOBILE DEVICES FOR PROFESSIONAL LEARNING

Semi-structured face-to-face interviews were held with individuals and focus groups. All participants were Aboriginal and/or Torres Strait Islander people. Most were pre-service teachers from two community-based ITE programs, and some were Aboriginal and Islander Education Workers not enrolled in an ITE course. A total of 64 volunteer informants (55 females and nine males) from five sites in South Australia and 10 sites in Queensland participated in interviews. Participants came from seven Very Remote communities, seven Outer Regional sites and one Inner Regional location. Interviews were conducted in English and audio recorded.

Pre-service teachers in South Australia did not use mobile devices for their study. This was due largely to unavailability of mobile infrastructure in most of the communities, and lack of experience with a university online learning management system. Participants in Queensland across Inner Regional, Outer Regional and Very Remote areas used mobile devices for their tertiary study. Three key findings emerged. First, features of mobile devices made them engaging and personalised learning for these pre-service teachers. Second, use of mobile devices empowered the pre-service teachers by fostering their ability to actively control their lives and make decisions. Participants expressed this in terms of place, time and pace of study. Pre-service teachers experienced freedom of location for study, flexibility about time of study and capacity to accelerate study. Third, use of mobile devices fostered the development of online or digital communities, which enhanced academic support, administrative procedures and personal encouragement. Mobile device use empowered women, in particular, to simultaneously fulfil family, community and cultural responsibilities as well as study requirements.

CONSTRUCTS OF MOBILE LEARNING

Baran (2014) synthesised empirical research published between 2000 and mid-2014 on mobile learning in teacher education contexts and found few reports of theoretical perspectives. She drew attention to the work of Kearney and associates who proposed a pedagogical framework of mobile learning (Kearney et al., 2012). They suggested a two-way interaction exists between mobile learning experiences and the use of space and time. Their framework indicated three main constructs of mobile learning: authenticity, collaboration and personalisation. Each has two subscales, yielding six factors: situatedness, contextualisation, conversation, data sharing, agency and customisation. Authenticity of learning with mobile devices occurs when the learner participates in a community of practice (situatedness) and this situation is relevant to the learner (contextualisation). Collaboration happens when there is rich, deep dialogue (conversation), and includes the consumption, exchange and co-production of material (data exchange). Personalisation ensues when the learner has control of, or can negotiate, content and/or goals (agency), and can modify activities and the mobile device (customisation). We return to this construct of mobile learning a little later to see how it relates to Aboriginal and Torres Strait Islander philosophies.

ABORIGINAL AND TORRES STRAIT ISLANDER CULTURAL PHILOSOPHIES

Australia's Aboriginal and Torres Strait Islander peoples have diverse beliefs and practices. However, commonalities exist. We consider these for their influence on the popular uptake of mobile devices for tertiary study by Aboriginal and Torres Strait Islander people living in Very Remote communities. We view cultural philosophies through four lenses: *cosmology*, view of the universe – physical and spiritual realities; *ontology*, view of identity/being; *epistemology*, ways of knowing; and *axiology*, ways of valuing.

Regarding *cosmology,* Arabena (2008, p. 1) suggested Indigenous philosophers around the world share a common perspective, namely, "the Universe is known as inherently dynamic, constantly changing in a process of renewal, and profoundly interrelated". A feature of an Aboriginal and Torres Strait Islander sense of being (*ontology*) is that it is framed within a collective or corporate understanding. "Indigenous peoples have learned to be in the world in reciprocal relationships with all things in the Universe, through cooperation, complementarities and interdependence" (Arabena, 2008, p. 1). Martin (2008, p. 69) similarly noted: "Throughout this account of Quandamoopah worldview, the essential feature of relatedness is constant". Regarding knowledge (*epistemology*), Nakata (2007, p. 185) stated "Indigenous peoples hold collective rights and interests in their knowledge". Ford (2010, p. 24f) pointed to the dynamic capacity of epistemology: "Our knowledge system is rich in abstracted theoretical understandings centred on metaphorical ways of thinking and understanding the world. [These] come to inform new practices for us in contexts that involve us with other knowledge systems". *Axiologies* are matters that are important and valued, and generally determine actions. In discussing the cultural interface of Torres Strait Islander and

scientific knowledge, Nakata (2010, p. 55) affirmed "our storytelling teaches children that we know other things as well, that we do other things in particular ways for particular reasons". These brief comments illustrate some foundational perspectives for Aboriginal and Torres Strait Islander people that influence daily life. These may also shape attitudes towards, and behaviours with, mobile devices for the Aboriginal and Torres Strait Islander female pre-service teachers in Very Remote communities, who were the focus of the research.

CONGRUENCIES BETWEEN MOBILE LEARNING AND CULTURAL PHILOSOPHY

We propose that there are some congruencies between the andragogies associated with mobile learning and Aboriginal and Torres Strait Islander cultural philosophies. We consider the cultural perspectives of one Aboriginal academic, Veronica Arbon, the first Aboriginal Director of Batchelor Institute of Indigenous Tertiary Education. Arbon draws on those experiences to write about the place of cultural philosophies in tertiary education (Arbon, 2008). We acknowledge that her views are not necessarily representative of all Aboriginal and Torres Strait Islander peoples. Nevertheless, they provide a robust and informative basis for exploring congruencies. She stated "the metaphor of **Yalka**, a small onion that has layers which can be peeled to metaphorically reveal ontological foundations of what it is to be, know and do, is important here" [emphasis in the original] (Arbon, 2008, p. 26). Arbon (2008, p. 160) described ontology as an inner layer, followed by epistemology and then axiology as the outer layer. In our thinking, for a model of mobile learning to be applicable to Aboriginal and Torres Strait Islander people, it needs to align with the worldview they already hold. Hence, we placed Kearney and colleagues' (2012) mobile learning framework within the layers of cultural philosophies, which are shown as concentric circles, as illustrated in Figure 3.1. This graphically represents privileging of cultural philosophies.

With reference to Figure 3.1, we now examine each of the three areas of *authenticity*, *collaboration* and *personalisation* in the light of cultural philosophy. Space limitations for this chapter prevent discussion of all four philosophical lenses for each aspect of the mobile learning framework. Hence, we have chosen to highlight one different philosophical lens for each of the mobile learning areas. We consider the aspects of space and time alongside cosmology. These issues of alignment are examined with reference to the context of being a pre-service teacher, as described in the PhD research.

Our first consideration of alignment looks at Aboriginal and Torres Strait Islander cosmology, and interactions with space and time in mobile learning. Most of the professional relationships outside a pre-service teacher's community are virtual and long-distance, mediated through mobile devices. Physical proximity in the same place is not required. Mobile devices enable proleptic embodiment, which allows user X in Place A to "be" with user Y in Place B. Person Y in Place B has a "foretaste" of the presence of person X, whose body stays in Place A while he/she is proleptically embodied in Place B.

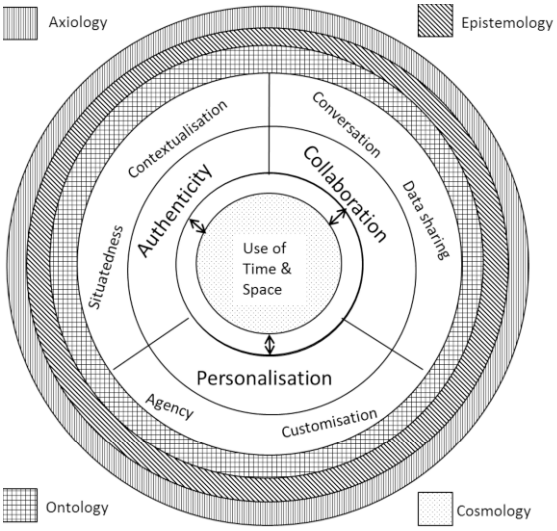

Figure 3.1. Cultural philosophies and mobile learning juxtaposed

Based on Kearney et al. (2012, p. 8); used with permission from Matthew Kearney

Kearney et al. (2012, p. 4) suggested "m-learning" offers a variety of alternatives, including "virtual or non-geographical spaces, such as virtual world environments". Arbon characterised cosmology as whole, renewing and interrelated. She noted "for the **Arabana**, relatedness is where time and space is collapsed and organised" [emphasis in original] (Arbon, 2008, p. 35), in effect "bringing the ancient and today together" (p. 36). She stressed:

> Relationships within the relational humanist tradition are anchored across time and space, and are experienced as more contexts are engaged. However, an Indigenist research paradigm is served by an ontology that anchors all experiences to relatedness, no matter what the contexts. (Arbon, 2008, p. 81)

There is then, within Arabana perspectives, a concept of the mutability of time and space. The creation of virtual and non-geographic spaces that can be accessed through mobile devices resonates with these mutable aspects of Aboriginal cosmology. Research participants mentioned the regular use of web conferencing with their training institution, and that they could access these sessions through mobile devices. One participant said "I've got a private laptop at home I use when I can't get into the [study centre] for my Elluminate sessions".

The next point of congruence is between cultural views of ontology and the construct of authenticity. Arbon (2008, p. 34) asserted "relatedness is central to being as **Arabana**" and "for the **Arabana**, becoming who you are is accomplished by knowing your reciprocal relationships" [emphasis in original]. Mobile devices

enable pre-service teachers to establish, maintain and develop various respectful professional relationships with the supervisory teacher resident in their community, fellow students in that community, other pre-service teachers throughout the state, administrative personnel and lecturers at their training institution, and staff at schools where they do their professional experience practicum. One participant mentioned she used a mobile device with peers to develop relationships "just from general conversation to just discussing assignments and assessments, and just seeing where everyone is". These are not simulated contexts but participatory environments requiring reciprocity. Kearney et al. (2012) described this as "situatedness". They used the term "contextualisation" to describe learning through mobile devices that is neither contrived nor artificial but realistic and relevant to the learner.

We suggest the construct of collaboration aligns with cultural views of epistemology. Interview participants spoke of using mobile devices to both seek and offer academic support. One said they ask questions such as, "How is the assignment going?" Or, "Whereabouts are you up to?" Another said "they all get on to Facebook … when they're collaborating with each other and exchanging ideas". These are examples of what Kearney et al. (2012) described as data sharing, both at a simplistic transmission level and to the extent of co-construction of new multimodal material. This aligns with Aboriginal and Torres Strait Islander perspectives about group ownership of knowledge, and the requirements for cooperative production and performance of knowledge. "Knowing concerns experience in life and ceremonies …" (Arbon, 2008, p. 41). Within the research sample, pre-service teachers used mobile devices to form digital communities characterised by frequent communication; these align with Kearney and associates' (2012) description of conversation with rich interactions. Arbon affirmed "both entities and knowledge are organised in order to move to one's potentiality" (Arbon, 2008, p. 43). She also stated "knowing is controlled to ensure appropriate access to some areas of knowledge and knowing" (Arbon, 2008, p. 48). Collaboration through mobile devices with peers, supervisors and lecturers incorporates these cultural aspects of both the organisation and control of knowledge.

Our final discussion suggests cultural perspectives of axiology align with the construct of personalisation. Mobile devices enable agency – a subconstruct noted by Kearney et al. (2012) – such as choice about place of study, flexibility of when to study and variation of the pace of study for pre-service teachers. We suggest that agency aligns with the value of being engaged. Arbon (2008, p. 49) emphasised "engagement concerns all senses and more as one engages spiritually, mentally, physically and in a social context. In this way, all energies are engaged to understand. … Engagement is dialogic activity with all entities in our world". Customisation was another subconstruct identified by Kearney et al. (2012), which occurred for some of the research participants at both a device and an activity level. Some participants selected features of a mobile device to highlight their personal preferences, particularly with regard to administrative requirements such as redirecting emails to a mobile phone or placing reminders in diaries about assignments. Customisation ties in with the axiological feature of being interpretive. Kearney et al. (2012, p. 4) stated "fixed notions of linear time are

increasingly making way for a softer version of what some authors have termed 'socially negotiated time'". The perpetual communication possible through mobile devices exemplifies the 24/7 nature of learning as experienced through relationships. This is fundamental to Arbon's (2008) understanding of what is important for learning.

CONCLUSION

This chapter has provided a theoretical explanation of the popular uptake of mobile devices for both social purposes and tertiary study by Aboriginal and Torres Strait Islander pre-service teachers in community-based ITE programs in Very Remote communities. We have argued that the three main constructs of mobile learning as presented by Kearney et al. (2012) – authenticity, collaboration and personalisation – are to some extent congruent with cultural philosophies regarding cosmology, ontology, epistemology and axiology as identified by Arbon (2008). There is undoubtedly more that could be argued from a more complete analysis of the data and a wider examination of Aboriginal and Torres Strait Islander cultural philosophies, but space limitations prevent this.[i]

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NOTE

[i] Parts of this chapter were published previously as Townsend, Philip B. (2015). "Mob Learning – Digital Communities for Remote Aboriginal and Torres Strait Islander Tertiary Students", *Journal of Economic and Social Policy,* vol. 17, no. 2, Article 2. Retrieved from http://epubs.scu.edu.au/jesp/vol17/iss2/2

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Philip Townsend MEd
CRC-REP/Remote, Education Systems Project
Flinders University, Australia

R. John Halsey EdD
Rural Education and Communities, Flinders University, Australia

John Guenther PhD
CRC-REP/Remote Education Systems Project
Flinders University, Australia

CAROL LE LANT AND MICHAEL J. LAWSON

4. INTERACTIVE WHITEBOARD USE AND STUDENT ENGAGEMENT

> My reflection on transforming from a student/researcher to a researcher/ publisher brings to mind an image of a tadpole metamorphosing into a frog. I feel at this moment my tail is shrinking and I am developing my hind legs. The water that once supported me (the guidance of my supervisors) will soon hold less significance as I move from the watery environment of being a student to land in my role as published researcher. (Le Lant)

Interactive Whiteboards (IWBs) have been associated with positive affect, and are perceived as motivational for students and teachers. Their multimedia capabilities have been reported to capture students' attention and support the transition from concrete learning to more abstract concepts. Betcher and Lee (2009, p. 1) state that "Interactive Whiteboards (IWBs) have the capacity to fundamentally change – and indeed revolutionise – the nature of teaching". They go on to say that "the IWB may just be the catalyst that finally moves schools away from the traditional paper-based model towards a more integrated digital mode of operation". However, Lovell (2014, p. 250) concludes from her research that there "is limited evidentiary support for claims of improved interactivity and student motivation, engagement, and learning". This, coupled with the many and varied claims that IWB use improves learning, invites further research. This chapter identifies the benefits and challenges of using IWBs in classrooms and applies their use to the teaching of an aspect of reading to students with intellectual disability (ID).

GENERAL CLAIMS

The literature associated with IWB use often contains a set of general claims about its advantages, such that it will enable access to, and use of, digital resources for the benefit of the whole class while maintaining the teacher's role of guiding and monitoring learning (Gillen et al., 2007; Hall & Higgins, 2005). It is suggested that for teachers, IWBs allow flexibility by enabling pre-preparation of material and/or its initiation during lessons, retrieval of material at a later date for reflection or revisiting prior teaching, and manipulation of the information displayed (Kennewell & Beauchamp, 2007; Kennewell et al., 2008). Interactive lessons that are planned in advance to support learning are seen to underpin lesson structure to enhance the way in which students think through visual representation of concepts (Glover et al., 2007). It has been suggested that teachers can use IWBs to produce

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 33–42.

quite complex and interactive lessons more easily than was previously possible, providing a clear structure for well-resourced lessons while retaining the capacity for spontaneity or provisional adaptation as lessons proceed (Gillen et al., 2007). Similarly, it is noted, IWBs enable teachers to access the Internet to source educational websites, video and audio clips, photos and textual material to enrich their teaching (Coyle et al., 2010).

For students, IWBs are seen to provide them with the capacity to interact with, and control, the display. It is suggested that an important feature of the teaching style that is evolving with IWB use is its similarity to the multimedia, multisensory, multifaceted style students experience with their computer games and television, thereby providing a link to what the students know and enjoy doing (Slay et al., 2008; Tanner & Jones, 2007). The features of IWBs are argued to have the ability to "intensify learners' participation in, and amplify the importance of, the activity" (Jones et al., 2011, p. 58). Possibly the most general reason cited to incorporate lessons conducted on IWBs is the perception of both teachers and students that such lessons improve teaching and learning (Higgins, 2010).

IWBs also appear to have significant potential to provide an effective medium of instruction for students with ID. Whitby et al. (2012) highlight the visual processing strengths of many students with ID, which suggests IWBs can provide a medium in which information can be paired both visually and verbally, leading to increased understanding. The visual supports available on IWBs are seen to help develop students' receptive language capabilities (Pennington, 2010) by providing concrete visual examples of abstract concepts and allowing the consistent representation of an activity or model, facilitating much needed repetition (Goldsmith & LeBlanc, 2004). IWBs' dynamic and graphical capabilities are predicted to offer substantial advantages for presentation of curriculum content in ways that students with ID can manipulate and interact with. If these expectations can be realised, IWBs will be seen to complement other instructional approaches used with this group of students (Martin, 2007; Somekh et al., 2007).

IWB AS A TEACHING TOOL

IWBs have been represented as a tool teachers and students perceive as relevant and up-to-date (Miller et al., 2005; Moss et al., 2007; Tanner & Jones, 2007). This is in keeping with the view that modern technology needs to become an integral part of most lessons, supporting concept development through its interactive capacity (ACARA, n.d.; Higgins, 2010; Miller et al., 2005; Miller et al., 2004). The ability to mix visual and aural information is argued to facilitate the learning process, enabling learners to make connections between what they see and what they hear, enhancing recall (Bell, 2002; Smith et al., 2005). Multimodal interactive displays can engage and elicit students' prior knowledge (Murcia, 2014), facilitating connections between ideas and meaning making (Scott et al., 2011).

Incorporating IWBs into lesson delivery is perceived to motivate and engage students in the learning process (Cutrim Schmid, 2008; Hall & Higgins, 2005). It has been reported that students believe IWBs help them pay more attention to

lessons (for examples see BECTA, 2003; Cogill, 2003; Higgins et al., 2005; Smith et al., 2005). Some reports have found that when students use IWBs, their attention spans often exceed what would normally be anticipated (Carter, 2002; Smith, 2001). This is particularly so with very young students, deaf students (Carter, 2002) and those who cannot read (Slay et al., 2008). In this way, IWBs are seen to hold the promise of addressing attention issues with students with ID (Whitby et al., 2012) because the multimodal options direct students' attention to a lesson's relevant features, particularly with the use of embedded prompts in an activity (Goldsmith & LeBlanc, 2004). The consistent use of technology is said to support students with special learning needs (Goldsmith & LeBlanc, 2004). Other claims have been made about the impact of IWB use on student interaction within lessons, such as improved discussions between students and teachers, and the increased use of open-ended questions and probes (BECTA, 2003; Higgins et al., 2005; Levy, 2002) that can help enhance cognitive processing capabilities within the learner (Moreno & Mayer, 2007).

Reports prepared by BECTA (2003), Higgins et al. (2005) and Smith et al. (2005) discuss a number of themes regarding the potential benefits of IWB use to student learning, including potential positive effects on motivation and affect, and increased capabilities for multimedia and multisensory presentation. The BECTA report (2003, p. 3) suggests that "motivation is a key benefit of whiteboards. Reasons for this include their presentation capabilities and the high level of interaction that students enjoy [through] interacting physically with the board, manipulating images". This report also suggests that IWB use can lead to increased self-esteem and enjoyment, more relevant questions being asked, and students providing longer, more detailed responses (Higgins, 2010).

IWB AND STUDENTS WITH SPECIAL EDUCATIONAL NEEDS (SEN)

Very little research has been conducted involving students with ID and their use of IWBs (Yakubova & Taber-Doughty, 2013). However, some research reports have identified potential advantages and pitfalls of IWB use that would be applicable to students with ID (Allsopp et al., 2012). In general, the predicted advantages of using IWBs with students with ID include the hands-on interaction with the software, and the provision of conceptual links in the development and understanding of more abstract and complex ideas (Learning Development Centre, 2008). Further to this, Egerton et al. (2009, p. 14) state that "the IWB does afford students without strong verbal or literacy skills the ability to learn through nonverbal means through the presentation and manipulation of pictorial images, and similarly the opportunity to participate and to demonstrate their skills and knowledge". It is also argued that the "experience" students encounter due to the highly visual format is helpful because many students with SEN particularly relate to it and it supports the development of attention (Jamerson, 2002; Learning Development Centre, 2008; Martin, 2007). Another claimed advantage of using IWBs is that they enable students with poor fine and gross motor control skills to participate in lessons without having to manipulate a regular mouse and keyboard;

students can demonstrate their skills and knowledge via the board's tap, drag and drop features (Learning Development Centre, 2008; Somekh et al., 2007).

Problem areas identified with the increased use of IWBs for SEN students are the potential consequences of the associated whole-class teaching approach, which may reduce the level of access to a differentiated curriculum to which all students are entitled. Students with Autism Spectrum Disorder have experienced sensory overload in some instances, and those with Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder can become over excited due to over use of IWBs' auditory and visual features (Jamerson, 2002; Learning Development Centre, 2008).

Yet, despite these strongly expressed general and specific claims, at the time of writing there was little detailed empirical research on the benefits of IWB use with students under eight years of age (Burnett, 2010) or students with ID (Yakubova & Taber-Doughty, 2013). Much evidence has been derived from student attainment data in national tests, interviews, surveys and questionnaires that seek teachers' and students' perceptions. This latter type of evidence is common in most of the research literature relating to the effects of IWB use (Higgins, 2010; Higgins et al., 2005; Moss et al., 2007). Somekh et al.'s (2007) evaluation report, for example, used language such as positive gains are "likely" to be achieved by all attainment groups, "may" lead to a widening gap in attainment for low achieving students, and "appears" to have relatively little impact on raising the attainment of students with special needs. Smith et al. (2005), unable to find any experimental research to review, identified the need to undertake research to fully understand the impact of IWB technology on teaching practice and student learning.

CHALLENGES WHEN USING IWBS

As noted, the introduction and use of IWBs is not without its problems. Much of the research to date identifies areas of concern for teachers and students alike, one of which involves cognitive engagement. Although IWBs involve students in physically manipulating content, cognitive engagement is also required for learning to occur. When cognitively engaged, students are more likely to make sense of the information presented by exploring their existing knowledge and constructing new knowledge by selecting relevant information, organising it into their memories and transforming it into knowledge (Mayer, 2009). It has been suggested that an overemphasis on use of some IWB technical features can cause teachers and students to lose focus on the lesson's objective (Armstrong et al., 2005; Cogill, 2003; de Castell & Jenson, 2004; Hodge & Anderson, 2007; Sakar & Ercetin, 2005). Cutrim Schmid (2008, p. 1564) identified that she sometimes "tended to use hyperlinks more as an instrument of power than as a way of encouraging learners' active participation", which does not support the active integration of student knowledge into a lesson's learning objectives, thus undermining the opportunity to construct meaning.

Of relevance here is the less-is-more principle advanced by Mayer and Estrella (2014) who identified the importance of eliminating extraneous material when

creating instructional material to enable students to undertake essential processing tasks. This principle would be violated if over use of IWB dynamic features distracted learners from processing essential information. Importantly, for students with little prior knowledge and potentially for students with ID, who are more prone to become overwhelmed, decorative illustrations can be detrimental to the learning process, resulting in students becoming frustrated and disengaged from learning activities (Kalyuga, 2011).

Over-reliance on the capacities of new technologies has also been shown to lead to faster paced lessons, without students participating in in-depth questioning or discussion (Tanner & Jones, 2007). Fast paced lessons can fail to address some students' specific needs (Higgins, 2010) when, for example, students fall behind because they are unable to grasp the relationship between symbols and words or concepts without more individual help (Somekh et al., 2007). This can lead some students to disengage from the learning process (Finn & Zimmer, 2012). Thus, challenges when using IWBs may negatively affect student engagement in the learning process and minimise the impact of an intervention.

STUDENT ENGAGEMENT AND IWB USE

Research on student and teacher perspectives about engagement and motivation arising from using IWBs includes positive reports, particularly related to the ability to bring real learning opportunities into the classroom in real time (Higgins et al., 2005). The increased interactivity between students and content has been noted to be associated with more open questions, longer discussions and more general classroom talk (Higgins, 2010), suggesting greater cognitive involvement in learning (Somekh et al., 2007). The BECTA report (2003) identified IWBs' potential positive influence on student motivation and affect in the classroom by reducing negative behaviour (Whitby et al., 2012) through increased self-esteem and enjoyment, while students perceive the multimedia, multisensory capabilities as making learning easier by helping them connect concrete ideas with more abstract concepts (Cutrim Schmid, 2008; Hall & Higgins, 2005). These perceived positive outcomes for student engagement should lead to positive academic outcomes because students who are affectively, cognitively and behaviourally engaged in school and learning are more likely to experience success (Finn & Zimmer, 2012; Fredericks et al., 2003). If the challenges of IWB use identified in mainstream literature and literature on students with SEN are considered during lesson planning, students should experience positive learning outcomes.

Despite many self-reports and perspectives gathered from teachers and students about the positive, motivating aspects of IWB use, there is little detailed evidence about whether IWB use increases student engagement levels, particularly in students below the age of eight years and those with ID. Research related to this issue has not been derived from observation of student engagement levels during learning.

The study described here endeavoured to answer the question of whether IWBs are associated with higher levels of engagement than traditional desk-top

(non-IWB) teaching with SEN students below nine years of age involved in early reading lessons. A new student engagement rating scale was developed that provides an expanded view of observable student engagement behaviours in the areas of task, affective and cognitive engagement.

THE PRESENT STUDY

Drawing on the literature for teaching and learning when using IWBs, this current study focused on the student engagement behaviours observed when teaching an aspect of reading to students with ID. Consideration of the challenges of IWB use was built into the design of the lessons prepared for this research. The lessons were tailored to the individual student and their learning needs, and paced to ensure their understanding and participation. Due to instruction only occurring with one student at a time, student interaction with the IWB was assured and cognitive involvement was encouraged through the use of questioning and presentation of problems to be solved. The amount of information contained within any one lesson was minimised to ensure the student could focus on the required component of that particular lesson. Concrete examples were incorporated to enable the student to organise and integrate the information with their existing knowledge. The case of Martin is discussed here, with the full report provided in Le Lant (2015).

Martin was a 7y 5m old male who had been identified with Global Developmental Delay and Severe Language Delay. He participated in 20 specifically targeted early reading lessons, in which he was taught a reading skill identified as lacking from the pre-test data. Ten lessons were taught using an IWB and ten were taught without it. Content for IWB and non-IWB lessons was as comparable as possible (Le Lant, 2015). Data was collected using an alternating treatment design whereby the lessons were alternated randomly to allow comparison of the effects of the two interventions (Wolery et al., 2010). The lessons were video recorded and the footage was analysed using the Student Engagement Rating scale (SERS) created specifically for this research (see Le Lant, 2015). The scale was used to rate Martin's engagement behaviours during the lessons using a 30 second partial interval sampling.

Findings

On completion of the 20 lessons, Martin had improved his ability to decode real two (vowel consonant) and three (consonant, vowel, consonant) letter words when prompted to use the sounding and blending strategy taught across the lessons. His primary strategy was to rely on memory to recall words, which was problematic due to the words in the pre- and post-tests being different to those taught, and not being a transferable skill to novel situations.

In response to the question about whether the IWB lessons were more engaging than the non-IWB lessons, the non-IWB condition was consistently rated more engaging for task, affective and cognitive engagement. This conclusion was based on the results of three forms of analysis: visual inspection, examination of non-

overlapping data points (Scruggs et al., 1987) and statistical testing using randomisation tests (Dugard et al., 2012; Levin et al., 2012). This preference may have been due to less distractible features/objects available to Martin in the non-IWB condition because he verbalised a preference towards working on the IWB. For example, in the IWB condition, Martin could "take control" of the lesson by deleting flipcharts or shutting down the program if he perceived the tasks to be too difficult, or if he thought he had made an error. These behaviours led to wasted time while flipcharts were retrieved, new pages opened or programs reloaded; time in which Martin became distracted by classroom features. He was also able to "play" with the IWB's accessible features, such as changing the pen size, colour and font, erasing, highlighting and deleting. In comparison, when working in the non-IWB condition, he was less able to take control of the lesson because there was little wait time if he chose not to participate in a particular task; no time waiting for the computer to reload and plenty of spare pencils, paper and games available to readily substitute a task. This is not to say Martin did not engage in negative behaviours in the non-IWB condition. He fiddled with equipment and protested verbally about what we were doing. It was just more difficult to "lose" teaching time due to the nature of the planned activities.

Two notable features of Martin's behaviour became evident during analysis that were not intended observations; his behaviour after he made or perceived he had made an error, and the quantity of verbal outputs recorded across the two conditions. For the latter, the number of elaborated verbal responses recorded in the non-IWB condition were double the number recorded in the IWB condition. This chapter focuses only on the impact of error making, which had a negative effect on task engagement, particularly when the error occurred early in a lesson. The earlier in a lesson Martin made or perceived he had made an error, the less engaged he became in the task. He generally had difficulty recovering from making an error in either the IWB or non-IWB condition, and practised avoidance behaviours such as trying to engage the researcher in non-task-related talk about subjects or items other than the activity. Language was his primary avoidance behaviour. This pattern was similar to that reported by Guthrie and Davis (2003), who identified student engagement as driven by the self-perception of ability to perform reading tasks. When Martin perceived he had made an error or perceived the task to be too difficult, he engaged in avoidance behaviours in an attempt to distract the teacher from the task, which had a negative effect on learning outcomes and was more apparent in the IWB condition. Newmann et al. (1992) related avoidance behaviours to the need for competence; when students felt unable to succeed, they employed strategies to protect themselves from failure.

CONCLUSION

This case study provides evidence where use of the IWB for teaching a student with an ID an aspect of early reading was not associated with increased engagement. However, this claim comes with a caveat. The lessons across the two conditions were very similar. Only the delivery mode differed. The IWB lessons,

by their very nature, allowed the student space at the board to manipulate images, letters, words and components in games. This space enabled him to move about freely, to shut down programs and delete pages if he was overwhelmed by the content, perceived difficulty or thought he had made an error. When this occurred, he was left with time in which the pages were recovered, programs rebooted or new activities loaded. Once Martin was in avoidance mode, it was difficult to bring him back to task. In the non-IWB lessons, by contrast, Martin had less space because he was physically seated at a desk next to the researcher. If he discarded an activity, there were plenty of alternatives on hand to quickly replace it.

Further case studies have now been undertaken and are reported in Le Lant (2015). The findings from these other studies support the conclusion drawn in Martin's case. Taken together, the findings suggest that the impact of IWB use on student engagement should not be assumed to be positive.

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Carol Le Lant BBSc, BEd(Spec Ed) (Hons), PhD
School of Education, Flinders University, Australia

Mike Lawson PhD
School of Education, Flinders University, Australia

EMILY TAM AND TRUDY-ANN SWEENEY

5. LEARNING WITH IPADS IN EARLY CHILDHOOD EDUCATION

> The lack of peer reviewed research that was accessible to educators and teachers in childcare centres, preschools and schools encouraged me to make something that would benefit them, my colleagues. My aim, therefore, was to communicate to educators, teachers and parents who were not academics. (Tam)

This chapter describes the design-thinking underpinning a theoretical framework created as part of an action research project conducted in a South Australian childcare centre to investigate the integration of iPads into the curriculum using a play-based learning approach. iPads have become popular in early childhood education because they are simple to use and the applications (apps) that are available are inexpensive and plentiful. The development of this new technology and its presence in early childhood educational settings is increasing rapidly, and interactive touchscreens have changed the way children engage and play with technology (McManis & Gunnewig, 2012, p. 15).

These new devices result in new learning possibilities for young children who can easily navigate the screen and learn through multiple applications (Barone, 2012, p. 6). The prevalence of iPads, combined with an understanding that the introduction of these is insufficient to enrich learning, has motivated early childhood directors and educators to seek support from academics and professional associations to help them achieve the potential benefits.

Limited research has been published about the potential for iPads to support play-based learning, however, there is an abundance of informal, non-peer reviewed anecdotal evidence and experience available via social media about the use of iPads in early learning settings. This evidence often takes the form of blog posts. In the few peer reviewed studies that have researched the use of mobile technology in early childhood education (see Banister, 2010; Barone, 2012; McManis & Gunnewig, 2012; Pegrum et al., 2013), educators suggest that mobile devices can foster play-based learning at an early childhood level. Specifically, some apps on these devices are well aligned with the spirit of early childhood education because they encourage children to play and discover as they interact with them (Banister, 2010, p. 125).

However, many educators have raised concerns that some apps are pedagogically limited (Pegrum et al., 2013, p. 73). This has led some educators to perceive that iPads are best suited to reinforcing rote-learning activities such as

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 43–52.

letter formation (Pegrum et al., 2013, p. 73). Therefore, there is a need for more research into the possibilities of iPads supporting a play-based curriculum that provides children with the opportunity to engage in digital play.

METHOD

Action research was used to investigate the integration of iPads into the early childhood curriculum using a play-based learning approach. The theoretical framework created as part of the investigation had a two-fold purpose. Firstly, it aligned with the needs of the participating childcare centre during its early stage of technology exploration, and research participants used it as a tool and dialogue prompt when planning and reflecting on their interactive teaching sessions with the children. Secondly, the framework was used to analyse and discuss the project's findings in terms of the play value of the iPad apps and the educators' Technological Pedagogical Content Knowledge (Koehler & Mishra, 2009).

The participating educators' limited access to mobile devices and the Internet, and limited previous experience of using these technologies influenced the framework's design. The apps recommended to participants did not require access to the Internet. Hence, a limitation of the research was that it did not explore apps that may have fostered exploration of communication and literacy practices that connected the centre to outside sources.

APPLAYCATION FRAMEWORK DESIGN

Australian early childhood education advocates' strong support for play-based learning is evident in the *Early Years Learning Framework* (Department of Education Employment and Workplace Relations [DEEWR], 2009, p. 5). Therefore, it is important for educators to consider the play value of each iPad app they use in their program and how this meets their children's learning needs. Various frameworks have been proposed, including the *Padagogy Wheel* (Carrington, 2015), apps classified by the *SAMR Model* (Swanson, 2012) and the work of Cherner et al. (2014).

However, these do not classify the play value of specific apps or identify links to the five learning outcomes in the *Early Years Learning Framework*. Instead, they classify apps based on content, skills and ideas. With this in mind, *The Applaycation Framework* was designed to support early childhood educators to critically reflect on the alignment between their Technological, Pedagogical and Content Knowledge (Koehler & Mishra, 2009) when designing learning experiences for their young children.

The Applaycation Framework (see Table 5.1) combines the *Early Years Learning Framework* (DEEWR, 2009), Mishra and Koehler's *Technological Pedagogical Content Knowledge (TPACK) Framework* (Koehler & Mishra, 2009), and Bergen's schema for play and learning (Bergen, 1998). This design aimed to support development of the educator participants' Technological Pedagogical Content Knowledge by prompting them to consider the interplay of their existing

knowledge of specific iPad apps (technology; TK), play-based learning (pedagogy; PK) and the *Early Years Learning Framework* (content; CK) outcomes when designing digital learning experiences for children. These three primary knowledge types form the foundation of the *TPACK Framework* and are necessary for educators to teach effectively with technology in the 21st century (Koehler & Mishra, 2009).

Koehler and Mishra (2009, pp. 63-64) define CK as educators' knowledge about the subject matter to be learned or taught, for example the *Early Years Learning Framework*; PK as educators' knowledge about the processes and practices of teaching and learning, for example play-based learning; and TK as including "what" as well as "how" technology is used. The *TPACK Framework* includes other types of knowledge besides CK, PK and TK. Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK) and Technological Pedagogical Knowledge (TPK) occur at the intersections of each of the primary types with the other, and Technological Pedagogical Content Knowledge (TPACK) at the intersection of all three (Koehler, 2012).

Effective technology use in early childhood education requires developing sensitivity to the dynamic and transactional relationship between these more complex types of knowledge (Koehler, 2012). The *TPACK Framework* is not a prescriptive model because it recognises educators' unique knowledge relevant to their specific contexts. It applies to all curriculum areas and ages, and is more than simply adding technology to traditional approaches; it depends on knowing how technology can be used to access and process content, and understanding how it can support and enhance learning (Commonwealth of Australia, 2011).

The three key sections of *The Applaycation Framework* (The *Early Years Learning Framework* Outcomes, Bergen's Play Types and Learning Types, and App Examples), as shown in Table 5.1, as well as the intersection of all three, are described in more detail after the table.

Section One: Early Years Learning Framework Outcomes

The first section of *The Applaycation Framework* is based on Content Knowledge (CK) and consists of the five *Early Years Learning Framework* Outcomes. In Australia, the *Early Years Learning Framework* is the national document that supports the learning and development of children aged from birth to five years. Divided into five major outcomes, the *Early Years Learning Framework* provides guidance to early childhood educators to ensure children experience quality early learning and care, with an emphasis on play-based learning (DEEWR, 2009). The five outcomes provide the content that educators "teach" in early childhood. Instead of specific content, however, each outcome highlights desired goals for children. All play and learning experiences offered in early childhood education are to be aligned to one of the outcomes. However, in the absence of a curriculum in early childhood education that explicitly states the content educators must teach, educators have flexibility to identify content based on the outcomes and goals of the *Early Years Learning Framework*, and their children's interests.

Table 5.1. The Applaycation Framework (condensed version)

***Early Years Learning Framework* Outcomes**			
Outcome 1 - Children have a strong sense of identity. Outcome 2 - Children are connected with and contribute to their world. Outcome 3 - Children have a strong sense of wellbeing. Outcome 4 - Children are confident and involved learners. Outcome 5 - Children are effective communicators.			
Bergen's Play Types	**Bergen's Learning Types**	**App Examples**	
Free Play	**Discovery Learning**	**Examples of Free Play Apps**	
Children control all aspects of the app Motivation for using is not external rewards Take risk-free challenges & try new things without lasting consequences	Children construct their own understanding of concepts as they actively manipulate and interact with the app	Toca Tea Party Toca House Toca Kitchen Monsters Toca Hair Salon 2 Toca Builders My Story	Sock Puppets Doodle Buddy Art Set StoryKit Book Creator Reel Director Falling Stars

Source: Tam (2015), adapted from Bergen (1998); used with permission from Doris Bergen and Routledge Publ.

Bergen's Play Types	Bergen's Learning Types	App Examples	
Guided Play	**Guided Discovery Learning**	**Examples of Guided Play Apps**	
Influenced by some kind of rule Children still have control over the app but their choices are more limited There may be external motivation	Apps are carefully structured so that particular discoveries are more likely to occur	Toy Story Read-Along Photo Booth PlayArt by Tapook DoodleCast for Kids Google Earth Freddi Fish	Bug Builder Juno's Piano Wheels on the Bus HD Playschool Art Maker Sago Mini Sound Box Jigsaw Puzzles
Directed Play	**Reception Learning**	**Examples of Directed Play Apps**	
Children may have to follow programed steps Would still have some choice in when & how they do those steps Probably have some kind of external reward Generally a certain way to play	Concepts, principles and ideas are presented and understood, but not discovered	Hairy McClary Talking Tom Pirate Treasure Hunt Green Eggs and Ham The Lonely Beast ABC Bubble Guppies Pepi Tree	Awesome Eats Play123 UNO Pictureka Little Things Move the Turtle Memory Train Angry Birds

Bergen's Play Types	Bergen's Learning Types	App Examples	
Almost Play	**Rote Learning**	**Examples of Almost Play Apps**	
Children have little control over what the app does Usually some kind of goal at the end of the "game" or some kind of reward Generally one way to "properly" interact or play with the app	Learning is achieved through repetition or conscious efforts at memorisation	Fruit Ninja Music for Little Mozarts LeapFrog Songs A Day with a Difference ABC Farm Counting Bees Which Go Together	Which Does Not Belong Farm Flip Memory Fun Shape-O ABC's Park Math HD Interactive Alphabet ABC's
Work	**Drill & Repetition Learning**	**Examples of Work Apps**	
Has externally defined goal Children have no control over what the app does Generally only has one way to play Drill-and-practice games that have little re-play value	Required and repetitive Recall is usually poor and understanding is lacking	Colouring 4 Kids Funimal Phonics Animal Alphabet HD Splish Splash Inn First Words Animals ABC PocketPhonics	Eggy Numbers Montessori ABC for Kids Counting and Addition! iWriteWords

Section Two: Bergen's Play Types and Bergen's Learning Types

The second section of *The Applaycation Framework* is based on Pedagogical Knowledge (PK) and is presented in the first and second columns of Table 5.1 that relate to Bergen's five distinct types of play and learning. After identifying a child's learning goal and/or interest, and aligning this to one of the five *Early Years Learning Framework* learning outcomes, educators are prompted to consider how they are going to encourage a child to explore their interest or goal. Bergen's schema for play and learning characterises a range of play and learning types in relation to the amount of internal control, motivation and reality children experience in an activity (Bergen, 2006, p. 237). The schema (see Figure 5.1), used with permission from Doris Bergen and Routledge Publ., suggests children engage in five types of play (Free Play, Guided Play, Directed Play, Almost Play and Work) ranging from play with the most internal control (child-initiated) to play with the most external control (adult-initiated) (Bergen, 1998, p. 111).

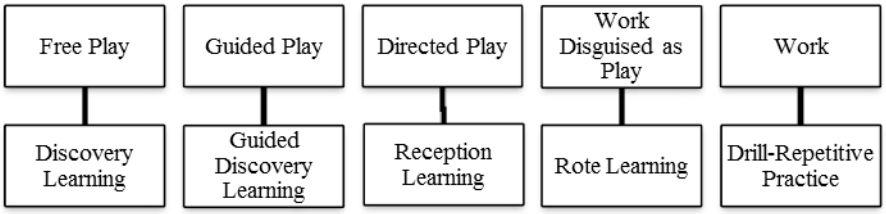

Figure 5.1. Bergen's (1998) schema for play and learning

Each play type, according to the schema, has a corresponding learning process. These five learning processes are also categorised by dimensions of control, motivation and meaning (Bergen, 1998, p. 115). Ideally, to teach effectively with technology educators need to consider which type of play and learning best suits a child's learning goal.

Section Three: App Examples

The third section of *The Applaycation Framework* is based on Technical Knowledge (TK). This section, when viewed vertically, identifies some of the many age-appropriate iPad apps available in the iTunes App Store that can be used for digital learning experiences. These apps, shown in Table 5.1, have been aligned with Bergen's five play and learning types. When this section is viewed vertically and aligned horizontally with Bergen's play and learning types, it represents Technological Pedagogical Knowledge (TPK) because it suggests alignment between specific apps and distinct play and learning types. This offers ideas for how the example apps can be used to support different types of play and learning.

The Intersection of TPK and TPACK

Educators are encouraged to use *The Applaycation Framework* to support them in aligning their knowledge of the outcomes required by the *Early Years Learning Framework* with their PK related to Bergen's five types of play and their choice of iPad app. When doing this, they are encouraged to consider their design choices in terms of individual children and their needs. Therefore, each app (TK) is aligned with a specific play and learning type (PK) and learning outcome (CK) from the *Early Years Learning Framework*. Bergen's five play and learning types and how they relate to the apps to form Technological Pedagogical Knowledge (TPK) are defined in Table 5.2.

The Applaycation Framework, in consideration of the participating educators' greater familiarity with the *Early Years Learning Framework* (CK) than with the iPad apps (TK) and Bergen's five different play and learning types (PK), was designed to prompt educators to firstly identify which of the five learning outcomes, and five play and learning types are the priority for a child's learning experience. Having identified these, educators are then prompted to identify an app that aligns with their chosen outcome and play and learning type to assist them to draw together their Technological Pedagogical and Content Knowledge (TPACK).

Table 5.2. Bergen's (1998) types of play and how they relate to iPad apps

Play Type	**Definition**
Free Play Apps	Children control all aspects of the app and their motivation for using it is their interest in the content and not an external reward, such as a sticker for solving the problem. With these apps, children can take challenges and try new things.
Guided Play Apps	These apps are influenced by some kind of rule. Children still have control over how they use the app, but their choice of what to do is more limited. There might be an external motivation for playing with it, such as an animation after completing a game.
Directed Play Apps	Directed Play apps have more restrictions about what children can do with them than Free Play or Guided Play apps. Children may have to follow a set of pre-programmed steps, though they would still have some control over when and how they did those steps. These apps generally demand a certain way in which to play with them.
Almost Play Apps	These apps demand a rigid way in which children interact with them; children have little control over what the app does. Children are motivated to play these apps because there is usually a goal to achieve or a reward to gain. The app is designed for children to follow specified steps and play with those steps in a specific, predetermined order.
Work Apps	Work apps are similar to Almost Play apps; they have an externally defined goal, such as tracing all the letters of the alphabet. Children have no control over the app because it only has one correct way in which to play and is based on drill-and-practice, which has little re-play value.

Used with permission from Doris Bergen and Routledge Publ.

The Applaycation Framework version used in the research project was expanded from the framework illustrated in Table 5.1. It was divided into five pages, with each page focusing on one of the five learning outcomes of the *Early Years Learning Framework*. The expanded version clearly classified and aligned the iPad apps with each learning outcome and play type. Thus, it drew attention to the alignment between learning outcomes, specific iPad apps, and different play and learning types (i.e. TPACK).

Using all three sections of *The Applaycation Framework* together to decide on an app for a learning experience underpins effective teaching with technology (known as Technological Pedagogical Content Knowledge or TPACK) because educators consider all three types of knowledge needed to teach with technology and how they work together. In summary, educators use their knowledge of the *Early Years Learning Framework* (content), types of play (pedagogy) and apps (technology) to plan effective play and learning experiences using technology.

CONCLUSION

This chapter has described the design underpinning a theoretical framework created to support an investigation of the integration of iPads into early childhood education using a play-based learning approach. *The Applaycation Framework* draws together existing theoretical knowledge in a meaningful way for educators to use in unique contexts. Researchers and educators may find the framework helpful in supporting the analysis of how early childhood educators plan and reflect on the use of iPad apps in the curriculum in other contexts. The framework facilitates early childhood educators to plan, reflect and share their thinking and practice about the kinds of digital play they wish to promote to meet learners' needs. This is important because educators are critical agents in mediating the integration of iPads into interactive and engaging learning opportunities for young children.

Feedback from the research participants in this project was positive. Jenna, one of the participants, remarked on the framework's ability to help her link apps to outcomes and play types, and justify the educational choices she made during the project:

> *The Applaycation Framework* helped by creating a clear format for me to use when relating apps to the curriculum, which in turn meant I was more easily able to document in my planning cycle using learning outcomes. The [framework] also helped when talking to colleagues about which apps to use in relation to children's specific learning needs as it helped document learning styles as well as curriculum subject areas (Jenna, Interview 2015).

> I would recommend *The Applaycation Framework* to other educators. It is a useful tool to introduce to new educators in the centre to familiarise them with the learning outcomes of current iPad apps. It is also used during planning sessions for upcoming themes or projects to help incorporate current technology seamlessly into the curriculum (Jenna, Interview 2015).

The apps identified in the framework will become out-of-date due to the rapid development of technology. However, the design-thinking underpinning its creation may inspire educators to replace these apps with new ones classified into the relevant play types. This will continue to allow early childhood educators to design rich and meaningful digital play experiences for the children in their care, creating a strong foundation for the digital learners of the 21st century.

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Emily Tam BEd (Hons)
Flinders University, Australia

Trudy-Ann Sweeney BEd, MEd, PhD
School of Education
Flinders University, Australia

SECTION 3: PROFESSIONAL LEARNING AND PRACTICE

PETER NIELSEN AND BERNARD MAGEEAN

6. COMMUNICATING REAL-LIFE CLASSROOM INNOVATIONS AS RESEARCH

> Writing as a teacher-researcher, one does not want to change identity from one to the other, but to retain the crucial link to practice. (Nielsen)

This is a narrative account of a particular teacher redefining his educational task through communication with research experts and colleagues. It ends with the suggestion that formal theoretical research communications about professional practice constitute a network operating and interacting with two other networks. One is the professional's self-communicating and self-defining activity with a task and a problem. The other is essentially a validation and generalisation effort, driven by task-defining messages that are constantly sent and received in the actions of networks of professional colleagues – communications that can be promoted, planned and formalised to foster further developments and refinements of practice, pedagogical or otherwise. Research for practice should keep in view all these interacting networks.

TEACHER AND RESEARCHER, FROM WITHIN-GROUP TO WITHIN-SELF COMMUNICATIONS

Relations between teachers and researchers are matters of communication. Teachers and researchers may be thought of as accomplished performers, an audience to themselves and others, tending to respond to each other in set pieces. This may be because you become a researcher or a teacher by learning to do what researchers or teachers do. Vital verbal and nonverbal messages about identity are found in the core tasks and task-defining messages of tightly bound group networks. A key question taken up here is how to delineate task-defining messages for a possible joint teacher-researcher role. The clue lies not in group communication networks but in self-talk.

The start of the story told here is in the self-communications of a junior primary/primary teacher of Spanish to English speaking pupils. This teacher, as performer and audience, found himself in a constant inner dialogue, voicing messages of dissatisfaction about what was happening in his classroom. He had inherited a "language awareness" program with much student disengagement. His self-talk, experience suggests, indicates a professional actively building a crucial message-generating and message-sorting framework for a self-defining question:

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 55–64.

How should I be doing this job here and now? The teacher who is responsive is always moving with this inquiry. It is a self-message with research implications.

WIDER AUDIENCE PARTICIPATION: AN EXPERT TASK-MESSAGE NETWORK

When receiving problem communication, it is natural to widen the audience. Given awareness of externally available professional and theoretical (research) messages, an obvious task was to speak directly with potential expert partners located in university departments, in the education system's bureaucracy and in schools. This was a movement from concrete actions to systematic abstraction, with a view to affecting the ongoing concrete practical decisions in purposeful and measurable (i.e. definable and useful) ways. Accordingly, the teacher's aim, which guided his wider dialogue with experts, was defined in concrete and practical terms as a task of getting measurable outcomes, linked to the primary school's literacy aims, from the delivered Spanish language program.

A research-communication network emerged, with this teacher ultimately inviting messages of commentary and recommendation, principally from two expert sources. An expert in primary school literacy development was asked to help formulate systematic messages regarding pedagogical possibilities and considerations, and a research psychologist was sought to provide more abstract messages on schemes of knowing, learning and researching. In, and through, this dialogue, the would-be teacher-researcher (as he may now be called) started organising relevant literature from psychological, literacy and language studies.

Thus, it may be speculated that the ordinary intelligent actor becomes a formal research actor by actively joining in certain ongoing research-related communications, testing their implications for the problem of action in hand. In general form, the flow of communication is not different from that of ordinary intelligence in action but it is specialised in the communications of definable groups. In fact, the web of research-communication that was created was a product of some years of self-talk and critical dialogues, based on the experts' research literature suggestions, and the teacher-researcher's past and present professional experience. An example of a research-based, task-message for classroom action is given below. However, our interest here is not the particular content so much as how the research-communication exercise unfolds.

FROM THE EXPERT NETWORK: THE RESEARCH-BASED TASK-MESSAGE FOR ACTION

It was possible to identify a number of messages from research sources that could influence task analysis for the classroom action both generally and directly. The first of the messages concerned universality. Chomsky (1965) proposed that all human languages are fundamentally innate and the same universal principles underlie all of them. He contended that the grammars of human languages cannot vary freely, especially with regard to syntax. The next message concerned transference. Recent syntheses of research on second language literacy

development suggest a broadly accepted definition of transfer to be the ability to learn new language and literacy skills by drawing on previously acquired resources (August & Shanahan, 2006; Riches & Genesee, 2006). Prior experience is now seen as providing a reservoir of knowledge, skills and abilities available when developing literacy skills in a new language (Riches & Genesee, 2006). In these newer conceptualisations, the message is about which cognitive and linguistic resources can become available to second language learners when learning the new language and developing literacy skills in that language, rather than the bare message that first language influence is either negative or positive.

Getting closer to the concrete setting of the classroom, subsequent discussion and analysis on aspects of practical pedagogy for literacy-based language programs uncovered two abiding frameworks for classroom action – linguistic inter-dependence and contrastive analysis – providing messages that could support pedagogical application of universality and transference notions. After consideration of both frameworks, it was determined that most of the messages emerging from the literature in the field of language transfer could be viewed in one or both of these frameworks (Melby-Lervåg & Lervåg, 2011).

The first framework, linguistic interdependence, evolved out of Cummins' hypothesis on common underlying proficiencies, language and interdependence thresholds (Cummins, 1979, 1984, 1991). The core message is that all languages are interdependent in a learner's brain; that is, they rely upon common underlying proficiencies that reside in a central processing system for all languages. The second framework, contrastive analysis, also maintains a central concern with commonalities between languages, but in this case the identified message relates to structural similarities between languages themselves (Chomsky's notion of a Universal Grammar) rather than skills (i.e. operations, such as the interdependent phonological, literacy and pragmatic operations). Considerations of universality are foremost within this perspective to discern structural (e.g. phonological, syntactic and semantic) similarities and differences between languages (Odlin, 1989). They can either assist or hinder the learning of languages through an analytic compare and contrast process.

A scheme for teaching a second language, oriented towards measurable literacy outcomes in the Australian primary school context, emerged from messages passed between teacher-researcher and experts, teacher-researcher and literature, and teacher-researcher and self-in-action. This scheme was called the *Multilingual Literacy (MLL)* approach. Its purpose was to guide and support the development of contextually-based dual or integrated languages and literacy programs – this means language and literacy development being planned and taught in any particular school by a single, coordinated program for both English and any second language through the application of six overarching pedagogical principles:

1. Universal schedules, identifiable and usable for languages and literacy learning and teaching. The common developmental and underlying proficiency aspects of language, language learning and language use underlie the teaching approach.
2. Developmental scaffolding of language and literacy learning tasks, offering collaborative programming opportunities both within and between languages –

in-step planning – along with the principle of universality in language structures.
3. Task analysis (from the program design principles of Howell et al., 1979, and Howell & Nolet, 2000) to specify the purposes and outcomes of the multilingual teaching programs.
4. Systematic assessments for feedback, including criterion-referenced diagnostic assessments tied to the multilingual programs.
5. Naturalist-immersion classroom environment for language opportunities, developed progressively involving the use of translanguaging methods.
6. Development of a metalanguage for comparing and contrasting language systems.

Messages from the instructive, ongoing, self-defining activity of the teacher-researcher's classroom practice, testing and weighing realistic possibilities for innovation, were constantly in the background because this scheme for action emerged from years of dialogue. As his practice developed, it became more clearly instructive action; a message not just to himself but to others.

COLLABORATIVE INTELLIGENCE: EXTENSION TASK-MESSAGE NETWORKS

Naturally, similar problems had arisen among other language teachers, priming them to respond to any pertinent messages that became available. Information about the above scheme and its related classroom work was spread by word of mouth to reach an extended audience who may be interested in learning about what was happening. This added the normal flow of interprofessional communication to the existing message-web as interested colleagues sought information.

Following support from the education system, teachers were invited to become part of a now extending communication network. A formal arrangement was not in mind initially, but it became an opportunity to establish the generalisability and validity of the approach, thus extending any practical benefits and establishing further data from a range of languages and school contexts. Such opportunities then created a research-communication model that was a congruent and natural consequence of already established communication patterns. The pivot here was the actual ongoing communication, revealing the all-important consistency of the overall research-task-communication scheme. A detailed recursive communication had been demanded with written literature, guided and supplemented by the face-to-face expert communications network, and tested in the originating self-talk of daily practice to gather the best task definition from the formal research process. For the further communications that were starting to extend through a professional practice web, the same effective, detailed recursive communication became the aim, with the same focus on clearly defined schemes that were tested in action. It would be an interactive exercise about practice.

The research-communication was not given to the interested professionals as answers but as a task-message in progress. In what can be framed as critical deprivatisation of practice, these teachers' daily experience, in its concrete variety, would set the same reality test for the further communication of this message as the

classroom experience had for the initial teacher-researcher. Collaborative development of teacher-researchers was predicated on this basis.

THE RESEARCH VEHICLE: STRUCTURING MESSAGES AND COLLABORATIVE LEARNING IN ACTION

The vehicle formally employed to carry task messages and monitor their effects was an extended professional learning (PL) program, fostering a teacher-researcher network that involved ten second language primary teachers and their class-teacher colleagues. The public education system was persuaded to give substantial backing for teachers to be involved, sending a vital signal to the profession and researchers alike. Effective reflection, constructive dialogue and responsive programming were felt most likely to eventuate away from the "school bell", so funding was provided to release the teachers to undertake a series of regular full-day plenary sessions at the university over two years. Associated research-communication tasks were developed for these sessions to drive schemes of implementation, generalisation and validation.

Site visits by the initial teacher-researcher, as "audience" to pick up the messages from each teacher's own setting, approach and style, directly aided this communicative dynamic. Then he and the literacy expert (from the expert network), working as leaders together (both being experienced primary-level teachers), developed a dialogic presentation of the key tasks/messages to the participants, which were planned and delivered, critically, as a series of teaching moments. The collaborative leadership scheme arose as a natural consequence of the development of communication in the expert network. It was based upon the community of interest that led to that expert network initially and sought to extend the effective open communication that had developed successfully within it. The leaders' credibility aided these dynamics. They were able to use task exemplars from their years of teaching experience to enable constructive communications with teachers, modelling and encouraging a type of research-communication the participants subsequently employed with each other on the plenary days, and with their school-based colleagues on an ongoing basis. Clarity, responsiveness, modelling of tasks and timely feedback were core principles at work in this space. What is done, and what data or outcomes are claimed, must be clear in any research-communication exercise.

The PL program was thus a series of communications about the MLL approach, guiding participants from their concrete contexts to the research abstractions behind the approach and its defined tasks, and then back again. Transmitting true task-defining messages was critical to providing conceptual anchors for discussions and action in the general process of knowledge mobilisation. The research-communication leaders had to identify the tasks (for integrated literacy teaching and learning as called for by the MLL approach) and analyse each one in terms that were recognisable as teachable chunks or subcomponent skills and knowledge to prompt a cycle of explanation, modelling, guided practice/planning, independent application and reflection. Guiding the teacher-researchers into a task-analytic stance required heuristic and dialogic communication at a range of levels from

broad theoretical abstractions to practical pedagogy. Initial messages about core pedagogical tasks (such as activities to build oral language patterns) gave way to formative task-defining discussions in the light of participants' prior experience and later of their own current practical testing. It was this final element that proved highly productive in terms of research-communication; participant feedback on task definition and performance came from their learning-by-doing as they systematically used the approach themselves.

Ultimately, the teacher-researcher network planned, tested in action and responded by turns. This ensured effective feedback, with engagement and partnership in the process of transmitting ideas and tasks from the expert-researcher network through to classroom enactments and back again. In this research-communication exercise, the reciprocal cycle of communications that encouraged equal and open interplay between actors and networks participating jointly in the research task constituted the research "method". It was centred on real-life classroom activity that formed the basis for transmitting a dynamic task-analytic research message about languages education, and obviously provided a scheme that could be used for any curriculum or pedagogical innovations.

RECURSIVE, ACCUMULATING AND AMPLIFYING FEEDBACK

The formally requested and checked participant feedback was clear, unwavering and mutually reinforcing regarding the efficacy of the MLL approach and tasks as jointly established through the research-communication vehicle – the PL program. The teacher-researchers' messages from their classroom innovations included:

1. Measurable literacy outcomes in all languages and all school settings could be achieved.
2. Languages programs became integrated into site literacy plans and into daily classroom programs.
3. Languages teachers and classroom teachers were able to plan collaboratively for student literacy development using the given schemas and principles.
4. Classroom teachers were modelling effective learning strategies when using the target language alongside their students in daily interactions.
5. Knowledge of the target language supported understanding and effective use of English grammar, phonics, spelling and reading to a rate what was equivalent to, or greater than, the normed average.
6. Languages programs were able to support students struggling with English literacy development.
7. Student literacy development in the target languages was enhanced through an explicit, systematic and developmental approach to the teaching and learning cycle that provided ample opportunities for multisensory practice, beginning with phonemic awareness and phonological knowledge and skills.

Importantly, the feedback message was similarly clear and unwavering in its support for the research method. The collaborative communicational emphasis, focused on intelligence in action, was evaluated very positively. In interviews

conducted by a third party, teachers and Principals were unanimously in favour of the conduct of the PL program. From this experience, and from Louis and Miles' (1990) work on successful professional learning communications, a conceptual frame emerged for this more explicitly interactive basis for research activity.

Promoting the self-defined and self-defining teacher-researcher role of all teachers involved in this exercise was vital. Teachers involved with this research-communication exercise had organisers to plan, coordinate, schematise, provide overviews and so on, but they were guided to expect these things to be for, or part of, some authentically joint activity that was theirs and congruent with their own professional inner dialogue. The planning had to be flexible and negotiable. All actors had to be responsive to all other actors. Group purpose and interaction had to both reinforce and challenge all self-defining communications and theoretical messages. These considerations were keys to developing a productive research network that supports learning in action through joint communications with the following specific attributes:

1. Clarity: New messages must be comprehensible and clear, not vague and confusing.
2. Relevance: New messages must be seen as meaningful for everyday school life and not irrelevant, inapplicable or impracticable.
3. Workability and Responsiveness: It must be possible to illustrate the messages in terms of specific tasks in a range of settings. Teachers must know what they are doing to get there.
4. Inspiration: New messages must develop the motivation, the interest and the will to do something with them.
5. Supportiveness: Each individual teacher (or administrator) must be equipped with appropriate skills to support and implement new tasks.

A GENERAL RESEARCH FRAMEWORK: TASKS OF KNOWING AND LONERGAN'S TRIPLE CORD

As the years progressed, it seemed that our underlying developing view of intelligence in action, and likewise our more formal research exercise, related to Lonergan's theory of the "triple cord" of knowing (Lonergan, 1967). What occurred quite naturally as research-communication in this exercise simply amplifies Lonergan's empirically-based scheme that underlies method generally – a scheme he advised researchers to keep in mind as a "framework for collaborative creativity" in their collective practice (Lonergan, 1972). Lonergan approached method as something dynamic yet ordered, directed yet free, with a clear sense of how to get to an as yet unknown. He thought it best to start from "cognitional theory" based on the questions "what is happening, and what do I do, when I know anything?" (Lonergan, 1957, pp. xvii-xxviii).

Lonergan's cognitional theory or theory of method is a kind of overall "task analysis of task analysing", discerning the distinct but interrelated subtasks of intelligence in action in any particular task, and able to be appreciated by any active inquirer who looks into their own activity for an understanding of their

knowing. Lonergan's inquiry exposes a dynamic cognitional structure; a compound of three tasks forming a "triple cord" in all intelligence in action (Lonergan, 1967, p. 230). This triple cord is a cord of communicative and active intention. One strand is made up of the messages from whatever is going on (the data of the moment), for which Lonergan uses the ordinary term "experience". A second strand is the conceptualising – the saying-what-is-happening – with insights both habitual and new, in a self-talk that is mostly as expected but sometimes revelatory. This second strand is "understanding".

Conceptual understanding is never the last word. There is an all-important final strand of reflective understanding, or judgement, in which we are always informally, but sometimes formally, testing and checking each insight message against others and against further experience to produce three strands moving together to achieve some overall certainty of definition; some hard-won coherence and stability for our ongoing moving intelligence in action. The strands are always interwoven. "Inevitably, one has to regard an instance of human knowing, not as this or that operation, but as a whole whose parts are operations. It is a structure..." (Lonergan, 1967, p. 223). This third strand of critically checking and moderating any supposed understanding is bound up with decisions for the ongoing action, and will generate or govern ever-developing cycles of action.

The very fact of our communicating is, for Lonergan, a powerful argument for our knowing the kind of pattern he identifies. Like Peirce (see Gallie, 1952, ch. 1), Lonergan holds that human action is always a joint performance and that humans in active living are a single message system; a communication web potentially catching all in its spread. "The self-correcting process of learning goes on in the minds of individuals, but the individual minds are in communication. The results reached by one are checked by many, and new results are added to old [results] to form a common fund" (Lonergan, 1957, p. 290). Conceptualisation, or insight-put-in-words, is always abstract, but instructive action is in the concrete moment. Therefore, active judgement – a constant checking and refining process going on to suit the experience of the moment as the task unfolds – is the ultimate dynamic element of intelligence in action. The criterion of truth (Lonergan, 1957, pp. 549–552) is only met in the case of an informed overall judgement that further inquiry is not necessary. Such is the logic of inquiry governing the activity of the whole human race.

Lonergan modestly pointed out that his general theory of method is simply a helpful instruction worth keeping in mind by the intelligent actor (Lonergan, 1972, p. xii). As a framework for "collaborative creativity", it is to be tested and appreciated in action. His message does not communicate an abstract definition or set of rules (p. xi). It is advice about something we do and can do better. The general task-scheme is abstractly summarised in Lonergan's "transcendental precepts" (Lonergan, 1972, p. 53), namely to "be attentive" in the matter of judicious selection of data of experience; to "be insightful" in the matter of seeking an open but definable understanding of those data; and to "be reasonable and responsible" in the final interconnecting, judging and weighing of the knowledge gained in, and for, the widening field of one's action as experienced. These

precepts, it is suggested below, map neatly onto the three networks identified here in researching practice.

CONCLUSION

In this story, researching begins with typical teaching activities, out of which comes a problem needing suitable definition for further action. This is accepted as a challenge and as a message to act; to seek further messages. There then follows, in natural sequence, the taking up and proving of the communication networks or subsystems that promise to sustain a cycle of learning in real-life action.

The initial communication subsystem in use is self-communication. Then, audiences are found who become partners in communication. The first is an audience of expert-researchers who claim some abstract understanding of relevant performance and can talk of abstract task analysis or definition. The second is an audience of fellow professionals; colleagues receptive to useful messages about the tasks they have to perform. The three communication subsystems involved – self, expert and professionals in the field – embody the interrelated core tasks of knowing, as delineated by Lonergan. Each subsystem has its own emphasis, each amplifying one aspect of Lonergan's "triple cord" of human knowing in action.

In our view, the ongoing definition of our tasks as we perform them is the basic form of our learning, intelligence being not only *in* action but *for* action. Research on classroom teaching activity is not complete, therefore, until it communicates with teachers in the field about their learning in action; where their effective tasks and messages are, and where their self-attending will be most intense. The organising of an ongoing communication subsystem engaging that professionally active network is thus integral, not subsequent, to the research task. Real-life practice researchers must expect multiplicity, but within a single overall governing pattern, rather than a sheer multiplicity of patterns. No single approach or scheme will be all that is needed because of the complexity involved.

If researchers produce messages for fields like teaching without having practitioners in the field jointly involved in the definition of tasks, the effort is likely to exacerbate the notorious theory-practice communication gap. So it is of paramount importance to develop the teacher-researcher as a communicator as well as an actor. Nothing teaches like doing, and only through the effective activity of credible teacher-researchers, as here, can one create joint task endeavours. A more communicational model of researching offers a framework or methodology to be taken up in different guises as appropriate. Delineating concepts such as the "self-communication subsystem", the "expert communication subsystem" and the "professional practice communication subsystem", together with their various divisions and permutations, identifies some of the things to be kept in mind when planning, and actively guiding, future worthwhile research exercises.

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Peter Nielsen BEc, BA(Hons), BEd
School of Education
Flinders University, Australia

Bernard Mageean PhD
School of Education
Flinders University, Australia

MUHAMMAD NUR AKBAR RASYID, JANICE ORRELL AND ROBERT CONWAY

7. ENHANCING EDUCATIONAL QUALITY IN AN INDONESIAN ISLAMIC UNIVERSITY

> There were times I felt strong and saw myself like a strong eagle who was able to explore the universe but at many times I felt just like a powerless newly-born chick that could do nothing. I felt that my ambition to be a real researcher through pursuing PhD was very high, like a rainbow in the sky. It was very beautiful but could not be reached. But, with the support from important people around me, I could still stand on my feet on the journey. (Rasyid)

Universities worldwide claim to aspire to quality. What quality actually represents for each university is influenced significantly by government agendas, local market forces and universities' own internal constituents, namely administrative leaders and academic teachers. This chapter describes the generation of a framework for systematically enhancing and ensuring the quality of learning and teaching in Indonesian Islamic universities.

INDONESIAN HIGHER EDUCATION POLICY

The Indonesian Government's efforts to improve the quality of its higher education include issuing several Higher Education Long Term Strategies (HELTS). HELTS (1996-2005) identified five pillars of Indonesian higher education management. *Quality* is the core pillar, which has four supporting pillars, namely *autonomy, accountability, accreditation* and *evaluation*. In addition, HELTS (2003-2010) introduced three new main goals of higher education, namely improvement of national competitiveness, implementation of decentralisation and autonomy within higher education, and improvement of organisational health (Directorate General of Higher Education, 2003). Based on the National Education System Act No. 20, Year 2003 (The Ministry of National Education, 2003) and its derivatives (Act No. 14 Year 2005 about teachers and lecturers), a strategic national Teacher Certification Program was introduced to improve the quality of higher education in general, and of student learning and teaching in particular. The Acts describe the academic teacher as a professional educator who is responsible for transferring and developing knowledge, technology and arts through teaching, research and community outreach. A teacher must undertake several evaluation procedures, including evaluation of their effectiveness as a university teacher, to achieve professional certification.

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 65–74.

Furthermore, the National Education System Act No. 20, Year 2003 requires university teachers to have a standard qualification suitable for the level they teach. The Ministerial Regulation No. 42, Year 2007, states that a teacher must have a minimum of a Masters degree to teach at undergraduate level and a Doctorate to teach at postgraduate level. The government provides support for this requirement, and seeks to enhance the quality of teachers and teaching practices by encouraging university teachers to pursue their own further education (Asari, 2007). For example, scholarship programs are provided for teachers to pursue research and scholarship in teaching and learning. Thus, it can be argued that these national policies and programs indicate the Indonesian Government's serious intention to enhance the quality of its higher education, including the quality of teaching and student learning.

CHALLENGES FOR INDONESIAN ISLAMIC HIGHER EDUCATION

Despite the Indonesian Government's national programs aimed at encouraging and enhancing the quality of university education, investigations within the Indonesian context have uncovered several concerns. The first is the uneven distribution of quality higher education. It has been found that good quality higher education is largely located in Java (Kartiwa, 2006). The second is difficulty attracting and retaining well qualified teaching staff (Buchori & Malik, 2004) due to inadequate support for teachers, including poor salaries and lack of promotion systems. Attempts to address these issues through increased salaries and a national Teacher Certification Program have had little positive impact to date. The third concern is that many graduates face difficulty obtaining employment relevant to their educational background, skills and competences, leading to accusations that current curricula are not relevant to society's needs or the expectations of employers and professional organisations (Tadjudin, 2007).

Quality, particularly in regard to private Islamic universities (*Perguruan Tinggi Agama Islam* – PTAI), is still considered inferior to that of general universities (*Perguruan Tinggi Umum* – PTU; see, for example, Farida, 2009; Muqoyyidin, 2012; Thoyib, 2012). It is publicly known that PTAI receive less government funding than their PTU counterparts (Farida, 2009; Welch & Syafi'i, 2013). Limited funding underlies challenges experienced by PTAI, which increase the perception of these universities as second-class. Not only is educational quality challenged in Islamic universities, but research with the potential to inform improvement and strategic change is lacking. There is limited published research on the Indonesian higher education context, particularly on issues related to quality enhancement and assurance of Islamic higher education. Kinoshita (2009) claims that there is an overabundance of literature on Indonesian Islamic education at the primary and secondary levels, but very little on Islamic higher education. This concern is echoed in Welch's (2012) examination of the regional trends in Islamic higher education, noting that Islamic higher education institutions in Southeast Asia seem to be poorly represented in scholarship on higher education.

Student learning and teaching are part of the core missions of university education worldwide. Therefore, it is essential to understand what constitutes

quality in learning and teaching, and what infrastructure and processes are required to establish, assess, maintain and enhance it.

THE STUDY

A study was conducted in one of the largest state Islamic universities in Indonesia to address the need to gain a grounded understanding of what constitutes quality in Islamic education, and what processes are needed to support and enhance it. Fourteen academic teachers with diverse discipline backgrounds, education qualifications and teaching experiences, and 14 leaders (university leadership n=9; government leaders n=5) participated in individual interviews and focus groups. Inductive and deductive data analysis (Willis et al., 2007) sought to discover emergent, grounded themes from participant data (inductive), and other findings on enhancement and assurance of student learning and teaching from the extant literature (deductive).

ACADEMIC TEACHERS' CONCEPTIONS OF QUALITY EDUCATION

Academic teachers' conceptions of educational quality encompassed students and their learning, the nature and responsibilities of teaching, responsibilities of institutional governance and, to a lesser extent, curriculum design. Teachers advocated that high quality learning involved learning for conceptual understanding, not merely memorisation to pass examinations. This type of learning requires students to actively engage in learning to learn, not merely learning to pass exams. Teachers also referred to students' independent learning as a desirable capability, including utilisation of study groups in which ideas are discussed and shared with peers or experts. Central to this notion of independence was that students should not rely solely on teachers as a source of knowledge and information. Independent learning includes researching additional information outside of class through making maximum use of other knowledge sources such as the Internet and libraries. Another perception was that good learning involved students' ability to deliberately manage their own learning. What was largely absent in the teachers' discussions of high quality learning was reference to notions of higher-order thinking, integration of knowledge and critical reflection on learning. Despite the teachers' belief that students should become independent learners, few discussed techniques for promoting independent learning.

The teachers perceived that high quality teaching involved focusing on enhancing students' understanding; teaching was not merely a matter of transferring knowledge to students without checking their understanding. Teachers strongly identified with a requirement that they should be able to demonstrate a good command of both content and pedagogical knowledge; something they believed was essential for effective teaching.

They argued that teachers should demonstrate their pedagogical competency through their ability to deliver attractive teaching, including adopting a variety of teaching methods and teaching media. They also felt that teachers should demonstrate disciplinary expertise through their ability to explain subject matter and respond to students' queries.

Facilitation of respectful relationships between, and among, students and teachers was another mark of quality teaching the teachers felt strongly about. This involved treating students and their opinions with respect, and being like friends or parents to them. Assessment was mentioned as important to quality teaching but discussion was simplistic, focusing on the importance of using various methods of assessing student learning. There was no consideration of the complexity of assessment design and its alignment with education goals, provision of feedback to students, and the challenges of interpreting achievement and objective grading.

Some critical understanding of the current situation can be drawn from teachers' responses with respect to curriculum design. The teachers referred mostly to the idea that clear curriculum objectives were necessary for quality learning and teaching, and involved arranging the curriculum based on levels of difficulty. They argued that curriculum was of high quality when it demonstrated its usefulness to students' lives by showing the connectedness between materials and current conditions within the community. Some silences were observed in relation to curriculum. Only one teacher raised the issue of equity and diversity, but their discussion was limited to the use of assessment techniques to meet students' diverse abilities and preferences, rather than diversity and equity across all areas of teaching and learning.

The teachers' opinions revealed several critical issues regarding educational quality, which involved the use and design of teaching evaluation. Some teachers argued that teaching evaluation should be undertaken continuously and objectively, and involve external evaluators to ensure quality. They also argued the need for physical, financial and intellectual support for students if universities were to promote quality education, and funding support for teachers to attend professional development events and receive recognition and rewards for good practice.

EDUCATIONAL LEADERS' CONCEPTIONS OF EDUCATIONAL QUALITY

Educational leaders, like the academic teachers, identified the concept of learning for understanding, not content memorisation, and learning to learn, not merely learning to pass. Active engagement in learning was also an attribute of quality learning in which students were active participants in their own education both inside and outside the classroom context. This attribute was linked to student independence in learning. Leaders argued that it was important to ensure that the content students were required to learn was relevant to their everyday life and that students had opportunities to apply their knowledge to practice. They were keen for students to acquire the ability to relate current acquired knowledge across other disciplines, and to transform their mindset and behaviour as a result of their learning. They also argued that teachers with expertise in subject matter knowledge

and who could master an array of teaching skills could create learning environments for effective student learning. They believed teaching involved facilitating active and independent student learning, and that good teaching would enable respectful relationships between, and among, students and teachers. They expected good teachers to use a variety of assessment techniques, clear assessment criteria and objective, unbiased grading. In contrast to the academic teachers, leaders acknowledged the importance of good curriculum for high quality learning and teaching. However, the only feature of a good curriculum they identified was learning's connectedness to real world matters and/or students' lives.

Many leaders referred to the importance of credible teaching evaluations as motivation for teachers to perform at their best. They argued that achieving high quality education required support for teacher development as well as student learning. Support for students included providing teaching media, libraries, Internet, laboratories and good academic services. Support for teachers included assistance to attend academic events and to pursue higher degrees.

Comparing the beliefs of the academic teachers and educational leaders indicated that they share common concerns regarding learning, teaching, curriculum and governance. However, only one teacher showed concern for the idea of ensuring that the curriculum attends to equity of access. Ensuring student achievement of graduate attributes was largely a leadership concern.

ENHANCING LEARNING AND TEACHING

A further inquiry regarding academic teachers' and educational leaders' ideas about what institutional practices are needed to achieve quality, and the values required to drive these practices, followed the exploration of these stakeholders' conceptions of educational quality. The key features teachers and leaders believe will enhance the quality of student learning and teaching in Indonesian Islamic universities are as follows.

1. Enhancing teachers' quality and teaching practice through academic development programs

   I think what is needed is that every teacher is provided adequate opportunities to join academic development programs. Providing academic professional development will give teachers opportunities to improve their knowledge and skills. (TA.07.16)

2. Acknowledging and rewarding excellence in teaching

   Any effort of improvement initiated by teachers or departments should be recognised by leaders within the university. Do not overlook any efforts done by productive teachers. (TL.03.9)

3. Encouraging active learning through student-centred learning approaches

   Thus, the first principle is that the ones who must be active [in the teaching and learning process] are learners. (TA.02.14)

4. Designing curricula that meet graduates' needs for their future roles in workplace and society

   Each subject in curriculum meets the requirements of the discipline or subject and at the same time meets the needs of markets or users. So, there are two aims here. … How the curricula meet the requirements of the disciplines and how it meets the needs of the graduates users. (TA.02.03)

5. Increasing the quantity and quality of learning and teaching spaces, resources and facilities

   The next one is how to create an enjoyable teaching and learning environment. In this case, the institution has to provide quality facilities and adequate resources in the libraries. (TA.12.02)

6. Strengthening the leadership and management roles for achieving quality in student learning and teaching

   I think we need controlling … monitoring of the teaching and learning, Monitoring from institution leaders. I think the leaders are the representative of the institution. (TA.09.07).

VALUES TO GUIDE ACHIEVEMENT OF EDUCATIONAL QUALITY

In combination with the suggested strategies, the teachers and leaders espoused the following common values that should underpin and guide a system seeking to maintain and enhance quality education in an Islamic university.

1. The exercise of a sense of responsibility

   We [teachers and leaders] must have sense of responsibility (TA.09.09)

2. Being professional

   Another value is being professional. Thus, academics work based on their respective duties. I think like that. (TL.02.08)

3. Commitment to collaboration and cohesion

   Yeah, after having strong commitment from institution administrators, the next thing is dissemination of the strategic plans for teaching and learning. Thus, all the involved stakeholders ranging from curriculum developers, students, parents, and others are required to work collaboratively. (TA.04.02)

4. Adopting a religious approach

   This is a religious-based institution. Thus, religious values must underpin all our activities, including the evaluation and enhancement of the quality in teaching and learning. The responsibilities the government puts on our institution must be undertaken by keeping taking religious values into account. This might include morale values. (TA.13.09)

Teachers and leaders expressed strong beliefs regarding the necessity of acknowledging excellence in teaching, and rewarding quality teachers and teaching

practices through the provision of teaching awards or incentives. They saw this as a fundamental principle for enhancing quality in teaching to enhance students' learning experience. Ramsden and Martin's (1996) study in Australia similarly indicated that quality teaching should be valued in their institutions, although few felt that it was.

Enhancing teachers' quality and teaching practices through provision of adequate, well-designed, ongoing academic professional development programs was also suggested. Teachers and leaders believed high quality academic development programs were important for equipping teaching staff with the knowledge and skills to empower good teaching practices. Programs would include designing curricula relevant to modern social needs, engaging and interactive instructional strategies to foster effective student learning, designing effective assessment strategies that shape transformative learning, and establishing good learning environments and positive student-teaching relationships (see for example, Killen, 2013; Shulman, 1986, 1987).

There was a consistent call for encouraging students' active learning through the implementation of student-centred learning approaches in which teachers are expected to position themselves as learning facilitators, providing opportunities for students to engage in their learning and take more responsibility for their learning. Promoting students' active learning has been widely discussed in the higher education scholarship on learning, and is acknowledged as essential for enhancing the quality of student learning experiences (e.g. Davis, 2009; Kember & Leung, 2009). In the last 6-8 years, instruments to measure student engagement in their learning have become available internationally and are widely reported in the literature. Several countries use a system for measuring this as an alternative indicator of quality student learning. Australian universities, for example, administer the *Australasian Survey of Student Engagement (AUSSE)*. The United States of America also implements this kind of survey, which they call the *National Survey of Student Engagement (NSSE)*. An important consideration is how to frame such a survey to make it sensitive to the Indonesian Islamic context.

Developing a curriculum design that equips students with the skills and knowledge they need for their future professional roles was seen as essential. The teachers and leaders discussed the need to design a curriculum in which students intentionally develop critical thinking, problem solving, interpersonal and communication skills, work in teams and self-regulate learning (Biggs, 2012; Kember & Leung, 2009; Kember et al., 2007). However, while participants clearly valued this type of curriculum development, achieving it poses a major challenge for Islamic universities in Indonesia to confront. It would require considerable investment of resources to establish collaboration between key stakeholders, including future employers and professional organisations. Without these mature partnerships, it is not possible to design curricula that are oriented towards equipping graduates with the knowledge and skills they need to play their future roles in the community and workplace (e.g. Knight & Yorke, 2003; Vermeulen & Schmidt, 2008).

IMPLICATIONS OF THE FINDINGS FOR UNIVERSITY GOVERNANCE

The educational leaders and academic teachers acknowledged that providing institutional support for learning and teaching, including adequate, quality learning and teaching spaces, resources and facilities, is fundamental for enhancing quality learning and teaching at Islamic universities in Indonesia. Chalmers' (2007) comprehensive international review of research into quality systems and indicators of learning and teaching highlights what institutions can do to improve educational quality. Providing an appropriate learning environment conducive to student learning and good teaching is most important, and includes sound assessment processes and student support, and addressing diversity and equity issues.

Enhancing good learning and teaching in Islamic universities in Indonesia is linked inextricably to governance and management systems that are sympathetic to Islamic religious principles and culture when developing strategies to establish a supportive environment. This study identified participants' awareness of leaders' strategic role in attaining educational quality. Marshall et al. (2011) identified that effective leadership and management are required at all levels of an institution to establish the quality of the academic environment required for quality university learning and teaching. This suggests that induction into educational leadership is an essential aspect of higher education teachers' preparation.

There is no question about the study participants' recognition of the need to establish an institution-wide culture of quality in Islamic universities in Indonesia to underpin educational quality enhancement. This culture would include being professional in regard to undertaking individual responsibilities, and practising collaboration and collegiality among staff and faculty administrators. Other strategies for quality improvement depend on this deliberate recognition of institution cultures, underpinned by professional behaviour and collegial engagement. Barrie et al. (2005) identified that the most successful faculties in assuring and enhancing educational quality were those with coherent collegial systems and processes to disseminate policy, and whose staff demonstrated strong engagement with implementing and adapting policy to their particular contexts.

Achieving a culture conducive to quality teaching and learning in Islamic universities in Indonesia rests on key stakeholders' ability to incorporate key religious values in curriculum, and teacher and student support systems. Participants deeply believed that embedding key religious values into individual and institutional efforts is fundamental to the enhancement of educational quality. These values include a "sense of sincerity", incorporating the most fundamental religious values expected in all institutions coordinated by the Indonesian Ministry of Religious Affairs (MoRA), and not being money oriented. Participants were acutely aware of the importance of considering Islamic university values when designing and developing new institutional policies, systems and practices. Pennington and O'Neil (1994, p. 13) acknowledge that "organisations themselves are best placed to determine their own strategic approach in the light of their own history, and future priorities and plans".

CONCLUSION

Academic teachers, and institutional and governmental leaders have a comprehensive awareness of what is needed to enhance the quality of student learning and teaching in Indonesian Islamic higher education. In most cases, their understanding aligns closely with the claims found in international higher education research and theoretical literature. The leaders argued for the establishment of an institution vision; a deliberate approach to encourage an environment and culture to foster quality student learning, supported by effective teaching. Three core principles underpin such an approach: establish commitment to agreed professional behaviour standards, collegial respect and engagement to develop a culture of quality; translate key religious values to educational practices; and provide effective leadership and sound management systems to realise educational quality. There are significant potential challenges for attaining quality within existing institutional conditions, systems, policies, practices and culture in Indonesia. These require the establishment of infrastructure, systems and strategies initiated by the senior institutional leadership to support an environment conducive to change and innovation, and in which staff feel confident to engage in quality enhancement processes. Central to this is the provision of respectful spaces for staff to express their opinions, and engage in dialogue and critique of existing policies and systems. Creating such an environment at the Islamic university that participated in the study requires a significant cultural shift.

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Muhammad Nur Akbar Rasyid PhD
UIN Alauddin Makassar, Indonesia

Janice Orrell PhD
School of Education, Flinders University, Australia

Robert Conway PhD
School of Education, Flinders University, Australia

ANTHONY ARROWSMITH, DAVID D. CURTIS AND
JOHN GUENTHER

8. BEYOND THE TRADE QUALIFICATION

Seeking Higher-order Cognitive Skills

> To transition from a student to a published researcher is a bit like stepping back from the "finish line" and having to re-run much of the race. The challenge here is to accept the thesis is just the beginning, not the end. The true value of research is putting it out there in such a way that the wider population can benefit from what you have learned and can contribute. Being a researcher means you can have a "do-over". Perhaps the next time around you will be just that little bit better. (Arrowsmith)

The mining industry, although a small employer (<2% of the workforce), is an important component of Australia's economy. It makes up 7.7% of GDP and 48% of export earnings, and requires a highly skilled workforce (Australian Bureau of Agricultural Resource Economics and Sciences [ABARES], 2011). The mobile fleet, including ore extractors and dump trucks, is essential in the ore extraction process. Highly skilled technicians are required to maintain equipment to meet high production targets. Comprehensive apprenticeship training of heavy equipment fitters to keep these machines operational is adequate for commencing tradespersons but little is known about how heavy equipment fitters continue to learn and develop the higher-order cognitive and interactive knowledge and skills to service and maintain modern mobile mining equipment. New knowledge and skills are required as new technologies are introduced. The aim of this research was to discover how mobile mining equipment technicians gain the higher-order cognitive and interactive skills necessary to maintain modern mobile equipment.

A qualitative multiple case study methodology was employed to consider the context of working either at the two selected mine sites or in equipment dealerships tasked with providing technical and logistical support to the sites. Research participants were selected purposefully and included 11 heavy equipment fitters, supervisors and trainers who had diverse roles and differed in their experience in the industry. They shared their views and experiences through interviews. Their work practices were observed periodically over a 12-month period. Worksite documents, including procedures manuals, were analysed to understand mobile equipment technicians' skills requirements.

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 75–84.

Identifying Required Worksite Skills

Mine site technicians have specialised knowledge that relates to the specific equipment used at their site. Mine sites limit the range of machine types (such as dump trucks, wheel loaders and bulldozers) to specific manufacturers and models, which explains the site-specific knowledge required by tradespersons to perform their roles. Therefore, a mine site tradesperson does not need to be familiar with every type of dump truck or wheel loader and their various maintenance requirements; they need be familiar only with the models on which they work. Tradespersons wanting to work in the mining industry require good knowledge and skill in servicing and general maintenance, and a capacity for logical diagnostic practices that can be enacted should common fault-finding methods not resolve a machine breakdown. Specific knowledge of machines, tools and equipment used onsite is learned onsite. Tradespersons customise their generic trade knowledge and adapt it to become highly proficient in maintaining site-specific equipment.

Skill Requirements Needed on a Mine Site

We classify work at mine sites as routine servicing, non-routine but common problems, and non-routine challenging problems. Most work heavy equipment tradespersons undertake on mine sites is routine servicing and maintenance in accordance with detailed service documentation. This work occurs at strict service intervals to minimise the risk of unscheduled breakdowns. Maintenance routines do not necessarily mean the work is easy. Selected personnel who are recognised as site experts at certain tasks through extensive practice undertake tasks such as engine liner pack changes using the tools and equipment available under site conditions. A review of the procedure in the service manual revealed that this task requires high levels of underpinning trade knowledge and skill. Thus, although routine, this is a knowledge-intensive task.

Analysis of maintenance problems that occurred with equipment at each mine site showed that individual machines develop common faults. This is where site-specific knowledge and experience play an important role in maintaining the fleet at high production standards. Site experience leads the tradesperson to check the common issues first, discarding a formal diagnostic process. A deductive diagnostic approach is used only after exhausting the "usual problems" approach. Tradespersons with a capacity to use specialist tools and equipment can diagnose and repair common site-based problems. Although higher level skills are necessary compared with normal servicing and adjustments, these tasks become routine. From this perspective, it is reasonable to deduce that high-order cognitive skills are not necessary for typical problems once these issues are identified and strategies adopted that become internalised as "site-specific knowledge".

Challenges arise when non-routine problems occur. The findings showed that not every tradesperson has the high-order cognitive and interactive skills necessary to deal adequately with these situations. Most tradespersons were satisfied with completing the tasks they were given, despite these being routine, but were willing

to take up the challenge of resolving non-routine problems with the machines with technical and peer support from more experienced tradespersons. However, one tradesperson was excited and motived by the challenge of difficult problems, and was capable of undertaking the research needed to systematically diagnose and resolve them. He revealed a much higher level of cognitive skill than his peers. His colleagues indicated his willingness and ability to pass on his knowledge and experience; he showed strong skills in communication, problem solving, self-management and use of technology. Observations at other sites identified a similar pattern of skill distribution among team members. The evidence gathered showed that the current level of site knowledge, skill and work practices are sufficient to maintain the machines to required production standards provided there is a capacity to resolve non-routine problems. We identified three skill levels: technicians who undertake routine servicing and maintenance tasks; those who can perform complex maintenance tasks, including basic problem solving using specialised diagnostic equipment; and those who use high-order cognitive, diagnostic and interactive skills to solve problems and pass on to others what has been learned.

Developing the Required Knowledge and Skills Needed on a Mine Site

The fleet size and the environmental conditions under which the machines operate place diverse maintenance pressures on the personnel operating and servicing them. Tradespersons in each environment become very knowledgeable about individual machines as well as specific machine models and types. Evidence from conversations recorded in diary entries suggests machines often develop "quirks" that distinguish them from others of the same type. Participants attributed these quirks to the number of operating hours within the equipment's service life, how individual operators have treated it, how well it has been serviced and maintained, whether it has been involved in an incident resulting in damage and whether it has been used beyond its designed capacity during its service life.

The mine sites studied have technical and logistic support from equipment dealerships through service contracts in addition to their own technicians. Dealerships have technical support from manufacturers. Mine Site 1 has a dealership facility close by and can call on specific technical or maintenance support readily. Mine Site 2 has some relatively new equipment but does not have an equipment replacement program of a similar nature to Mine Site 1. Mine Site 2 has a technical support contract with the dealership because of the number of machines required onsite. This support is called on to assist with challenging problem solving tasks. Cooperation between mine site maintenance staff and their dealership colleagues ensures sufficient knowledge and skills coverage. Interactive skills to work effectively in teams are essential for the mining environment. Participants' comments and worksite observations showed that tradespersons rarely work alone; they usually form small teams to readily access technical support and to work safely. This practice extends to site tradespersons, who are encouraged to work with dealership personnel where possible to learn specific skills through an informal shadowing or mentoring process. Site-specific knowledge and experience

is passed on to dealership personnel, and technical knowledge and experience is passed on to site personnel. Teamwork enables quick, safe completion of required work to allow for the machine to return to production.

The Importance of Site Experience

Site experience is highly valued. Functioning as a heavy equipment fitter requires practical, hands-on exposure to the machines and specialist tools and equipment. This practice is often based on trial and error using detailed technical service documentation. The effectiveness of the learning that occurs is consistent with the elements described by Rogers (1969) and the reflexive practice that follows, linking action with thought (Beard & Wilson, 2006; Kolb & Fry, 1975). A more experienced person mentoring a less experienced tradesperson is one way of sharing site knowledge. Communication between work crew members is encouraged and supported during daily prestart meetings, particularly when non-routine issues arise or have been resolved. This practice places a strong emphasis on interactions between members rather than getting information from reading or interpreting service reports. The location and informal atmosphere of these prestart and toolbox meetings, which occur in the main workshop among the machines at Mine Site 2 and the workshop crib room attached to the main workshop at Mine Site 1, seem appropriate for tradespersons (Le Clus, 2011). This may be a reason for the confidence observed among those presenting during these meetings.

Knowledge with little or no opportunity to practice is quickly lost or difficult to recall. Underpinning trade knowledge needs to be embedded into relevant practical tasks designed to reinforce the importance of general and specific knowledge. A critical incident involving an engine fault at Mine Site 1 supports this. Two tradespersons were assigned this task. They indicated they had received training in using the diagnostic equipment and were familiar with the engine type and its technology, yet they found it difficult to devise a test to resolve the non-routine problem. Later observations of both persons during other work activities, and confirmed by their supervisors in a general discussion, indicated they were competent and skilled in what they had learned through experience (a combination of learned knowledge and practice) but were unable to transfer this knowledge to a difficult novel problem. Their lack of transfer suggests that something more than site experience is necessary for highly proficient performance. Other experienced individuals were able to deal with non-routine problems.

Technical Service Training in the Workplace

Some tradespersons value service training for site-specific equipment provided by dealerships but it has limited impact in developing sufficient knowledge to maintain equipment to high production levels. Dealerships collaborate with manufacturers to develop training programs for those required to maintain their equipment. Pending the introduction of new equipment or technology, dealerships prepare for its release by providing training for those who make the decision to

adopt it and those who manage and maintain it. However, dealership-provided service training has not been conducted on either mine site recently. There is a view that the service training programs are not what the sites require, or are not delivered at a useful time. Mine site tradespersons need to know what problems might arise and how they can be rectified. This training is effective if it is practice-based. New equipment entering mine sites is often supported under service contracts (Komatsu Australia, 2013). Maintenance agreements require dealership-trained service personnel to work collaboratively onsite with site personnel. This creates opportunities for mine-based tradespersons to benefit from peer learning and training opportunities at times when skills development is needed. Planning for workforce development must ensure training is not generic but targeted to site-specific needs.

Informal Learning and Interactive Skills in the Workplace

Informal learning is a dominant mode of skills enhancement at each site. Planned informal learning takes place during mentoring activities between experienced site members and those new to the site. Unplanned informal learning occurs as non-routine situations arise. It is influenced by the mentor's and the mentee's interactive skills generated through the experience (De Laat & Schreurs, 2013). The process identifies strengths, weaknesses and benefits in those being mentored and in the mentors and supervisors making decisions on how best to deploy personnel. Peer learning and mentoring in this study is consistent with findings reported by Cairns and Mallock (2011) on the importance of workplace learning as an inspiring and significant dimension of learning.

Reasons for adopting a strong informal learning process appear to be mutual support and reassurance rather than monetary rewards or job security (Evans & Waite, 2010). Informal learning continues beyond the task or activity, as evidenced in diary notes of general conversations away from the workplace, which suggest a reflexive dimension to the learning. When considering workforce development, a strong social network both inside and outside the workplace is important in disseminating site knowledge and experience. This occurs frequently in the workplace through regular toolbox meetings and shared breaks, but less frequently outside the workplace.

Improving the Level of Diagnostic Skill Onsite

Advanced performance depends on individuals who have high-order knowledge and skills. The emergence of these skills appears to be related to high performers' personal attributes. One tradesperson identified with high-level skills reported he had not completed any formal training qualifications since his apprenticeship, but during the interview he revealed he had completed his trade studies at Certificate IV level and not the more common level III. He was dealership-trained and had completed many service training courses prior to working on his current mine site; a pattern consistent with the literature on human capital theory that states current

levels of human capital arise from cumulative investment (Becker 1962; Schultz, 1961). The investment this tradesperson has made is general in nature (an apprenticeship in mobile equipment maintenance), with selected dealership service training specific to the organisation's requirements. Current and future employers benefit from previous employers' investment in training (Booth & Katic, 2011). In this case, the tradesperson's level of confidence and self-efficacy appears to arise from a combination of exposure to relevant service training programs and hands-on experience with the equipment, tools and software. He is able to maintain machine performance because he has developed a recursive, systematic diagnostic approach (Andic & Eng, 2012) that ensures he can solve problems readily. This tradesperson generates explicit knowledge, applying concepts in practice to develop expertise (Tynjala, 2008). His willingness and ability to support colleagues is important for both his development as an expert and as a source from whom his colleagues gain specific workplace knowledge (Billett & Choy, 2013).

It is apparent from site observations that even if people of the calibre of such a tradesperson have only limited experience with the technology, they have a level of confidence and initiative to take responsibility and work through problems until a suitable resolution is found. The tradesperson being discussed (Edward) uses the metacognitive processes described by Downing et al. (2008); he reflects on and analyses his experiences to draw conclusions and apply what is known. He has developed beyond "what to do" and "how to do it" to "why do it" and "what have we learned?" He can look forward to "how can we use this in the future?"

Learning in the workplace is an accepted and integral part of being a tradesperson at each mine site, although this was not always made explicit. The five cooperative learning components proposed by Johnson and Johnson (1999) were identified during observations of work procedures at both sites. The resolution of the critical incident involving the premature engine shut-down fault demonstrates the effectiveness of cooperative learning over competitive or individualistic learning (Johnson & Johnson, 2004).

Motivation to Learn

An intrinsic motivation to learn appears to separate tradespersons with higher-order cognitive and interactive skills from their less-skilled peers. Skill shortages would be evident if it were not for the personal drive and commitment revealed by participants Roger, Edward and Andrew. They appear to be motivated by personal satisfaction and self-esteem arising from peer recognition rather than financial incentives. In contrast, the majority of participants were not interested in doing any additional training unless there were financial incentives to do so. Comments such as "I'd probably think about it but that [the financial reward] isn't really happening at the moment" was a common response. Most participants were willing to attend service training provided the incentives were favourable.

Incentives to undertake further personal development through formal training are mainly financial. Long term job security and the ability to earn in a competitive and fluctuating employment market were silences in most interviews. This speaks

to the "here and now" philosophy prevalent in research in the mining industry. The work of Robinson and Arthy (1999), and Robinson (2000) suggests that if a learning culture had been introduced earlier in the participants' mining industry careers, those interviewed might have experienced a much broader interpretation of personal development and reward. Only Edward, Roger and Andrew (all with leadership or supervisory roles) revealed intrinsic motivation for ongoing learning, such as increased job satisfaction. The evidence strongly suggests that building a learning culture within the workplace depends on the personal attributes and intrinsic motivation of those with high-order cognitive and interactive skills rather than extrinsic factors.

Balancing Site Skill Requirements

The current balance of expertise is adequate to maintain the fleet to acceptable productivity levels. The literature reviewed revealed the potential for skills shortages but the sites in this study indicated no current skills shortage. None of the sites were seeking additional mobile equipment tradespersons. Thus, we conclude that the current balance of skill levels is adequate to meet the sites' requirements.

The introduction of new technologies may disrupt current skills requirements and supply. Most of the discussion of new technologies in this study is on the technology being built into mobile equipment. Another equally important development is the increase in technology in the diagnostic tools used to solve problems. During discussions about computer use and familiarity with information technologies, all participants indicated they used information technologies as part of their work and were comfortable with them. The problem with using technology is that any lack of skill in using the software or tools only becomes apparent when their use is outside the norm. This limitation is evinced by the lack of understanding of what the available diagnostic tools could do to identify and solve the critical incident involving the engine fault.

In evaluating current work practices and capacity to work with new technologies, the evidence suggests heavy equipment fitters adopt the same strategies they have used in the past; they wait until a new technology arrives, which is when service training is offered. They then develop knowledge and skills to use it as they are exposed to the equipment. The difference between emerging technologies and previous systems is that newer technologies are more complex and more sensitive to incorrect settings. Also, learning by traditional methods such as trial and error takes time; time service personnel and the industry may not have if problems arise early in the introduction of new technologies.

DISCUSSION

The most effective way for tradespersons to develop their high-order cognitive and interactive skills is to adopt a strategy of blending exposure to the equipment with cooperative, informal learning activities. The method of sharing learning through prestart and toolbox meetings further develops individual interactive skills.

Although learning occurs at each site, learning through dealership service training or similar programs is not valued unless it focuses on the needs of the tradesperson for the specific site. The most effective tradespersons have high-order cognitive and interactive skills, and underpinning knowledge and skills gained though formal training, dealership training and a commitment to working through problems to a satisfactory resolution, sharing findings with colleagues and being reflective (Andic & Eng, 2012; Billett & Choy, 2013; Johnson & Johnson, 2004; Tynjala, 2008).

Most work required to maintain high productivity levels is routine despite differences between the nature and focus of tradespersons' work at mine sites (general servicing and breakdowns) and at dealerships (component repair). Each workplace needs the capacity to diagnose and resolve non-routine issues when they occur. This study shows that this is not limited to the level of technology within current equipment. Workforce planning must anticipate a need for personnel who can carry out complex routine and non-routine tasks. The range of required capacities is not found in each individual tradesperson; rather, a mix of skill levels is required, including those individuals who are content to undertake routine work and those who are able to deal with complex non-routine problems.

Mobile mining equipment is evolving and new technologies are entering service in Australia, yet tradespersons in this study continue to adopt strategies used in the past, such as learning on-the-job through trial and error and informal peer learning techniques. The motivation for most tradespersons for developing their knowledge and skills is limited to financial incentives. It appears that only those who have high-order cognitive and interactive skills are driven to learn through personal motivation, satisfaction and the esteem in which they are held by peers. Recognising this distinction is important for ensuring the best skills mix for the worksite and for the development of a workplace learning culture.

This study found three levels of performance that are needed to maintain the current fleet to meet production standards. There are a) technicians who can fulfil required routine servicing and maintenance tasks; b) those who can perform more detailed and complex maintenance tasks, including basic problem solving using specialised diagnostic equipment; and c) those who can use high-order cognitive, diagnostic and interactive skills to solve problems and pass on what has been learned to others. This learned knowledge includes developing strategies to enhance equipment productivity.

CONCLUSIONS

Current trade training at Certificate III level provides a basic introduction to the technical knowledge and skills necessary to work in the mining industry as a heavy equipment fitter. Technicians develop their tradecraft following their pre-service training on the worksite through exposure to the tasks and activities required to service and maintain the mobile equipment used at the site. The research has revealed that knowledge needs to be applied under site conditions to develop skill and expertise. Technical information and resources are readily available from work instructions and service manuals, but learning occurs best in an informal setting,

supported by peers. The study has also revealed a need for high-order cognitive and interactive skills. It has shown that tradespersons with these skills become recognised as site experts.

These findings suggest that closer links between registered training organisations (RTO) and worksites, with specific trade training delivered onsite rather than remotely, may be advantageous in developing tradespersons with the desired knowledge and skills. This arrangement would create the opportunity to learn and practice in an authentic environment, increasing the relevance of the certificate learning. If such arrangements are not possible, RTOs may need to simulate the mining context, incorporating the work processes experienced on typical mine sites and in dealerships to improve the relevance of their training. Current trade training and qualifications assume that all qualified tradespersons can, and will, perform all tasks required of them to similar minimum standards on completion of a certificate. This study has shown that tradespersons employed in the mining industry are competent in carrying out routine maintenance to a high standard and that some technicians have gone well beyond that basic level of competence and have achieved a "mastery" level – having high-level cognitive and interactive skills. Such people are needed in the industry.

The mastery skill level is likely to become particularly important because of the introduction of new technology in mobile equipment, and the specialist tools and software required to maintain it. Tradespersons will need to be more proactive in their personal trade skills development as new technology enters service. This may include developing higher levels of cognitive and interactive capacity than are currently held. Participants identified skills gaps in electronics and advanced hydraulics. The deployment of new technologies to improve fuel efficiency, reduce emissions, enhance safety, greater machine monitoring and self-diagnostics will create a need for on-the-job skills development. This capability is not well-developed, as evidenced by the critical incident involving an engine fault. Service and maintenance personnel need the capacity to develop their knowledge and skills to remain current and familiar with innovations in technology to maintain equipment at peak performance levels.

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Anthony Arrowsmith EdD
School of Education
Flinders University, Australia

David D. Curtis PhD
School of Education
Flinders University, Australia

John Guenther PhD
School of Education
Flinders University, Australia

MARETHABILE MAPITSO IGNATIA MASAKALE,
MICHAEL BELL AND R. JOHN HALSEY

9. PREPARING TEACHERS FOR RURAL SECONDARY SCHOOLS IN LESOTHO

> When students and professors are thinking on the same page, they will start to understand each other's viewpoint, thereby making researching a paper easier. (Masakale)

Lesotho's population is concentrated in rural areas. Understanding the complexities of providing education to these areas is of paramount importance. Among the issues facing authorities charged with this task is preparing teachers to work in rural contexts. This chapter draws on the findings of a study of secondary teachers and their experiences of working in rural Lesotho. Findings indicate that inadequacies in teacher preparation programs may be undermining these teachers' success and sustainability.

CONTEXT

Geographic Location

Lesotho consists of four regions/ecological zones: the lowlands; the Senqu river valley; the foothills; and the highlands/mountains. Altitude is the main distinguishing factor. The lowlands sit at around 1,000 metres above sea level. Their population of 201 per km^2 makes them the most densely populated area. The highlands/mountains rise to 3,500 metres above sea level. They are characterised by extremely low temperatures in winter (Bureau of Statistics Lesotho, 2004), with heavy snowfalls. They make up the largest region (70% of the land area) but are the least densely populated with only 20 people per km^2 (Nyabanyaba, 2010).

Economic Status

Lesotho is resource poor. The average daily survival income is M8 (AUD $0.80). Rural households are the poorest, with a daily survival income far below $1 (Bureau of Statistics Lesotho, 2006). Approximately 70% of the Lesotho population live in rural areas (FinScope, 2011). The rural unemployment rate is over 40% and about 50% of rural people live below the poverty line (Bureau of Statistics, 2006; May et al., 2002). The poverty assessment (PA) and household

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budget surveys (HBS) show that the predominantly mountainous districts tend to be the poorest.

The Education System and Attrition

Lesotho applies the 7–3–2–4 model to schooling: 7 years of primary; 3 years of junior secondary; 2 years of senior secondary; and 4 years of tertiary (Mturi, 2010). Exam fees must be paid at the end of each level (Mturi, 2010). Those who can afford the cost and perform well progress to the next level. The Lesotho Examinations Council administers primary school leaving exams (PSLE) and the junior certificate (JC) exams locally. Success through education requires continuous participation and satisfactory exam performance at each level (Ntho & Lesotho Council of Non-Government Organisations [LCN], 2013). Success defined in terms of exam performances is virtually non-existent in Lesotho's rural schools, even for those who stay in school longer. When Free Primary Education (FPE) began in 2000, only 48,000 of the 180,000 pupils enrolled in Grade 1 (approximately 27%) managed to sit for the PSLE (Chiombe, 2007 cited by Morojele, 2012). Only 50% of children enrolled in secondary education completed the cycle (Ntho & LCN, 2013). The focus on English is a major reasons for this, among myriad others (Mulkeen, 2006). As Mulkeen et al. (2007) point out:

> All schooling after third grade in Lesotho is in English. Prior to the mid-1980s, many children did not continue past fourth grade, dropped out while struggling to complete the grade, or failed the grade because they had not learned enough English. (Mulkeen et al., 2007, p. 101)

This focus on English may deter rural secondary teachers who often see even the brightest children get lost in the system. Rural children are demotivated to persist with schooling because they see no chance of progressing to higher education and no prospects of economic returns from it (Lekhetho, 2013). Available education may not be accessible, affordable, acceptable or adaptable (Human Rights and Equal Opportunity Commission in Australia [HREOC], 2000a, 2000b).

The Implications of Low Quality Education

Education must be of good quality for a country to achieve improved results from providing it. The Dakar Framework for Action dictates that universal access to primary education should focus on providing "good quality" and "meaningful learning outcomes" (UNESCO, 2000, pp. 15-17). Ntho and LCN (2013), and Moloi et al. (2008) report that FPE, together with the school feeding program, have established almost universal access to primary school. Even so, many children continue to leave school without having attained significant literacy levels (especially in English and Mathematics). Shortages of trained teachers, physical facilities and learning materials are among the causes of poor quality education in rural Lesotho (Mothibeli & Maema, 2005). There is evidence of a correspondingly low performance in literacy rates in rural areas in Sub-Saharan African countries

(Mulkeen, 2006). It is against this background that this study explored strategies Lesotho could apply to attract and retain more qualified teachers for rural schools.

Statement of the Problem

Lesotho's rural areas are characterised by high birth rates, low economic activity, inadequate services (including educational facilities), teaching by unqualified teachers, low progression and completion rates in school, and high poverty rates (Mothibeli & Maema, 2005; Mulkeen, 2006; Ntho & LCN, 2013). Qualified, motivated teachers are critical if children are to access quality education. Rural children are reportedly hard to teach and would benefit from learning from qualified teachers (Mothibeli & Maema, 2005). They are often taught by unqualified teachers due to "a shortage of qualified teachers" and because the "difference that qualified, caring educators can make … is often underestimated" (Ntho & LCN, 2013, p. 9). Therefore, it is important that strategies to attract and retain quality teachers for rural secondary schools are devised and implemented so that the education system can achieve its intended goal of improving Lesotho.

Literature on education provision in Lesotho is mostly in the form of quantitative studies commissioned by international organisations and focused heavily on primary education, especially after the implementation of FPE, even though the first cohort of this initiative have entered secondary education with indications of even lower pass rates (Mulkeen & Chen, 2008). There is little information about the quality of teaching at secondary level and the experiences of qualified teachers working in rural secondary schools in Lesotho.

METHODS

The study reported in this chapter used a qualitative methodology for its "[focus] on the quality and texture of events rather than how often those events occur" (Kilbourn, 2006, p. 552). Participants were studied in situ, allowing the researcher to understand the study topic through the meanings they conveyed (Denzin & Lincoln, 2008). In essence, qualitative research facilitates scrutiny of the meanings and interpretations that individuals attach to their experiences by focusing on the participants' opinions (Punch, 2005; Lietz & Zayas, 2010).

Six participants were purposively selected; four qualified teachers employed in rural secondary schools in Lesotho and two unemployed qualified secondary school teachers. Each teacher was interviewed with the aim of exploring strategies the Lesotho Government could use to attract and retain qualified teachers for rural secondary schools. The interview transcripts were analysed for emergent themes.

Literature Review

Literature on staffing rural schools in Lesotho and Southern Africa is thin. However, there is extensive literature from other contexts like Australia that demonstrates a correlation between teachers' negative perception of rural teaching

and life, and their reluctance to take rural postings, causing shortages of qualified teachers in rural areas (Lock, 2007; Masakale, 2005; Mulkeen, 2006; Sharplin, 2002). Data collected from pre-service teachers prior to, and after a one-week placement in rural and remote schools showed an increased understanding of the rural context in each place, and a more positive perception and attitude towards rural teaching and life, demonstrated by teachers' preparedness to take up rural postings (Boylan, 2004; Boylan & Hemming, 1992; Lock, 2007; Masakale, 2005; Munsch & Boylan, 2008; Sharplin, 2002). Masakale (2005) suggested that such a rural placement program may be beneficial if governments and churches (as the schools' co-owners and managers), and communities supported it collaboratively.

Despite the one-week rural practicum program achieving significant positive results, some authors have suggested that pre-service teachers could be prepared more comprehensively through participating in a semester-long, on-campus training program coupled with an extended rural-based practicum (Boylan, 2004; Smith-Davis, 1989). This model has practical relevance to Africa and could be applied in the Sub-Saharan context to address the challenge of shortages of teachers in rural and remote areas. It is difficult to predict the outcome of western programs if these are adopted in the Sub-Saharan context because most pre-service teachers in western countries come from urban backgrounds (Munsch & Boylan, 2008). In Africa, pre-service teachers often come from a combination of urban and rural areas, with rural people showing more willingness if given the opportunity, as identified in Zimbabwe (Mhishi et al., 2012).

FINDINGS

The purpose of teacher training is to equip teachers-to-be with the content, knowledge, understanding and skills required to teach in a diversity of settings. However, the majority of teachers interviewed indicated that they were unprepared for teaching in rural settings. A key theme arising from the interviews was preparing pre-service teachers for appointment to rural schools in Lesotho. Three other themes were linked to this: irrelevant content; placements lacking context and time; and insufficient duration of teaching practice.

Irrelevant Content

Two of the participants explained that the training they received was inadequate and not on a par with actual practice. Keketso (employed) explained:

> We are not trained in such a way that what they are training us there at the university is already like what is going to happen in a school environment. We are completely taught things that are different from what we are going to teach here. It's like we are prepared to come and work in the offices; not to come and teach here; the actual content that we are [going to] teach is something very irrelevant … to what we teach in schools.

Libolao (unemployed) agreed, saying, "I think the way they are teaching there at the institutions, it's like they are preparing us to teach in urban areas only". Also, in Lesotho there are instances when teachers are required to be specialists in topics without adequate background knowledge. Teachers need to educate themselves in such areas, but this is often impossible in rural areas where there are no libraries and other facilities to support their knowledge (Lewin, et al., 2000; UNESCO-IBE, 2006). It is impracticable at the very least.

Placements Lacking Context and Time

Interviewees revealed that pre-service placements had not prepared them for rural and remote teaching because they were focused on urban contexts, and then only for a short duration. Libolao (unemployed) said:

> It is a must that we do our teaching practice where it is accessible, where it will be easy for them to come and check you there because if you are at the rural area, it won't be easy for them to reach the place. They only allocate [place us] to urban areas because they will be telling you that, "No, we don't have money to go to those schools. Those places are far, we can't go that far". They only place us around here; only to the nearest schools to the university.

Libolao (unemployed) also said she went to teach in a rural school oblivious of how to manage rural children. This experience is not unique to Lesotho. Australia's Rural and Remote Education Advisory Committee (RREAC, 2000) has observed that often teachers face unfamiliar professional and social situations when they reach rural schools. Therefore, it would benefit the education system to ensure that pre-service teachers are multi-skilled for diverse environments.

It seems that the financial and time constraints of supervising students in remote areas have led Lesotho's teacher training institutions (Mulkeen, 2006; Mulkeen & Chen, 2008; Ntho & LCN, 2013) to discourage rural placement at the peril of teacher training effectiveness. Many authors advocate for relevant training and teaching experience before teachers are employed (Lewin, 2004; RREAC, 2000).

Insufficient Duration of Teaching Practice

Lewin (2004, p. 12) explains that:

> At one or more points during the training period trainees spend anything from a few days to several months working in schools [referring to the countries in the study viz Ghana, Lesotho, Malawi, Trinidad and Tobago] as classroom teachers under supervision.

Lesotho College of Education (LCE) has extended its teaching practice time from six months to one year while the National University of Lesotho (NUL) has extended it from a few weeks to three months; still not enough according to the teachers who graduated from NUL. Keketso (employed) elucidated:

> It's true, they do give us 3–4 months, I think, for teaching practice, but I still feel that is not enough because in that three months, that is when you will be…still trying to understand your learners. And then, three months has elapsed, you haven't understood anything…

Lewin (2004) concurs that duration affects placement effectiveness. Shorter durations limit comprehensive learning, relationship building with learners and understanding of duties. Longer periods raise difficult problems of support and mentorship, mainly related to costs in developing countries: "TP is often the most expensive part of initial training because of the costs of travel, subsistence, supervision, and assessment" (Lewin, 2004, p. 12; see also Mulkeen, 2006). There are real economic and logistical problems in providing practical experience for large numbers of students in countries with poor infrastructure and low student numbers in schools (Lewin, 2004). Either student teachers are crowded into schools near colleges (e.g. in Lesotho, Ghana and South Africa), or they select schools that will accept them and where they can find accommodation, which may be distributed across a wide geographic area, as in Malawi (Lefoka et al., 2001). If the latter, it becomes expensive and time-consuming for tutors to visit; if the former, the experience may be largely at demonstration schools atypical of the schools where trainees will work (Lewin, 2004). This is an example of a "wicked problem" (Rittel & Webber, 1973) inherent in Lesotho's rural secondary education.

Two participants felt training was adequate. Tlalane (employed) said, "Really, I was well trained because the syllabus I was trained in prepared us for both rural and urban teaching. It didn't choose". Khothatso (employed) felt that training must be generic to "allow people to adapt creatively to their diverse contexts". Participants' opinions need to be interpreted relative to their profiles. Many had not intended to be teachers; definitely not in rural locations. Their lack of intrinsic motivation and passion for remote teaching may underlie their inability to adapt.

RECOMMENDATIONS

Exploration of ways to improve the preparation of graduates for rural teaching is recommended. Participants recommended that more qualified teachers, equipped with appropriate skills to function in difficult rural locations, and willing to teach there, are needed. There is a known link between increased willingness and preparedness to teach in rural locations, and having pre-service teachers taught about rural education and experience teaching practicum in rural schools (Boylan & Hemmings, 1992; Lock, 2007; Masakale, 2005; Sharplin, 2002).

Congruent with the literature, participants suggested that training institutions could encourage undergraduate teachers to teach in rural areas by furnishing them with contextual information and a robust understanding of rural schools' and communities' fundamental needs. This requires training institutions to increase their knowledge about rural places so they can competently inform and inspire their learners, and help them take advantage of benefits inherent in rural places. Pre-graduation rural placements may be another way to give students first-hand experience of teaching and living in a rural community. Other alternatives include

strategising to counteract pre-service training pedagogical and/or content deficiencies by designing ongoing school-based or regional-based professional development for rural secondary teachers. This may also reduce the number of school days lost when teachers attend similar workshops in distant urban towns.

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Marethabile Mapitso Ignatia Masakale BA, GradCertEd, MEd
Lesotho Polythechnic, Maseru, Lesotho

Michael Bell PhD
Coordinator Educational Leadership and Management
School of Education, Flinders University, Australia

R. John Halsey EdD
Rural Education and Communities, Flinders University Australia

SECTION 4: STUDENT LEARNING

ALFIAN, MIRELLA WYRA AND MARIETTA ROSSETTO

10. LANGUAGE LEARNING STRATEGY USE BY PROSPECTIVE ENGLISH LANGUAGE TEACHERS IN INDONESIA

> I believed that through research I could also help others, and I feel it is my social and academic responsibility to contribute to the development of my community. (Alfian)

The English language is considered an important language for international communication across many areas. Therefore, the Indonesian Government has made English a compulsory subject from junior secondary to tertiary level with the expectation that students will achieve a basic standard competency in English, enabling them to communicate in both written and spoken modes (Permendikbud, 2013). This places considerable demands on learners and on teachers. Learning a new language demands much time and effort. As time spent on language learning in formal educational settings is limited, it is important that learners develop effective ways of regulating their own learning. One of the key elements of language learning success is language learning strategy (LLS) use, which supports learners' learning in formal education settings and beyond. This chapter reports a study that investigated the use of LLS by learners at an Indonesian university who were studying to become teachers of English as a foreign language (EFL). It contributes an Indonesian perspective on LLS use.

BACKGROUND

Language Learning Strategies

Language learning strategies (LLS) are broadly considered as steps or actions learners take to enhance their learning of another language. A number of definitions of LLS (e.g. Chamot, 2004; Griffiths, 2003; Oxford, 1990) address a range of aspects of interest and importance. Although all are generally accepted in the field of LLS research, none of the definitions capture the full extent of the complexity of the concept of LLS, which has been deemed "notoriously difficult to define" (Griffiths, 2008, p. 83). This is not surprising. Learning a language is a complex process and capturing it through simple definitions is rather ambitious, if not impossible. The complexity is also reflected in a large number of LLS that have been identified in the past few decades. Trying to make sense of these strategies

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has led to a number of proposed classification systems (see Hsiao & Oxford, 2002) because there is no consensus as to which classification offers an optimal and comprehensive picture of LLS. One of the frequently cited classifications was that proposed by Rebecca Oxford (1990), which consists of two broad categories of strategies that contribute directly and indirectly to language learning. Direct strategies are those that directly involve the use of the target language, while indirect strategies support and manage the language learning process without the use of the target language (Oxford, 1990). Oxford has further classified direct and indirect strategies into six main categories: memory strategies, cognitive strategies and compensation strategies (direct); and metacognitive strategies, affective strategies and social strategies (indirect).

Although not without criticism, Oxford's LLS classification and her Strategy Inventory for Language Learning (SILL) have been used extensively in international LLS research. Her work is viewed as a comprehensive, systematic model of LLS (e.g. Cohen & Macaro, 2007; Ellis, 1994; Radwan, 2011).

SILL RESEARCH

By 1995, about 50 major studies had used SILL to investigate strategies used by approximately 8500 language learners around the world (Oxford & Burry-Stock, 1995). The number of studies using SILL has grown considerably since then. The EFL version of the questionnaire has been translated into more than 20 languages, including Arabic, Chinese, French, German, Japanese, Korean, Russian, Spanish, Thai and Ukrainian. However, only a handful of studies using SILL to investigate the LLS of EFL learners in Indonesia have been reported (Annurahman et al., 2013; Mattarima & Hamdan, 2011; Mistar, 2001; Wahyuni, 2013; Yusuf, 2012). It is important to engage in such investigations to gain a greater understanding of LLS across cultures and languages because one of the criticisms of using questionnaires is that large and general learner strategy inventories such as SILL are not readily transferable across sociocultural domains (LoCastro, 1994, 1995). Nevertheless, individual reports are valuable not only for the target group of learners and their context, but also for contributing to a larger international perspective on LLS use. Thus, although SILL is not without problems, it has been used extensively and serves as a common tool for measuring LLS use across languages and cultures. It is a useful measure for providing a basis for understanding LLS patterns in a range of sociocultural contexts and has been used to investigate relationships between language learners' patterns of LLS use and factors such as gender, age, language proficiency levels and year level of study (e.g. Oxford & Burry-Stock, 1995; Wharton, 2000).

LLS and Language Proficiency Level

Studies investigating LLS use by learners of various levels of language proficiency have used different instruments to classify learners into proficiency levels. Standardised proficiency level tests such as the Test of English as a Foreign

Language (TOEFL), the International English Language Testing System (IELTS) and the Test of English for International Communication (TOEIC) have been used often (e.g. Gerami & Baighlou, 2011; Gharbavi & Mousavi, 2012; Green & Oxford, 1995; Hong-Nam & Leavell, 2006; Liu, 2004; Park, 2010; Wahyuni, 2013; Wharton, 2000; Yang, 2010). Other measures, like teachers' judgements (Magogwe & Oliver, 2007) and grade point averages (GPA) (Mullins, 1992; Yılmaz, 2010) have also been used. Findings indicate that learners with higher language proficiency levels use more strategies more often than those with lower proficiency levels (Alhaisoni, 2012; Green & Oxford, 1995; Liu, 2004; Magogwe & Oliver, 2007; Radwan, 2011; Wahyuni, 2013; Wharton, 2000; Yang, 2010).

Studies related to the use of the six noted categories of LLS in the SILL at different proficiency levels have displayed consistent findings in the profiles of strategy use. Some noted that all three proficiency levels (good, fair and poor) favoured metacognitive strategies (Magogwe & Oliver, 2007; Radwan, 2011). Radwan (2011) found in studies in Oman that both proficient and less proficient learners used metacognitive strategies at a high frequency, and Magogwe's studies in Botswana showed that learners at all proficiency levels tended to choose metacognitive strategy categories the most (Magogwe & Oliver, 2007). In contrast, some studies have demonstrated that only high proficiency level learners employ metacognitive strategies at a high frequency, with middle and low proficiency learners employing different strategy categories (Gharbavi & Mousavi, 2012; Peacock & Ho, 2003; Wahyuni, 2013; Yang, 2010). For example, Yang (2010), who conducted a study involving 300 "high", "intermediate" and "beginning" proficiency level participants in a Korean university, found that high proficiency level students tended to choose metacognitive strategies, while intermediate and beginning level learners tended to choose compensation strategies. This is consistent with Wahyuni (2013), whose study in Indonesia found that advanced learners favoured metacognitive strategies, whereas intermediate and elementary learners preferred compensation strategies.

LLS and Year Level of Study

Year level of study refers to the course level or length of study, and how it may influence LLS use. Studies show that students in higher course levels use a broader variety of strategies than those in lower course levels. Griffiths (2003) found a positive relationship between year level of study and LLS use in a study with 348 students in New Zealand. Lee and Oxford's (2008) research on LLS use among 1000 Korean EFL learners from middle school to university in relation to education levels found that middle school and university students used LLS more often than high school students. A recent study by Tse (2011) in Hong Kong, also involving high school and university students, found that university students used LLS more than grade 12 and 13 students. Magno (2010) identified that the length of time taken to study English in formal schooling influenced learners' proficiency; the longer the learners studied English, the more proficient they became, developing more in-depth experience in learning that helped them use LLS

appropriately. Magno's finding reaffirmed McLaughlin's (1990, p. 170) argument that "more experienced language learners are more able to switch strategies when the task calls for such flexibility".

LLS and Gender

Studies investigating the influence of gender on LLS have had mixed findings. A few studies report higher LLS use among male students (Radwan, 2011; Wharton, 2000), some demonstrate no, or a less clear, distinction between male and female students' LLS use (Nisbet et al., 2005), while most report greater LLS use by female students in terms of quantity, frequency and quality (Catalán, 2003; Green & Oxford, 1995; Hong-Nam & Leavell, 2006; Liu, 2004; Macaro, 2000).

THE STUDY: AN INVESTIGATION OF LLS USE BY INDONESIAN LEARNERS

At the Indonesian tertiary level, students wishing to be English language teachers can choose English as a major. These prospective English teachers will teach English at a range of levels, beginning with elementary school and going through to university level. The university curriculum or syllabus addresses the Teaching English to Speakers of Other Languages (TESOL) Curriculum in which 80% of the subjects are related to the teaching of English, such as Teaching English as a Foreign Language (TEFL), focusing on the four English macro skills (reading, listening, writing and speaking), vocabulary and grammar. In addition, lecturers use mainly English as the medium of instruction.

Prospective English teachers' language proficiency represents one of the major contributions to the success of English teaching and learning in the Indonesian context because informed teachers are a critical factor in successful student learning (Baradja, 1994). Thus, prospective teachers as English language learners need to develop sound proficiency in English prior to graduating. However, while some prospective English teachers who learn English as a foreign language learn quickly and use English well, many experience difficulties and make little progress (Song, 2004). Many cannot use English well, cannot pick up new words and sentences quickly, and do not do well in exams despite learning English for years (Song, 2004). Prospective teachers' LLS knowledge and use can contribute to how they teach, and consequently to the success of future generations of EFL learners.

ETHICS

The Dean of the participating university and from the Flinders University Social and Behavioural Research Ethics Committee gave permission to conduct this study. Participation was informed, voluntary and confidential.

METHOD

Participants

Two hundred and eighty six students pursuing EFL teacher education at an Indonesian university volunteered to participate and completed the SILL questionnaire translated into Indonesian. Students from four year levels were invited to participate but only a small number of 4th year students volunteered because they were engaged in fieldwork and not required to attend university classes. Slightly over 75% of the participants were women (see Table 10.1).

Table 10.1. Selected demographic characteristics of participants

Characteristic		**N**	**%**
Gender	Female	218	76.8
	Male	66	23.2
Year level	Year 1	102	35.9
	Year 2	92	32.4
	Year 3	67	23.6
	Year 4	23	8.1
Proficiency level	Low	10	3.5
	Middle	190	66.9
	High	84	29.6

English Proficiency

A range of language proficiency measures has been used in the literature, including standardised tests, such as TOEFL, IELTS and TOEIC (Gerami & Baighlou, 2011; Gharbavi & Mousavi, 2012; Hong-Nam & Leavell, 2006; Park, 2010; Wahyuni, 2013) or self-rated reports (Green & Oxford, 1995; Liu, 2004; Wharton, 2000; Yang, 2010). Using GPA to identify proficiency levels is also generally accepted as a classification mechanism (e.g. Al-Buainain, 2010; Radwan, 2011; Yilmaz, 2010). Despite the many classification methods, most studies classify learners into three proficiency levels, albeit using different terms. For example, Yilmaz (2010) classified learners by GPA as "good" (3.5–4.0), "fair" (2.5–3.4), and "poor" (less than 2.5). Similarly, Wharton (2000) classified learners into "poor", "fair" and "good" using self-rated proficiency levels. In another study, Hong-Nam and Leavell (2006) used TOEFL scores to classify learners into "beginning", "intermediate" and "advanced" levels. In this study, English course GPAs were used to classify learners into "high", "middle" and "low" proficiency levels, with high and middle representing successful learners and low representing less successful learners (Table 10.1).

SILL Validity and Reliability

Validity and reliability of the six SILL constructs (memory strategies, cognitive strategies, compensation strategies, metacognitive strategies, affective strategies and

social strategies) were examined to ensure that SILL was a valid and reliable measurement instrument for investigating LLS use. All items in each construct were checked for construct validity by performing Exploratory Factor Analysis (EFA) using Alpha Factoring (AF) (Thompson, 2004) to identify factors that may be inferred from the pattern of responses for the set of variables. The constructs' suitability for EFA was examined by looking at the Kaiser-Meyer-Oklin (KMO) value and Bartlett's test of sphericity prior to performing the EFA. The KMO was >.6 and Bartlett's test of sphericity was significant ($p<.001$) for each scale, indicating that all constructs met the basic requirement for EFA (Field, 2009).

The SILL reliability in the Indonesian context, with a high Cronbach alpha (.92), was similar to most SILL studies reported by Oxford and in Mistar's (2001) study. The Cronbach's alpha for the SILL constructs varied from .67 to .83, indicating an adequate level of internal consistency. These findings are consistent with each construct's reliability values reported in most studies using SILL (e.g. Gharbavi & Mousavi, 2012; Griffiths, 2003; Radwan, 2011; Wharton, 2000).

DATA ANALYSES

Descriptive statistics using means, frequencies, percentages and standard deviations were employed to describe demographic information, and to identify overall frequency of strategy use in the six categories and associated strategy items. In line with the majority of studies on LLS, this study adopted the three frequency criteria proposed by Oxford, which involved assessing the degree to which the strategies were used, namely: high frequency use (5.0–3.5), medium frequency use (3.49–2.50) and low frequency use (2.49–1.0) (Oxford, 1990, p. 300).

An analysis of variance (ANOVA) was conducted to examine the strategies used at the three proficiency levels and year level of study. An independent samples t-test was performed to identify differences in strategy use by gender. SPSS Version 22 was used in these analyses (SPSS, 2013).

RESULTS AND DISCUSSION

Individual Strategy Use

In terms of the strategy item or individual strategy in the SILL, the mean scores for the 50 SILL items were ranked from the lowest to the highest. One of the most frequently used strategies was a metacognitive strategy: "I try to find out how to be a better learner of English". In contrast, a compensation strategy had the lowest mean score, indicating it was the least favoured strategy: "I read English without looking up every word". What is of particular interest is that these experienced EFL learners continue to seek ways to be better learners of English, suggesting that they are not satisfied with their current strategies for language learning.

Strategy Category Use

The descriptive statistical analysis showed that participants used all six strategy categories at a high frequency (see Table 10.2) in accordance with Oxford's (1990) mean score criteria.

Table 10.2. Strategy use in the six SILL strategy categories

Strategy category	N	Mean	SD
Metacognitive	284	4.19	0.50
Social	284	4.16	0.57
Affective	284	3.78	0.60
Cognitive	284	3.76	0.49
Memory	284	3.76	0.47
Compensation	284	3.55	0.64

Metacognitive strategies were used most frequently, followed by the social, affective and cognitive strategies, then the memory strategy and finally the compensation strategy. The high use of these six strategy categories, despite the compensation strategy being used least often, proved significant because it shows that prospective English language teachers in Indonesia always or usually use LLS.

Strategy Use by Proficiency Level

Like the majority of studies on LLS, this study adopted Oxford's (1990) three proposed frequency criteria, which involved assessing the degree to which the strategies were used. Results of the ANOVA conducted to examine strategy use by proficiency level indicate a significant relationship between proficiency levels and overall use of SILL strategies ($F(2, 281) = 585$, $p < 0.05$), with a small effect size ($\eta=0.014$). A Tukey-LSD Post Hoc was run to identify any significant differences between groups, which indicated significant differences between the low and high levels ($p= 0.03$), and the middle and high levels ($p= 0.00$). However, there were no significant differences between the low and middle levels ($p= 0.35$), suggesting that the higher the participants' proficiency levels, the more strategies they employ. These findings are consistent with reports from previous studies that show a relationship between proficiency levels and the use of LLS (e.g. Alhaisoni, 2012; Magogwe & Oliver, 2007; Radwan, 2011; Wayhuni, 2013).

Strategy Use by Gender

An independent sample *t*-test demonstrated a significant difference in the overall use of LLS between male (M=3.72, SD=0.43) and female (M=3.91, SD=0.40) participants (t (282)=-3.27, $p<.001$, two-tailed). Significant differences between males and females were found for all substrategy categories ($p<.05$) except compensation strategies ($p=0.38$), consistent with findings reported in other LLS studies (Hong-Nam & Leavell, 2006; Oxford, 1990).

Strategy Use by Year Level

The ANOVA indicated no significant differences in overall LLS use among year level groups; somewhat surprising because it would be expected that experienced language learners would differ from less experienced learners in LLS use. This result leads to the proposal that experienced learners do not advance their LLS use or, more plausibly, that the number of strategies used does not change. Experienced learners may replace some strategies they deem ineffective with others they find more useful. A longitudinal study investigating strategy use by students over a period of several years would be useful. Typically, though, studies report changes in strategy use *between* rather than *within* learners.

CONCLUSION

Although this study provides a small picture of LLS use in Indonesia, its findings contribute to a better understanding of LLS use by future teachers of EFL in that country. The findings are not intended to be generalised but to contribute to the international body of LLS and SILL studies by providing a snapshot of LLS use in an Indonesian context. In order to fully understand the relationship of gender, year level of study and proficiency levels to LLS use, and to understand LLS use across time, a large scale longitudinal study is needed. Macaro (2006) added a good perspective to the picture of LLS use by proposing that "successful learning is no longer linked to the individual learner's frequency of strategy use, but to his or her orchestration of strategies available to him or her" (p. 332). This orchestration of strategies and the fluid movement between them should be of further interest to future LLS research. Considering that this study's participants represent a group of experienced learners who, although demonstrating that they use a broad range of LLS, are still concerned with finding new ways to best learn English, it is plausible to question whether they are using the identified strategies correctly and effectively. Further studies investigating learners' declarative, procedural and conditional strategy knowledge are needed.

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Alfian EdD
School of Education
Flinders University, Australia

Mirella Wyra PhD
School of Education
Flinders University, Australia

Marietta Rossetto PhD
School of Education
Flinders University, Australia

DAVID JEFFRIES AND CAROL R. ALDOUS

11. RECOGNISING INTIMATION

An Affective Reality in the Act of Creation

> The difference between your role in the world as a student compared to that of a researcher is the relationship you have with knowledge. One is concerned with the acquisition of knowledge where the other is concerned with creating it. Although inextricably linked, the understanding of the role of each and how they are both necessary in research is a barrier that proved difficult at times to comprehend. (Jeffries)

Noted psychologist Graham Wallas (1926, p. 11), hoping to transform the processes of human thought and solve significant problems, wrote early last century that "We can to some degree control Illumination by making ourselves conscious (as many poets are conscious) of Intimation…". Illumination is an important event in the act of creation within the context of novel problem solving. It is the stage in the process whereby a solution, or the means of finding the solution to a problem, becomes manifest in the individual's mind. It is often referred to as the "aha" moment; the turning point whereby a path to a solution can be navigated through the problem solving space. Consequently, anything that facilitates the onset of Illumination must influence the manifestation of a solution and, of necessity, provide a more complete understanding about the solving of novel problems and the expression of creativity. When Wallas advocated that Illumination could be facilitated, even controlled, by attending to an associated substage called "Intimation", he was making a profound claim. But is the claim valid? Is there any substance to the idea that individuals can feel their way to a solution in a novel problem solving event? This chapter attends to the provision of evidence about such a claim. But what exactly is Intimation, and in relative terms, why is so very little known about it?

An investigation of the *Oxford Dictionary of English* (OED, 2010) reveals Intimation to be "an indication or hint, the action of making something known, especially in an indirect way". The *Merriam-Webster Dictionary* (2012) describes it as "a slight or indirect pointing to something, a suggestion, inkling". Thus, in 21st century dialogue, Intimation is the action of making something known in an indirect way. But is this meaning the same as that employed by Wallas more than half a century ago? Drawing on evidence from introspective accounts of novel problem solving, Wallas most often documented the action of making something known in an indirect way as being a type of "feeling" or "sensing" associated with

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rising consciousness that a solution or idea is about to manifest. Specifically, Intimation was defined as a set of "'fringe-conscious' psychological events which precede and accompany the 'flash' of Illumination" (Wallas 1926, p. 11). In seeking to improve the art of thought, Wallas (1926, p. 11) believed that "both encouraging the psychological processes which Intimation shows to be occurring, and protecting them from interruption" would facilitate the action of Illumination. But what exactly are these psychological processes? What is their nature? Can they be identified and described, and moreover, how can they be measured?

Given Wallas' historical account of the existence of the substage of Intimation and its role in solving novel problems, together with other significant accounts, it is interesting to note the findings of an important study of creative problem solving within the Mathematics domain that demonstrates individuals who attend to a "Feeling approach to reasoning" are more likely to be successful than those who do not (Aldous, 2009, 2014). At the heart of this study lies the question about whether an indirect feeling or sensing can be used to navigate a path to a solution when solving a novel problem. A second study, a cross case analysis of six individuals in a novel problem solving event, reveals that students who both understand the "Feeling approach to reasoning" and attend to this feeling "reality" are more successful in solving a novel problem than those who do not (Jeffries, 2011). An account of both studies follows, presenting evidence about the role of feeling and intuition, and its correspondence to Intimation. Full details of *Study One* are reported in Aldous (2014). A synthesised account is given here for completeness.

STUDY ONE: AN IMPORTANT ROLE FOR A FEELING APPROACH TO REASONING

In contrast to Wallas, who drew evidence for the substage of Intimation largely from a small data set of introspective accounts, the documented evidence in *Study One* is sizeable, drawing on responses from 405 middle school students participating in the annual novel problem solving Mathematics Challenge for Young Australians in grades 5–10. Importantly for interpreting the data, the Challenge is a high calibre event, used as a training ground for selecting students for the Mathematics Olympiad. A team of people (the Problem Committee) spends 12 months or more designing and developing each problem to ensure it is novel, uniquely challenging and age-appropriate. Challenge participants have three weeks to answer six novel problems. Three questions guided the *Study One* research:

1. What cognitive and non-cognitive approaches to reasoning do middle school students use when solving novel problems in Mathematics?
2. What relationships exist among cognitive and non-cognitive approaches to reasoning and how do they interact?
3. What relationships exist among cognitive and non-cognitive approaches to reasoning and success in novel Mathematics problem solving?

The "Systems of Reasoning Questionnaire" (SRQ), a self-report instrument developed by Aldous (2001, 2009) and validated by Jeffries (2011), was used to

gather information about the kinds of reasoning students use when solving a novel problem. Designed to tap cognitive and non-cognitive reasoning systems, the SRQ is grounded in Sloman's (1996) theory of two systems of reasoning and Epstein's (1994) two patterns of mind, and is consistent with Kahneman's (2011) System 1 and System 2 modes of thinking. It comprises five process scales:

- Strategic approach to reasoning (Strat)
- Free-flowing approach to reasoning (Free)
- Spatial-verbal approach to reasoning (Spat/Vb)
- Feeling approach to reasoning (Feel); and the
- Systematic approach to reasoning (Syst)

The scales are used in the formation of their corresponding latent variables. Scales for Strategic and Systematic approaches to reasoning are predominantly cognitive, while those for Free-flowing and Feeling approaches are predominantly non-cognitive. The Spatial-verbal scale is both cognitive and non-cognitive depending on whether processing is simultaneous or successive, and whether verbal or nonverbal reasoning, or both, are involved (Aldous 2001, 2009). These five process scales reflect the *Approaches to Reasoning* construct in the comprehensive model of creative problem solving developed for the study.

Participants completed the SRQ with respect to two of the six novel problems in the Australian Mathematics Challenge; the more spatially-oriented "Cute Numbers" and the more numerically-oriented "Birthday Cake" problems (see Aldous, 2009). Scores for each were used to reflect the latent variable **PScore** (Problem score) in the comprehensive model of creative problem solving that incorporates four dimensions of creativity (**Person**, **Process, Product** and **Environment)** and was developed (Aldous, 2014) through the formation of a causal model in which the sequence of relationships between each of the latent variables was specified with due reference to theory, namely Carroll's (1963) "Model of School Learning", Keeves' (1986) "Cycle of Performance", Amabile's (1986) "Social Psychology of the Creative Process" (see Amabile, 1996) and Shaw's (1989) "Model of the Eureka Process". A microscopic explanatory model was embedded within this macroscopic comprehensive model. It comprised latent variables in the **Process** dimension of creativity within the *Approaches to Reasoning* construct, sequenced to represent the order in which cognitive and non-cognitive processes were hypothesised to operate during creative problem solving. The microscopic model sequence is given by **Strat → Free → Spat/Vb → Feel → Syst → PScore**.

Partial Least Squares (PLS) path analysis with latent variables was used in the PLSPATH computer program (Sellin & Keeves, 1997) to test structural relationships between variables within the comprehensive model for both data sets (Cute Numbers and Birthday Cake). Path models show with regression analyses where direct and indirect or mediated influences are argued to operate. Chapter space restricts discussion of the findings to the direct and indirect effects relating to the **Process** dimension of creativity in the microscopic model.

Summary Results for the Process Dimension: Study One

Analysis of paths within the comprehensive model of creative problem solving indicated that different creative processes are likely to be at work within the Cute Numbers and Birthday Cake problems. Different spatial and verbal processing requirements are indicated for each problem, and different approaches to reasoning are identified in each model. The Cute Numbers problem is characterised mostly by nonverbal processing and explicit use of non-cognitive factors; the Free-flowing (**Free**) and Feeling (**Feel**) approaches to reasoning. The Birthday Cake problem is characterised mostly by verbal processing and the dominant use of cognitive factors, namely the Systematic (**Syst**) and Strategic (**Strat**) approaches to reasoning. However, use of the non-cognitive factors **Free** and **Feel** is also evident in the Birthday Cake problem. An indirect effect of **Feel** on **PScore,** operating through **Syst**, was observed and an indirect effect of **Free** on **PScore** operating through **Feel** and **Syst** is present. The path from **Strat** to **Pscore** is negative but the path from **Strat** to **Pscore** passing through **Feel** is positive. Such indirect effects point to a significant role for **Feel** in the problem solving process. Thus, the Birthday Cake problem is characterised by direct effects of cognitive factors and indirect effects of non-cognitive factors. However, the reverse is not true for the Cute Numbers problem. Although the direct effects of non-cognitive factors characterise it, the indirect effects of cognitive factors do not. Indeed, the factor for the Systematic approach to reasoning (**Syst**) plays no role at all in the successful solution of the Cute Numbers problem. Moreover, an indirect effect of Strategic approaches to reasoning (**Strat**), operating through the non-cognitive factor **Free**, was observed and supported by an indirect effect of **Free** operating through **Feel**.

Interestingly, a negative direct effect for the Spatial-verbal approach to reasoning (**Spat/Vb**) was observed for the Cute Numbers problem. However, a positive indirect effect of **Spat/Vb** operating through **Feel** was also present, indicating that Spatial-verbal processing, occurring without recourse to the Feeling approach to reasoning, was unsuccessful. In conclusion, an important role for a Feeling approach to reasoning (**Feel**) in solving novel problems is indicated.

STUDY TWO: CONFIRMING ROLE FOR A FEELING APPROACH TO REASONING

Study One provides evidence that middle school students employ five different approaches to reasoning (Strategic, Systematic, Free-flowing, Spatial-verbal and Feeling) when solving novel Mathematics problems. It also indicates that students who use a Feeling approach to reasoning are more likely to be successful in a novel problem solving event than those who do not. It remains to be verified whether these same cognitive and non-cognitive approaches to reasoning can be identified within the verbal protocols of adolescent students solving a novel Mathematics problem. Students in *Study One* responded to the SRQ while attempting to solve two novel problems from the Mathematics Challenge for Young Australians. In *Study Two,* the item descriptors comprising each scale of the five approaches to reasoning are employed as indicators against which student protocols are analysed and assessed for perceptions and awareness about the approaches. Thus, it was not

necessary for students to articulate five separate names corresponding to the approaches. Rather, perceptions about, and use of, the five approaches to reasoning are identified by the students' descriptions, dialogued during semi-structured interviews concerning novel problem solving in general, and through analysis of concurrent and retrospective protocols (Ericsson & Simon, 1993) generated during the solving of a novel Mathematics problem. The following questions were used to guide *Study Two*:

1. What perceptions do middle to upper secondary students have about cognitive and non-cognitive approaches to reasoning while solving novel Mathematics problems?
2. What cognitive and non-cognitive approaches to reasoning do middle to upper secondary students employ while solving a novel problem in Mathematics?
3. What relationship exists between student perceptions about different cognitive and non-cognitive approaches to reasoning and their employment of these approaches in a novel Mathematics problem solving event?
4. What relationship exists between the different approaches to reasoning and success in novel Mathematics problem solving?

A non-random sample of six students from a specialist Mathematics and Science Secondary School in a single state of Australia was selected on the School Principal's advice that they were among those able to solve Mathematics problems well and to cope confidently when placed in a novel Mathematics problem solving context. Two students (one male and one female) from each of grades 10, 11 and 12 who agreed to participate were chosen. The first data collection phase involved participants answering a series of questions about their perceptions of the approaches to reasoning they used when solving novel Mathematics problems. The second phase involved participants solving a novel Mathematics problem using a think aloud strategy that permitted analysis of protocols to identify when different approaches were being used. The problem chosen was one used in a previous study (Aldous, 2009). Problem completion, researcher intervention and time taken to achieve a solution were used to indicate the degree of problem solving success.

Results of the Cross Case Analysis: Study Two

The frequency of the six students' perceptions about the different cognitive and non-cognitive approaches to reasoning is given in Table 11.1, which indicates that cognitive approaches to reasoning are perceived more frequently than non-cognitive approaches, and Spatial-verbal approaches to reasoning are also perceived less commonly. All students perceived the cognitive approaches to reasoning (strategic and systematic approaches) but three did not perceive at least one kind of non-cognitive or Spatial-verbal approach, one did not perceive the Feeling approach, one did not perceive the Free-flowing approach and another did not perceive the Spatial-verbal approach to reasoning.

A summary of the frequency of cases using the different cognitive and non-cognitive approaches to reasoning in solving a novel problem is given in Table

11.2, which indicates that middle to upper school students employed cognitive approaches to reasoning more frequently than non-cognitive approaches when solving a novel Mathematics problem. All cases used both kinds of cognitive approach to reasoning, namely a strategic approach and a systematic approach. However, two thirds of students made no use of at least one kind of non-cognitive approach to reasoning. Two students did not employ a Feeling approach to reasoning, and two did not use a Free-flowing approach to reasoning. These figures indicate that the frequency of use of non-cognitive approaches to reasoning is lower than the frequency of their being perceived. All students use the Spatial-verbal approach to reasoning.

Table 11.1. Frequency of perceptions concerning different approaches to reasoning

Approach		**Strategic** (Cog)	**Free-flowing** (N-cog)	**Spatial-verbal** (Both)	**Feeling** (N-cog)	**Systematic** (Cog)	**Total**
Sex	Grade						
Male	10	●	●	●		●	4
Female	10	●		●	●	●	4
Male	11	●	●	●	●	●	5
Female	11	●	●	●	●	●	5
Male	12	●	●		●	●	4
Female	12	●	●	●	●	●	5
Total		**6**	**5**	**5**	**5**	**6**	**27**

● indicates approach perceived; Cog - a cognitive approach to reasoning; N-cog - a non-cognitive approach to reasoning; Both - the approach to reasoning may be either cognitive or non-cognitive

Table 11.2. Frequency of use mapped to the different approaches to reasoning

Approach		**Strategic** (Cog)	**Free-flowing** (N-cog)	**Spatial-verbal** (Both)	**Feeling** (N-cog)	**Systematic** (Cog)	**Total**
Sex	Grade						
Male	10	●	●	●	●	●	5
Female	10	●	●	●		●	4
Male	11	●		●	●	●	4
Female	11	●	●	●		●	4
Male	12	●		●	●	●	4
Female	12	●	●	●	●	●	5
Total		**6**	**4**	**6**	**4**	**6**	**26**

● indicates approach perceived; Cog - a cognitive approach to reasoning; N-cog - a non-cognitive approach to reasoning; Both - that the approach to reasoning may be either cognitive or non-cognitive

Table 11.3 summarises the frequency of use of cognitive and non-cognitive approaches to reasoning in relation to the students' perception. It documents whether a given approach to reasoning is perceived as ascertained in the first phase of the study and then either used or not used in solving a novel Mathematics problem in the second phase. Table11.3 also documents instances where an approach to reasoning is not perceived in the first phase but subsequently used or not used in the second phase.

Table 11.3. Frequency of use mapped to perception about the five approaches to reasoning

Approach Subjects who	**Strategic** (Cog)	**Free-flowing** (N-cog)	**Spatial-verbal** (Both)	**Feeling** (N-cog)	**Systematic** (Cog)	**Total**
Perceive + use	6	3	5	3	6	23
Perceive + not use	0	2	0	2	0	4
Not perceive + use	0	1	1	1	0	3
Not perceive + not use	0	0	0	0	0	0
Total	**6**	**6**	**6**	**6**	**6**	**30**

Cog - a cognitive approach to reasoning; N-cog - a non-cognitive approach to reasoning
Both - that the approach to reasoning may be either cognitive or non-cognitive reasoning

The values recorded in Table 11.3 indicate that in instances where a given approach to reasoning is perceived, it is more likely to be used. In 77% of instances a given approach to reasoning is both perceived and used, particularly for the cognitive approaches. Instances of perception and use of non-cognitive approaches are half that of cognitive approaches. However, perception about a given approach to reasoning does not necessarily ensure its use. In 13% of instances, an approach is perceived but not used. There are two instances each in which the Free-flowing approach and the Feeling approach are perceived but not used with the non-cognitive approaches. Nevertheless, in 10% of instances, a non-cognitive approach is used but not perceived. There is one instance each where a Free-flowing approach, a Feeling approach and a Spatial-verbal approach are not perceived but used, indicating that non-cognitive approaches may be used without being perceived. Interestingly, there are no instances where a sole cognitive approach to reasoning (Strategic or Systematic) is used but not perceived, or where a cognitive or non-cognitive approach is not perceived and not used.

The findings of a cross case analysis in which success in solving the novel Mathematics problem is mapped against the five approaches to reasoning with respect to their perception and use are documented in Table 11.4. The rank order of success is indicated by whether the novel problem is solved, time taken to solve the problem and whether researcher intervention is needed for a solution to be found. The approaches to reasoning are listed in the following sequence: Strategic; Free-flowing; Spatial-verbal; Feeling; and Systematic, corresponding to the sequence in the microscopic model within the comprehensive model of creative problem solving discussed in *Study One*. A gap in the listing indicates that the approach to reasoning is either not perceived or not used. It can be seen that those students who are the least successful by rank (i.e., ranks fifth and sixth) in solving the novel Mathematics problem do not make use of a Feeling approach to reasoning, despite having perceived this approach in the first phase of the study. The fifth and sixth ranked students took longer to solve the problem and required researcher assistance. This occurrence is followed by the student ranked fourth in the table, who, although not having perceived the Feeling approach to reasoning, nevertheless made use of it when solving the problem.

Table 11.4. Synthesis of results

Sex	Grade	Phase 1: Perceptions	Phase 2: Approaches employed	Problem solved?	Intervention required?	Time taken (minutes)	Rank
Male	10	Strategic Free-flow* Spatial/Vb# Systematic	Strategic Free-flow Spatial/Vb Feeling Systematic	Yes	No	21	4
Female	10	Strategic Spatial/Vb Feeling Systematic	Strategic Free-flow Spatial/Vb Systematic	Yes	Yes	38	5
Male	11	Strategic Free-flow Spatial/Vb Feeling Systematic	Strategic Spatial/Vb Feeling Systematic	Yes	No	3	1
Female	11	Strategic Free-flow Spatial/Vb Feeling Systematic	Strategic Free-flow Spatial/Vb Systematic	Yes	Yes	39	6
Male	12	Strategic Free-flow Feeling Systematic	Strategic Spatial/Vb Feeling Systematic	Yes	No	8	2
Female	12	Strategic Free-flow Spatial/Vb Feeling Systematic	Strategic Free-flow Spatial/Vb Feeling Systematic	Yes	No	21	3

*Free-flow - a Free-flowing approach; #Spat/Vb – a Spatial-verbal approach to reasoning

These findings are in contrast to the students ranked first, second and third in the table, who not only perceived but also used the Feeling approach to reasoning. Interestingly, the student ranked first is not recorded as having used a Free-flowing approach to reasoning, although it is perceived. However, incubation and other non-conscious modes of reasoning indicative of a Free-flowing approach can vary in duration from a few seconds to years. Lack of identification of a Free-flowing approach in this instance cannot be interpreted because it is not being used. It can only infer that the interval of time the student took to solve the problem may have been too brief to observe this approach. A similar finding is indicated for the second ranked student, who, although having perceived a Free-flowing approach, is not recorded as using it. This same student made use of a Spatial-verbal approach to reasoning even though they did not perceive it as a form of reasoning.

DISCUSSION AND CONCLUSION

In answering the questions "What cognitive and non-cognitive approaches to reasoning do middle school students use?" (*Study One*), "What perceptions do middle to upper students have concerning cognitive and non-cognitive approaches to reasoning in the problem solving context?" and "What cognitive and non-cognitive approaches to reasoning do middle and upper school students' use?" (*Study Two*), it can be stated that middle and upper school students hold well-formed perceptions about the different cognitive and non-cognitive approaches to reasoning, and use them effectively in solving novel problems. However, they have less coherent perceptions about non-cognitive approaches, which are applied less well. Students perceive and use the Strategic and Systematic approaches to reasoning well, but the non-cognitive Free-flowing and Feeling approaches are less well perceived and applied. Interestingly, although the Spatial-verbal approach is less well perceived, it is better applied.

In answering the second question in *Study One* ("What relationships exist among cognitive and non-cognitive approaches to reasoning and how do they interact?") and the third question in *Study Two* ("What is the relationship between perception and student use of the different approaches to reasoning?"), findings show that students holding better perceptions about particular types of reasoning are more likely to use them. Even so, perceptions about a given approach do not ensure its use. Nor can it be said that lack of perception about an approach indicates it will not be used. While two students in *Study Two* who perceived a Feeling approach to reasoning chose not to use it, despite their verbal protocols indicating its presence, and another student who had not perceived a Feeling approach used it in the novel problem solving context, the *Study One* findings indicate that cognitive and non-cognitive approaches interact through "feeling", indicating the intuitive function and Intimation. Although cognitive processing dominates the Birthday Cake problem compared to the Cute Numbers problem (dominated by non-cognitive processing), finding a successful solution requires recourse to the non-cognitive Feeling approach to reasoning.

The final questions in *Study One* ("What relationships exist among cognitive and non-cognitive approaches to reasoning and success in novel Mathematics problem solving?") and *Study Two* ("What relationship exists between the different approaches to reasoning and success in novel Mathematics problem solving?") may be answered by stating that successful cognitive approaches to reasoning are likely to depend on non-cognitive approaches, and that successful problem solution is dependent on attention to a Feeling approach. *Study One* indicates that while novel problems can be solved non-cognitively with a direct feeling effect, no problem is solved cognitively independent of a feeling. *Study Two* supports this, showing that using a Feeling approach is the distinguishing element for success in novel problem solving. This is not to infer that cognitive approaches are not important; only that students in *Study Two,* who lacked attention to a Feeling approach, were less successful in finding a solution. It is evident that consideration must be given to the concepts of feeling and intuition revealed through the activity of Intimation. Wallas (1926) advised that attending to feelings of Intimation and discouraging their interruption would encourage successful Illumination. Contrary to traditional

psychological discourse, which argues that feeling interferes with an individual's ability to solve problems (Damasio, 1994, 1999), *Studies One* and *Two* reveal that successful students pay heed to feelings of Intimation (the Feeling approach to reasoning) while less successful students do not. Better problem solving requires an improved understanding of the processes of Intimation, and a richer, more refined language for their description and use. Middle to upper school students need a language to describe cognitive and particularly non-cognitive approaches to reasoning, as well as the knowledge and understanding to implement both approaches to successfully solve novel problems. Recognition of this is important for the productive development of future creative problem solving, its learning and teaching, and better solutions to some of humankind's most pressing problems.

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David Jeffries BEd/BSc (Secondary), BEd (Hons)
Port Lincoln High School, Port Lincoln, Australia

Carol R Aldous PhD
School of Education, Flinders University, Australia

SHAILEIGH PAGE AND TRUDY-ANN SWEENEY

12. PROMOTING POWERFUL POSITIVE AFFECT

> The opportunity to publish creates space to reflect on research with academic colleagues from current teachers' perspectives. (Page)

This chapter describes how one teacher's innovative attempts to promote powerful positive affect (PPA) in her Mathematics classroom gave rise to the development of concerns and tensions related to her practice. Tensions and concerns are identified and discussed using the theoretical tools of Activity Theory (AT) (Engeström, 1987) and the Stages of Concern (SoC) (Hall & Hord, 2006). The findings suggest that using these tools together provides a helpful theoretical lens through which researchers can understand the challenges of change and teachers' specific professional development needs. The identification and resolution of these tensions is of crucial importance for understanding and facilitating the efforts of sustainable pedagogical change. This chapter highlights the tensions and concerns of one participant as she attempted to promote PPA.

PROMOTING POWERFUL POSITIVE AFFECT

Researchers such as Goldin (2000) and Epstein et al. (2007) have identified a need for teaching strategies or tools that incorporate the affective domain into the Mathematics classroom to promote PPA. Alston et al. (2007, p. 327) define PPA as "patterns of affect and behaviour that foster children's intimate engagement, interest, concentration, persistence and mathematical success". Suggestions that essential affective elements of mathematical learning are often considered to be an incidental "add-on" to the learning itself (Goldin, 2007) have led to the call for tools to aid teachers' promotion of PPA. Affective elements are ambiguous but are commonly defined as encompassing feelings, emotions, attitudes, beliefs and values that are attached to a Subject or Object (Leder & Forgasz, 2006).

Fulfilling the need for teachers to promote PPA, as identified by Alston et al. (2007), creates challenges for researchers in terms of facilitating and implementing sustainable change in Mathematics teaching practice. In particular, challenges arise as teachers attempt to implement new teaching strategies and tools that others have designed to assist them primarily to reveal the affective dimensions of students' thinking and feelings in Mathematics. The implementation of new tools appears difficult to sustain, perhaps because teachers perceive them as an "add-on" to their existing practice rather than promoting the affective elements as an integral part of student learning.

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 115–124.

A limited range of tools, for example student surveys (Fennema & Sherman, 1976) and journaling activities (Jurdak & Zein, 1998; Scott, 2007), is available to teachers to aid PPA promotion in teaching practice. Often, researchers design these tools for teachers to implement as a result of professional development. There is a need for PPA-promoting teaching strategies that involve teachers' perspectives and experimentation with different tools (Flack & Osler, 1999; Smiles & Short, 2006). The term "professional development" refers to the "planned, focused activities … that teachers undertake to extend their professional learning" (Anderson, Bobis & Way, 2008, p. 314). This chapter argues that developing PPA-promoting teaching strategies requires a research approach sensitive to the affective dimensions of teachers' perspectives, professional development and learning.

According to Hall and Hord (2006), teachers approach professional development and the change process with many thoughts, feelings and concerns due to the affective dimensions of change. These dimensions are important because change implementers do not simply "do" the change but are constantly thinking and feeling about how the change process is unfolding. In describing the affective dimensions of change, it is helpful to refer to stages along a developmental continuum and seek to identify the characteristics of each stage from teachers' descriptions of how they feel about work, and their concerns as they attempt to implement a new program or modify their practice. In particular, identifying teachers' individual concerns and the resolution of tensions related to the promotion of PPA in their Mathematics classrooms is of fundamental importance.

METHODOLOGY

This study was part of a larger, qualitative PhD research project, which adopted a critical ethnographic case study approach over a six-month period to examine how teachers promote PPA. Ethnography is often defined as descriptive but it is so much more; it essentially means "learning from people" (Spradley, 1980, p. 3). Ethnography was chosen as the paradigm for this study because teachers are one of the most influential parts of the Mathematics teaching and learning process, and their perspectives and professional knowledge have often been neglected within education research. Critical ethnography encompasses many characteristics (Foley & Valenzuela, 2005; Kincheloe & McLaren, 2005), but in this study it was only critical in two ways: (1) participants were empowered through researchers valuing their voices in the analysis and presentation of results (Kincheloe & McLaren, 2005); and (2) the chief researcher explored the "self-other interaction" (Foley & Valenzuela, 2005, p. 218). She was self-aware of her role. Her positioning in the research was upfront and acknowledged (Kincheloe & McLaren, 2005).

Data was collected using two individual interviews with each participant, one at the beginning of the study and one at the end; three to five classroom observations interspersed throughout the six months; reflective journals; and eight group interviews with relevant professional learning teams as part of a Professional Learning Group (PLG) (designated PLC – Professional Learning Community – in Figures 12.1 & 12.2, sourced from Engeström, 1999). The PLG provided a safe

and supportive environment in which members had opportunities to critically engage with current literature, and to develop and reflect on tools to promote PPA. Members met approximately every three to four weeks. In keeping with Wenger's (2004) definition, the group instituted a collective and collaborative learning process within a group of people "who share a concern or passion for something they do and learn how to do it better as they interact regularly". The participant who is the focus of this chapter worked collaboratively with the researcher over a six-month period to contribute to the theorising about her work by focusing on the interaction between thoughts, affect and actions, and the factors that facilitate and constrain pedagogical change (Mahn & John-Steiner, 2008).

THE RESEARCH APPROACH: ACTIVITY THEORY AND STAGES OF CONCERN

The two theoretical tools used in the study are discussed separately first and then in terms of how they can be used to complement each other.

Activity Theory

When devising the research method, it is essential to maintain consistency between the research ideas and the inquiry procedures (Woolcott, 1992). A critical ethnographic case study approach was adopted to ensure this consistency because this approach facilitated the exploration and valuing of teachers' voices during the analysis and presentation of the results (Kincheloe & McLaren, 2005). Specifically, teachers worked collaboratively with the researcher to contribute to the theorising about their work by focusing on the dialectical relationship between thought and action (theory and practice), and the factors that facilitate and constrain pedagogical change. The critical ethnographic research approach complemented the use of Activity Theory as a cross-disciplinary framework for understanding, analysing and explaining participants' motives, actions and outcomes.

Activity Theory provides a versatile tool to inquire into various aspects of educational technology (Murphy & Rodriguez-Manzanares, 2008). It focuses attention on the processes by which activities shape, and are shaped by, their context (Lim & Chai, 2003). The activity system is the main unit of analysis in Activity Theory. A model of the third generation activity system is represented in Figure 12.1. The third generation of Activity Theory, as proposed by Engeström (1999), intends to develop conceptual tools to understand dialogues, multiple perspectives and networks of interacting activity systems. Boundary Objects operate at the interface of different activity systems, and "where two or more activity systems come into contact, there may be contradictions and tensions through which expansive learning is possible" (Robertson, 2008). For example, if teachers engage in discussion, debate and reflection while participating in professional learning communities, their learning may be expanded beyond what is possible within their own classroom activity systems (Russell, 2002). The idea of activity networks within which contradictions and struggles take place in the definition of the Object of the activity calls for an analysis of power and control within developing activity systems.

Figure 12.1 shows two of what may be myriad systems exhibiting patterns of interaction. The instability (internal tensions) and contradictions between these systems is the "motive force of change and development" or "expansive learning" (Engeström, 2000, p. 9). Engeström (1999) views the "reflective appropriation of advanced models and tools" as "ways out of internal contradictions", which result in new activity systems (Cole & Engeström, 1993). According to George (2000), Activity Theory classifies tools into three main categories: (1) Primary tools (artefacts, instruments, machines etc.); (2) Secondary tools (language signs, ideas, models of acting etc.); and (3) Tertiary tools (cultural systems, virtual realities). "Primary tools are considered as physical tools … whilst secondary and tertiary tools are termed psychological tools" (George, 2000, p. 241).

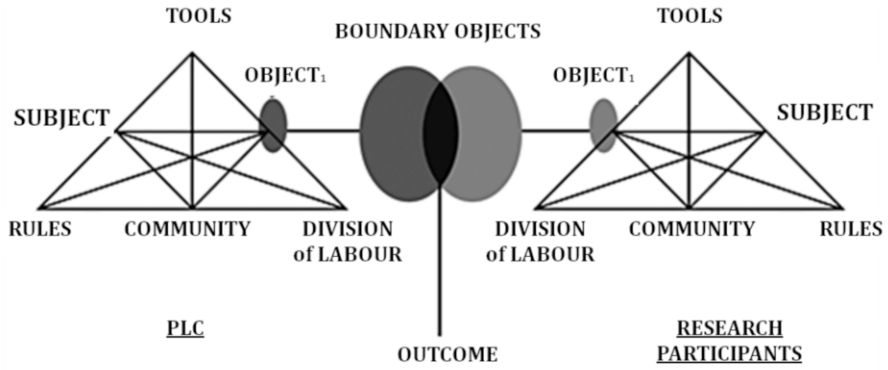

Figure 12.1. Third Generation Activity Theory (Engeström, 1999)
Source: Y. Engeström, R. Miettinen & R. Punamaki (Eds.), Perspectives on activity theory (pp. 377–404). New York: Cambridge University Press.

The Subject node refers to the individual or group whose agency or point of view is taken in the analysis of the activity. The identity and activity of the Subject is directed towards the Object node, or goal, and is transformed into Outcomes with the help of physical and symbolic external and internal tools that mediate the Object into an Outcome (Engeström, 1993). Thus, the Object embodies the system's meaning, motive and purpose. The base of the triangle represents the activity system's contextual characteristics. The Community node refers to the participants who share the same general Object with the Subject. The Division of Labour node refers to how tasks are divided among community members (horizontal as well as vertical division of power and status). Rules are explicit or implicit regulations, norms and conventions that constrain actions and interactions within the activity system (Centre for Activity Theory and Developmental Work Research, 2003).

Stages of Concern

A crucial step in facilitating change is to understand the pattern that exists when the process is successful and, based on this knowledge, to implement interventions to enable teachers to resolve their concerns and move to a more advanced level. The Stages of Concern theory provides a helpful construct to monitor, describe and quantify the emotional part of change that is often neglected, resulting in unnecessary resistance to an innovation (Hall, 2010). "There is a long history of research and application of this construct and its measures" (Hall, 2010), based on Fuller's (1969) original work.

The Stages of Concern describe a predictable pattern of developmental stages through which teachers move as they become increasingly sophisticated and skilled at using new innovations. The seven stages are: (1) Awareness; (2) Informational; (3) Personal; (4) Management; (5) Consequence; (6) Collaboration; and (7) Refocusing (Hall & Hord, 2006). The first stage typifies little concern or involvement in an innovation. The second and third stages are described as "self" types of concerns that focus on teachers' personal feelings of uncertainty and a need to find out more about the innovation (e.g. its general characteristics, effects and demands). The fourth stage is "task" oriented, with attention focused on the processes and tasks of using the innovation, and issues related to efficiency, organisation, management and time. The last three stages are "impact" concerns that deal with teachers' external concerns about how the innovation may affect students, colleagues and future work. At this final stage, individuals have definite ideas about major changes or powerful alternatives to the innovation's existing form (Hall, 2010; Hall & Hord, 2006). It is noteworthy that progress through the stages is not guaranteed and does not necessarily advance in one direction.

THEORETICAL ANALYSIS AND DISCUSSION

Data analysis was a cyclical process involving both Activity Theory (Engeström, 1987) and Stages of Concern (Hall & Hord, 2006). The former focused on identifying attempts to change behaviour in the activity system, while the latter focused on identifying the affective aspects of change. All data was transcribed and coded into Activity Theory themes using NVivo7 computer software. It is important to note that the data was first analysed using Activity Theory then reanalysed using the Stages of Concern. After these two rounds of data analysis, there was movement back and forth between the two theoretical lenses.

The two theories complemented each other in two main ways. Firstly, the Stages of Concern was useful for refining the analysis of tensions identified using Activity Theory. It provided further detail about the affective aspect of change related to how participants felt about the implementation of a particular PPA innovation. Secondly, data analysis using the Stages of Concern provided more description of the tensions identified using Activity Theory. In many cases, it highlighted tensions that had not been revealed using Activity Theory alone. This prompted further use of Activity Theory to analyse the transcripts and individual nodes related to the newly identified

tension, and to confirm whether this tension was associated with attempts to change behaviour and teaching practice.

In the following discussion of the case of one participant (Alice [pseudonym]), the Stages of Concern lens is used to theorise and illustrate the participant's actions, tensions, concerns and affective aspects of change. Activity Theory is then used to refine and theorise attempts to change behaviour and teaching practice in the activity system to promote PPA. The following vignette focuses on Alice and changes to her practice as a result of participation in a research-related PLG.

Alice

Alice has been a teacher for 29 years and has experience teaching in various school settings. She is currently a contract teacher working three days a week teaching a Year 5 class at Hillsview Primary School (pseudonym). Alice shares the teaching load with the Deputy Principal. During the first interview, Alice recalled growing up thinking that Mathematics was something she "really, really hated" and feeling that it "just wasn't meant to be enjoyable". She recalled her teacher, family and other classmates perceiving her as "not being very good at maths". Despite these negative experiences, she learned to persevere and continued to "struggle through" Mathematics to Year 12 because, as she explained, "I could see it was a necessity".

Alice's personal experiences in Mathematics significantly shaped her beliefs about teaching and learning, and created her strong mathematical identity. Alice explained that she is passionate about making Mathematics enjoyable for students and helping them to understand that it is an integral part of lifelong learning. Throughout the interviews and classroom observations, Alice identified group work, discussion, the use of concrete materials, visual aids, strong relationships, humour and encouragement as important tools for incorporating the affective domain into her Mathematics teaching practice. These strategies were useful because they helped Alice foster "children's intimate engagement, interest, concentration, [and] persistence" (Alston et al., 2007). A feature of Alice's practice was the high level of encouragement she provided to students to persist, engage with Mathematics and try hard, even if they found it difficult. She had established a classroom culture where trying and doing your best was a priority. Classroom observations also demonstrated that Alice made time for all students – especially those who struggled in Mathematics.

Alice's negative experiences as a Mathematics learner significantly shaped her identity and practice, resulting in her lack of confidence in teaching mathematical concepts. During the initial PLG meetings, it was evident this was an important issue for Alice that she wanted to share before moving on to talk about how her mathematical pedagogy could be changed. She encouraged others in the PLG to be honest about their mathematical experiences as learners. Some group members expressed positive experiences when learning Mathematics, resulting in them developing strong, positive mathematical identities. Their positive experiences appeared to reinforce Alice's negative experiences and lack of confidence.

Alice's reaction to her low confidence was to focus on the development of useful classroom strategies for engaging her students in Mathematics. Alice reflected that she preferred to share teaching practice and practical resources rather than philosophical discussions within the PLG. She sought discussion of strategies that others had tried and found helpful with students. She explained that she felt other PLG members were more advanced in their incorporation of the affective domain, and were able to draw on their wider professional development and community experiences. Specifically, Alice identified how some of the other PLG members were motivated to move on from a focus on identification of useful tools and the practicalities of their use in their classroom because they could engage in deep philosophical discussions about teaching and learning Mathematics. Alice explained that she did not feel comfortable moving the focus of group discussion. She commented:

> Let's share the practical ideas that actually work… There are some in the group who like the philosophical discussions, and they are really interesting, and yes they're the basis of how we learn and all the rest of it, but I want the practical stuff. That's what I want to come out with – the practical stuff.

After six months, at the conclusion of the study, Alice described how her concerns about needing more practical strategies remained unresolved. While the PLG provided a safe, supportive environment for sharing ideas and experiences, it seemed the group's Object had transformed, corresponding to an advancement of the Stage of Concern from a focus on "task" to "impact". Specifically, the new Object of the PLG was for the group to work "collaboratively" (Stage of Concern) to incorporate the affective domain into other areas of working mathematically. One outcome of this change was the organisation of a whole-school "Math-a-thon", an event aimed at challenging students' and parents' negative perceptions of Mathematics, and make learning Mathematics fun. This was achieved by creating opportunities for students to make clear connections across different learning areas, and apply their mathematical knowledge and skills to real life.

This vignette describes four tensions in Alice's Activity System, as represented in Figure 12.2. Alice's first tension is between her (Subject) and the tools because she has a limited range of tools to use in her efforts to incorporate the affective domain into her primary Mathematics teaching practice. Alice is limited to the use of secondary tools (psychological and semiotic tools, including models of acting, language) that allow her to achieve the Object of incorporating the affective domain, which is defined as the common Boundary Object with the PLG (Figure 12.2, Tension 1). Successful incorporation of the affective domain requires all three levels of tool use. This is what made the process such a complex challenge for Alice. While she demonstrated feeling comfortable using secondary tools, tensions remained between Alice and the use of primary tools, including student journaling and surveys. She wanted physical tools that had been deemed successful in incorporating the affective domain. Alice thought the PLG would provide some guidance in this area, but it did not meet her professional learning needs. Alice's discomfort with using the primary tools was not resolved. The second and third

tensions are between Alice and the PLG (See Figure 12.2, Tensions 2 and 3). It appears that some members of the group were operating from "Impact" Stages of Concern, whereas Alice's concerns were stuck between "Self" and "Task". Due to the different Stages of Concern between PLG members, and some members discussing the affective domain at higher levels than Alice was ready for, her professional learning needs remained unmet (Figure 12.2, Tension 4).

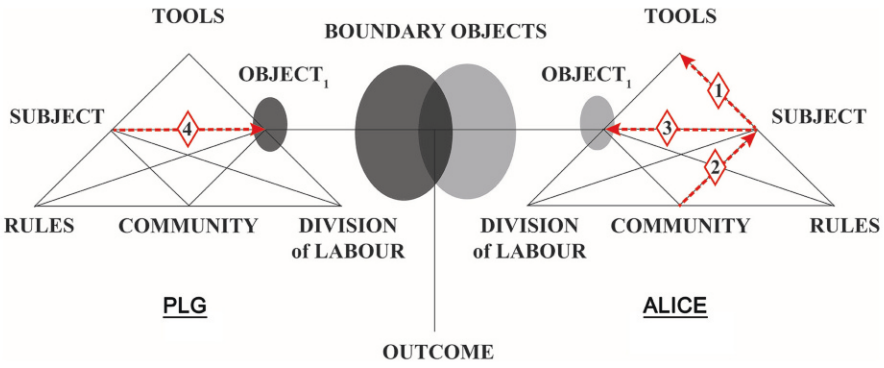

Figure 12.2. Alice's activity system and interaction with the PLG/PLC

It is evident from Alice's vignette that she was learning to "manage" the tools to reach the Object but could not reach the Impact stage because she lacked the professional learning and support from the PLG to meet her complex needs. It appears that Alice needed more professional development than the group could provide. Alice was focused on the Object of incorporating the affective domain into her Mathematics teaching. She progressed through the first four Stages of Concern, from Awareness to Informational to Personal to Management. However, she did not demonstrate a focus on the Outcome, which corresponds to Consequence, the fifth Stage of Concern. While Alice demonstrated Collaboration, the sixth Stage of Concern, by identifying a need to collaborate with others to share helpful strategies for incorporating the affective domain, her quest for Collaboration was mostly unfulfilled. Alice's inability to resolve these tensions may see her return to the pre-research status quo. However, it is not possible to hypothesise her final outcome because this project only investigated her progress over a six-month period. It is possible that, given professional development and support, Alice will advance her tool use to incorporate the affective domain into her Mathematics teaching practice.

CONCLUSION

Combined use of the Stages of Concern and Activity Theory proved powerful and valuable during the data analysis and discussion stage of this research. It revealed

unexpected insights and challenges related to the promotion of PPA that may not have been possible with the use of only one theoretical construct. Specifically, the Stages of Concern served as a valuable construct to monitor, describe and quantify the affective part of teachers' implementation of tools for promoting PPA. Activity/ Theory facilitated the examination of the promotion of PPA in terms of a complex system. Together, these constructs supported the researcher to look beyond a narrow focus on tools used by teachers in classrooms, to value teachers' voices to theorise the dialectical relationship between their perceptions, motives and actions that support and constrain pedagogical change. This chapter has drawn attention to the value of the Stages of Concern and Activity Theory as a combination of theoretical tools with which to understand and analyse teachers' concerns and tensions in relation to the promotion of PPA in Mathematics classrooms. The use of these two constructs, together with PLGs (or PLCs), has potential use in further research in this area.

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Shaileigh Page BEd, PhD
School of Education, Flinders University, Australia

Trudy-Ann Sweeney BEd, MEd, PhD
School of Education, Flinders University, Australia

SECTION 5: CURRICULUM CHANGE

SONI MIRIZON, BEN WADHAM AND DAVID D. CURTIS

13. TEACHING MATHEMATICS AND SCIENCE IN ENGLISH AT A UNIVERSITY IN INDONESIA

Lecturers' and Students' Attitudes to the Initiative

> This chapter reflects a doctoral candidate's process of scientific thinking and acting, not merely a matter of completing the thesis, but as a pathway from scholarship and practice to researcher. (Mirizon)

Indonesia is a multicultural country consisting of approximately 300 ethnic groups and a multilingual society having as many as 700 local languages. However, this diverse country shares one national language, Bahasa Indonesia, which functions as the *lingua franca*. Accordingly, Bahasa Indonesia has been used as the language of instruction at all levels of education across the nation since its independence from the Dutch in 1945.

In 2007, through the establishment of international standard schools (Sekolah Berstandar Internasional, SBI) under Law No.20/2003, the Indonesian Government introduced a policy of using English as a language of instruction for Mathematics and Science. Other subjects are taught in Bahasa Indonesia.

Globalisation is the stated rationale for establishing SBI because it "is perceived as being synonymous with international competition; international competition in turn is assumed to involve the use of English; and using English appears to necessitate the learning of other subjects through English" (Coleman, 2009a, p. 5). Teaching Mathematics and Science in English is important for at least two reasons. First, Indonesia has to be able to develop strong human resources in a relatively short period of time. Second, students must be able to use English to communicate globally because English is an international language (Department of National Education, 2004).

In order to be fully operational, SBI urgently need Mathematics and Science teachers who are competent in their Content Knowledge and proficient in English. However, there is a nationwide shortage of available in-service teachers who meet these criteria (Coleman, 2009b). Accordingly, teacher education institutions began pre-service training in 2008 to address this need through the International Standard School Teacher Education (ISSTE) program, which was established in one of the teacher education institutions. The ISSTE offers four study programs – Mathematics Education, Chemistry Education, Biology Education and Physics Education – to prepare teachers to deliver integrated content-based instruction (CBI) in SBI. Implementing CBI requires teachers who are content area specialists,

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 127–136.

and proficient in English and the practice of CBI. These skills are developed through ISSTE programs like the one discussed in this chapter.

The study reported here examined lecturers' and students' attitudes towards implementation of a policy of integrating the teaching of Mathematics and Science with English in an ISSTE program in a university in Indonesia (Mirizon, 2014). It evaluates those attitudes and relates them to the lecturers' and students' English language proficiency.

LITERATURE REVIEW

Integrated content and language instruction, commonly known as content-based instruction (CBI), is the practice of the integrated teaching of academic subject matter and second language skills. This practice focuses not only on the instruction of language but also on integrating it with content, which usually comprises academic subject matter (Brinton et al., 2011). For students, the focus is on acquiring information (content) via the second language and on developing their academic language skills in the process.

The benefits of CBI have become apparent over recent years. This method of instruction has been acknowledged as fostering academic growth while developing language proficiency (Crandall, 1993; Short, 1997; Snow, 1998; Stoller, 2004). Indeed, it is beneficial because "classroom tasks provide a context for language learning, are more cognitively demanding, and reinforce the existing school curriculum" (Pessoa et al., 2007, p. 103).

Although CBI was initially introduced in an English as a second language (ESL) context, it has been implemented in English as a foreign language (EFL) contexts (Butler, 2005). A number of studies explore the implementation of CBI in various EFL contexts, such as Spain, USA, Taiwan, China, South Korea and Japan (Boswell, 2011; Butler, 2005; Cammarata, 2009; Liaw, 2007; Okazaki, 1997; Pessoa et al., 2007; Willis, 1998). These studies acknowledge the benefits of CBI for integrating content and language instruction. This study occurred in the Indonesian EFL context.

THE STUDY DESIGN

The study design reflected the research aim of answering the questions: (1) what are the lecturers' and students' attitudes towards the implementation of integrating the teaching of Mathematics and Science with English policy?; and (2) what are the underlying reasons for the attitudes the lecturers and students show? These are the questions addressed in this chapter.

The study employed a mixed methods approach combining quantitative and qualitative data collection and analysis (Teddlie & Tashakkori, 2009). A survey of lecturers and students in the ISSTE program produced the quantitative data, while interviews with the lecturers and focus group discussions with the students generated the qualitative data. Classroom observations of teaching and learning practices supplemented these data collection methods. Survey data was analysed

using SPSS (2014), while the data obtained via interviews and focus group discussions was subject to thematic analysis (Babbie, 2010; Rivas, 2012; Silverman, 2011; Strauss & Corbin, 1998). The findings arising from both approaches were integrated and interpreted to draw conclusions.

Participants comprised 20 lecturers and 373 students for the survey, and 12 lecturers for the interviews and 20 students for focus group discussions who were selected purposively. All participated voluntarily. The lecturers represented the four study programs (Mathematics Education, Chemistry Education, Biology Education and Physics Education), and each had more than ten years' teaching experience. The students had studied in the ISSTE program for more than two semesters.

FINDINGS

Lecturers' Attitudes towards CBI

The findings revealed positive attitudes towards integrated Mathematics and Science teaching in English among lecturers who are proficient in English, while those with limited English proficiency had negative attitudes. Analysis of the survey and interview data revealed two key findings related to the lecturers' positive attitudes towards the integrated teaching of Mathematics and Science in English: (1) lecturers believed that teaching Mathematics and Science in English prepares students for the globalised job market; and (2) they expected favourable employment outcomes for graduates.

Most lecturers were aware of the importance of English for their students' futures. Thus, they had positive thoughts regarding the policy of teaching Mathematics and Science in English. They expected that, apart from Content Knowledge mastery, teaching Mathematics and Science in English would provide their students with an opportunity to master a foreign language, which would help prepare graduates for the globalised job market, as illustrated by Participant 8:

> The teaching of Mathematics and Science in this ISSTE program, as far as I know, is to prepare graduates to have not only content competence but also foreign language competence, like English, that is needed in the globalised job market …

This lecturer also believed that teaching content in English motivated students to improve their English skills because they expected these skills to lead to favourable employment. Motivation occurs when students feel challenged and realise the importance of English for their future employment:

> Teaching Mathematics in English has a positive effect on students; students are motivated to equip themselves with English skills to get a favourable job and career relatively easily. Those with limited English were later motivated and those who already had English skills became more motivated. This policy gave students a chance to study and improve their English … (Participant 8)

Conversely, data from the survey and interviews revealed two key findings related to the lecturers' negative attitudes towards implementation of the policy of integrated teaching of Mathematics and Science in English: (1) Limited English proficiency; and (2) low willingness to learn content in English. Some lecturers argued that the CBI policy had placed them in a difficult position due to their limited English proficiency. This, in turn, generated a negative influence on students who had limited facility in English. Having limited English proficiency made it difficult for lecturers to explain subject matter in English and to enable students to understand the content taught using English:

> Making students understand teaching materials taught in English is difficult; even in Bahasa Indonesia it is not easy, more so in English … sometimes they don't understand … because my English is not that good, I prefer using Bahasa Indonesia more so that students can understand … also to avoid misunderstanding … (Participant 5)

Apart from their own limited English proficiency, lecturers found their students' limited English proficiency another common obstacle. Most students' proficiency in English was very limited. Based on the data obtained from the university's language institute, the students had an average paper-based TOEFL score of around 380–450.[i] Lecturers' concerns about students' limited English proficiency is reflected in the following comment:

> … students' limited English competence is the most serious problem I face. If their English is good, it would be really helpful … but you know, they are not ready to study Biology in English although they have good intellectual competence. I cannot take a risk using English all the time in teaching … (Participant 3)

Although lecturers attempted to improve their own English proficiency, for instance by joining language classes provided at the university language institute or undertaking self-directed study, they admitted that it did not help much because they would need a long time to become proficient in English. Survey results indicate that most lecturers rated their English proficiency as "high intermediate", some thought their English was "intermediate" and only a few rated their English as "advanced". This range of English proficiency among lecturers was expected because Bahasa was the only language of instruction throughout their primary to undergraduate studies. Only those who had pursued a Master's or Doctoral degree overseas would have experienced English as the language of instruction. Thus, when some lecturers were asked to teach Mathematics and Science in English, they realised they were constrained by their limited English proficiency. One of the participants confessed:

> The biggest problem for me is my own ability to teach Physics in English. My English competence is still limited, so I mostly use Bahasa Indonesia for explaining and communicating with students; only the teaching materials, such as handouts and PowerPoint, are in English … (Participant 11)

Seemingly, it was those lecturers with limited English proficiency who reported a low level of student readiness to learn content in English; this certainly relates to the students' limited English proficiency. On average, students' passive English mastery (such as for reading texts) was just sufficient, but the active level needed to communicate and carry out scientific class discussion was still problematic. This issue is one of the problems that lecturers encounter when teaching in English. The following excerpt from an interview with Participant 1 shows evidence of this phenomenon:

> The biggest problem I face is the students' readiness to study in the ISSTE program … because their English is not sufficient enough to support them in the program. But not for reading, it is ok. To use academic English actively, such as discussing a lesson in English in the class, is not working … (Participant 1)

Students' Attitudes towards CBI

Analysis of the survey and focus group discussion data revealed two key findings related to students' attitudes towards the implementation of integrated teaching of Mathematics and Science in English: (1) students believed that learning Mathematics and Science in English prepared them for a globalised job market; and (2) it prepared them to pursue postgraduate study.

Students of Mathematics and Science showed a positive attitude towards the practice of learning content in English because it prepared them for a globalised job market. While they believed that the Indonesian language was better for studying Mathematics and Science, students recognised the importance of English in a globalised job market. This position is illustrated by a response from one focus group participant:

> … learning Physics in English provides us with an opportunity to improve and be proficient in English. Having good mastery in English makes us able to communicate in international communication. This skill is required in taking part in the global market. Before we start working we would need to be skilful both in our Content Knowledge and English … (Participant 4, Focus Group 3)

Furthermore, students believed teaching content in English equipped them with English skills for pursuing higher degrees, an ambition that many students shared. This viewpoint is revealed in the responses given by several students:

> … English has become the demand to pursue higher education such as a master's degree. It's better if, from undergraduate degree, we are accustomed to using English though we believe it is not easy … so, when we want to continue our studies, we are ready … (Participant 2, Focus Group 2)

This comment reflects the view that mastery of English is required to pursue postgraduate study. Therefore, developing proficiency in English during undergraduate study should be encouraged.

Participants in other student focus groups made similar comments, while many of the comments provided in the survey responses also indicate that students' reasons for choosing the ISSTE program included a desire to develop mastery in Content Knowledge and to be proficient in English. They believed that these dual competences were useful for their futures, including the opportunity to pursue postgraduate study. The following excerpts are examples taken from a teaching and learning activity in a Biology class the researcher observed. The lecturer applied a group discussion technique in teaching the Animal Structure subject, focusing on the topic "Terrestrial animal respiration". Each group was asked to discuss its assigned task and present it to the class. When all the groups presented their tasks explaining "Terrestrial animal respiration", most of the group spokespersons resorted to using Bahasa Indonesia, not English as was required:

> … we are from group one … er… er … we want to explain about the respiratory of worm …, but … we are not going to use English … er … er … but Bahasa … it's not easy, you know … er … er … to explain this in English. *Pernafasan cacing dilakukan dengan* (the respiratory system of worm) … (Student presentation, Group 1)

The above quote is just one example of the student presentations. Only one of the six participating groups managed to present their information in English. During group discussions before their presentations, most students did not seem to have significant problems understanding the texts written in English. However, they experienced difficulty using English to communicate the content of the texts to their classmates and lecturers during class discussion.

The results indicate that most of the students opposed the policy of integrating the teaching of Mathematics and Science in English. They found it hard to understand content taught in English due to their limited English proficiency. Although some possessed good English mastery, they were very much a minority. This is consistent with data obtained from the university language institute, where most students were at the pre-intermediate to intermediate level of English proficiency. The demographic data obtained with the survey showed that most students rated their English proficiency as pre-intermediate, some rated it at elementary level, and a few saw themselves as having a postintermediate or advanced level of English:

> In my case, the problem that I face is mastering Biology teaching materials in English. (Participant 4, Focus Group 3)

When students were asked further questions related to which area of English they found difficult, most had encountered difficulties related to discourse and sentence levels. At the discourse level, students were constrained in understanding and producing lengthy spoken or written information, while at the sentence level they were sometimes limited in understanding and using complicated grammatical structures in sentences.

Concord in Lecturer and Student Views

Despite some disagreement in attitudes towards the policy of integrated teaching of Mathematics and Science in English, lecturers and students shared the similar view that good English proficiency is required to learn Mathematics and Science content in English and to teach that content in English. Lecturers believed that good English competence was what students needed to learn content in English. Indeed, good English competence enables students to follow lessons and access content from many sources written in English, as illustrated in the following interview excerpt:

> I definitely agree that good English competence is what students need if they want to learn Chemistry in English. Without having this ability, it will be difficult for them to understand the content taught … (Participant 5)

Participants also shared the belief that limited English competence is a barrier to student learning, preventing them from making progress. Instead of feeling empowered and challenged by learning two subjects at the same time, students with limited English proficiency would see it as a burden. In this case, lecturers thought that teaching content in English inhibited student learning, as indicated by the following excerpt:

> I believe that teaching Mathematics and Science in English is not easy for students who have limited English. They would find it hard to understand content taught in English … (Participant 3)

The survey data demonstrated that students' linguistic competence in Bahasa Indonesia is significantly better than that of English. Hence, it is reasonable that students prefer learning content in Bahasa rather than in English, because good English proficiency is required in order to successfully learn content in English. Students also realised that integrated teaching of Mathematics and Science in English would open their mind about the importance of English for acquiring Content Knowledge. They were aware that good English proficiency was required to learn Mathematics and Science in English, as indicated in the following focus group discussion response:

> … nowadays English is not something "special" anymore, but a need. Being proficient in English is necessary when we learn Mathematics and Science in English … (Participant 2, Focus Group 3)

These excerpts illustrate an awareness that having sufficient English knowledge is required to understand and master Content Knowledge taught in English. The students realised that good mastery of English not only gives them the benefits of being able to comprehend course content, but it can also be used as a means of pursuing knowledge for their own benefit.

CONCLUSION AND IMPLICATIONS

The aim of this study was to examine lecturers' and students' attitudes towards the implementation of a policy of integrating the teaching Mathematics and Science with English in a university in Indonesia. It evaluated those attitudes and related them to the English language proficiency of the lecturers and students.

Findings obtained from questionnaires and interviews reveal positive attitudes towards the integrated Mathematics and Science teaching in English among those lecturers who are proficient in English while negative attitudes are found among those with limited English proficiency. Findings obtained from questionnaire and focus group discussion with students show similar results. Students who have good English proficiency reveal positive attitudes towards the use of English in teaching Mathematics and Science, whereas those with limited English proficiency show opposing attitudes. However, both lecturers and students share a similar view that good English proficiency is required to learn Mathematics and Science content in English and to teach that content in English.

The findings of this study indicate that effective implementation of integrated content and language instruction in tertiary education requires comprehensive and careful planning and preparation that embraces proficiency in English by lecturers and students, and specific professional learning by lecturers about CBI methods. Encouraging positive attitudes towards integrated Mathematics and Science teaching in English among all lecturers and students rests with strategies to raise their English proficiency levels. The link between attitude towards integrated Mathematics and Science teaching in English and level of English proficiency provides the basis from which to start improving proficiency levels. The fact that both lecturers and students shared the view that good English proficiency is required to learn Mathematics and Science content in English, and to teach that content in English, means that the task of raising English proficiency should be attainable. However, students who struggled to learn Mathematics and Science in English expected lecturers to emphasise the content, and to give proportional attention to both conversational and academic English, with a greater focus on the latter. Proportional attention given to both content and language (English) is the core principle of integrated content and language instruction, where students learn the language used in the context of the content taught, not as a separate subject. Unfortunately, the study's findings indicate that such attention was rarely paid as a result of some lecturers' limited English proficiency. Conversely, even if the lecturers' English proficiency was very good, some students' proficiency was lacking. Therefore, both lecturers and students need a competent level of English proficiency for the integrated learning of Mathematics and Science in English to succeed. English competence alone, however, will not solve the issues of integration. Lecturers must be knowledgeable about integrated content and language instruction (CBI) in order to deliver the information in ways the students can understand. Indeed, this study suggests that lecturers should be well trained in the effective implementation of integrated content and language instruction in addition to being proficient in English.

A Postscript to the Study

In 2013, and as the current study drew to a close, the Indonesian Central Government revoked the SBI policy after it had been in operation for six years. This decision, however, does not render the ISSTE program irrelevant. Many private primary and secondary schools across Indonesia continue to offer bilingual education that applies integrated content and language instruction. Moreover, this approach is gaining attention in many tertiary education programs in Indonesia. In short, content-specialist teachers who are also proficient in English are in demand to meet the needs of these CBI programs.

NOTE

[i] The minimum accepted TOEFL score for admission to an Australian university is 550.

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Soni Mirizon EdD
Faculty of Teacher Training and Education
Sriwijaya University, Indonesia

Ben Wadham PhD, GradCert Public Policy, BA (Hons)
School of Education
Flinders University, Australia

David D. Curtis PhD
School of Education
Flinders University, Australia

ANWAR AMIN AND MICHAEL BELL

14. ENABLING INNOVATION IN ACEHNESE SCHOOLS

> The challenging part of this research process was when I attempted to dive into the very bottom of the heart of exemplary innovative teachers in model schools to explore and discover their feelings, beliefs, experiences, perspectives and opinions regarding school culture nuances that determined the growth and sustainability of their innovativeness. This part of the research process has indeed given me meaningful lessons and assisted me to transform myself from a student to a researcher. (Amin)

Teachers in Indonesia are facing pressure to adopt curricular innovation. One driving force is a series of educational reforms, including the policy on regional autonomy stipulated in the Regional Autonomy Act No. 22/1999. This policy led to the decentralisation of education, as postulated in the Indonesian Government's Regulation No. 25/2000, which involved the implementation of school-based management (Bandur, 2009; Raihani, 2007), followed in 2006 by a mandated school-based curriculum (in Bahasa Indonesia it is called KTSP; Kurikulum Tingkat Satuan Pelajaran) (Raihani, 2007). Decentralisation led to delegation of policy, planning and administration decision making processes to municipal and school-based management (SBM) (Zajda, 2006), stressing that individual schools, rather than other government structures, were the primary units of improvement.

Under SBM, every school is granted the authority to make decisions about significant matters related to its operations (Barrera-Osorioet al., 2009; Shoraku, 2008) with the aim of stimulating and sustaining improvement. Schools are mandated to form a School Committee or School Council involving a variety of community members (parents, educational experts, alumni and teacher representatives), and are given authority to monitor teaching and learning quality and school performance, raise funds, and appoint, suspend or remove teachers (Barrera-Osorio et al., 2009; RTI International, 2010; Shoraku, 2008). Consequently, parents and the wider community become more involved in the operation of schools. In such circumstances, teachers may inevitably deal with a reality where parents and the community scrutinise their instructional practices more closely. This situation may compel teachers to seek new and better ways of performing instructional practices to satisfy the concerned parties.

It is argued that decentralisation policies acknowledge diversity in education across Indonesia, and consider local people's aspirations and needs (Ibrahim, 2008; Musanna, 2009; Shoraku, 2008). This acknowledgement of diversity is part of the

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 137–144.

principle of KTSP development (Badan Standar Nasional Pendidikan/National Education Standards Body [BSNP], 2006). In contrast to a highly centralised education system, KTSP provides teachers with greater autonomy and opportunity to develop syllabus, teaching materials and assessment tools that cater to, or are congruent with, local wisdom and needs, parental and community expectations, and contemporary learners' learning purposes (BSNP, 2006).

Aceh, one of Indonesia's provinces, possesses a culture and language significantly distinct from other parts of Indonesia. Islamic values are deeply embedded in Acehnese culture. Following the implementation of SBM and KTSP, demand has grown for incorporating Islamic values into public education. For instance, local education analysts have continuously scrutinised curricula and urged the implementation of Islamic values-based education (Ibrahim, 2008). According to the NAD (Nanggroe Aceh Darussalam) Education Strategic Plan 2007-2011, the implementation of Islamic values-based education involves developing a "National Curriculum added with Islamic Values in the Aceh education curriculum" (p. 33). Consequently, teachers in Aceh have been challenged to innovate in developing syllabi, selecting materials and defining teaching methods to incorporate Islamic values into public education.

LITERATURE REVIEW

Jain (2010, p. 81) argues that "all changes are not innovation, however, all innovations in organisation terms are change; undesired or unintended changes or changes involving nothing new do not constitute innovations". Innovations result in better practices and improvements, while change does not always improve matters in an organisation. Bartol et al. (2008, p. 212) state that innovation represents a "new idea applied to initiating or improving a process, product or service", while change is described as "any alteration of status quo" that may not use new ideas and may not be a major improvement. Scholars agree that organisational culture is a primary determinant of organisational innovation (Ahmed, 1998; Dobni, 2006; Parzefall et al., 2008). Thus, an organisation intending to innovate and promote innovation needs to nurture a culture that facilitates and encourages individual innovativeness. Schools, like industries, require innovation to survive; they hinge on a certain culture that supports innovativeness in order to innovate (Goatley & Johnston, 2013; Jaskyte, 2004).

Literature documents the nature of cultures that encourage and enable individuals' innovativeness in various organisations, including schools. Thus, recognising an innovator for their innovation is viewed as essential in a culture that allows and encourages individual innovativeness (Huhtala & Parzefall, 2007; Malaviya & Wadhwa, 2005). In addition, a culture emphasising professionalism is believed to facilitate individuals' innovativeness (Evan, 2008). Such a culture is concerned with individuals' attitudes and behaviour towards their profession or occupation. According to Haftkhavani et al. (2012), teachers perform better when they are strongly committed to the school. Professional commitment within a school functions as impetus for teachers to exert effort or act to achieve organisational targets (Shagholi et al., 2011).

Knowledge sharing has been suggested as essential in a culture that enables individuals to be innovative (Burg et al., 2013; Cerne et al., 2013) because it allows them to enrich their knowledge and share innovative ideas. Thus, knowledge sharing constitutes the primary precondition for innovativeness. Moreover, this cultural practice allows individuals to learn from their colleagues through mutually sharing ideas, information and experiences about issues related to their organisation (Chen et al., 2012; Tseng et al., 2012).

THE STUDY

Given the demands placed on educators in Indonesia generally and the special character of the Acehnese context, this study sought to explore how the nature of school culture effectively enables and encourages teachers' innovativeness for curricular innovation. The study consists of a case study of two model schools (School A and School B) from Banda Aceh, Indonesia.

METHODS

Six peer selected teachers, revered as notable innovative professionals within the two schools, were interviewed (3 from each site). Interviews were transcribed and translated. An independent bilingual individual checked the translation. Thematic analysis coding involved three stages; open coding, axial coding and selective coding (Ezzy, 2002). Each case was treated separately first, then a cross case analysis was conducted based in the emergent themes from each case.

CASE ANALYSIS FINDINGS

Recognition of Innovative Work (Formal, Informal and Peer Recognition)

Recognition of innovative work was reported to encourage innovation in both cases, although this played out slightly differently in each. First, recognition of innovative work was reported to create self-esteem within an innovative teacher. Exemplary innovative teachers at both schools felt themselves worthy for having performed innovation. They perceived they were given recognition due to their innovation being beneficial to both students and colleagues. The effect of self-esteem on exemplary innovative teachers in School A was that they were impelled to continue exploring and seeking innovative ideas about teaching and learning. At School B, self-esteem generated exemplary innovative teachers and increased their willingness to constantly perform innovative work for the school's improvement.

Second, recognition of innovative work created the perception within an innovative teacher that their innovation was supported. In School A, this perception resulted in teachers having the courage to seek support from colleagues when performing innovation. It also increased the teachers' passion to continue to adopt and implement innovation in teaching practices. In School B, the perception of being supported gave teachers more courage and confidence to continue innovating and initiating changes in learning and teaching.

Additionally, recognition of innovative work in School A caused teachers to feel more comfortable and confident in performing such work; a consequence not observed in School B.

Teacher Professionalism as Commitment and Autonomy

A professional commitment culture generated a creative disposition within teachers in both schools. In School A, this was characterised by the teachers' initiatives and endeavour to discover and apply a variety of teaching and learning models that met students' needs rather than relying on fixed, conventionally applied models. In School B, creative disposition was indicated by the teachers' willingness to continuously seek novel ways of teaching that they believed would be more effective and enhance students' achievement.

Autonomy enabled the School A teachers to be creative in taking the initiative to adopt and implement teaching and learning models that were considered novel and innovative. These teachers were unhampered in seeking out and experimenting with novel ways of teaching. This phenomenon also occurred in School B, although with a slightly different focus. Autonomy in teaching evoked creativity because it got rid of the teachers' apprehension that they would be blamed for doing something outside the conventional instructional practices; they did not feel constrained to perform instructional activities in school-stipulated ways, which enabled them to develop their innovative ideas and put them into action.

Unplanned or Emergent, Informal Knowledge Sharing Among Teachers

The effects of a knowledge-sharing culture on teachers' being innovative in the two schools were both similar and different. Knowledge sharing enabled the teachers to increase or enrich novel ideas regarding how to teach in innovative ways. It provided the teachers an opportunity to learn from their colleagues' experiences in regard to how to teach innovatively.

In School A, however, the teachers' participation in unplanned or emergent and informal knowledge-sharing activities gave them an opportunity to embrace their colleagues in order to initiate and create the collaboration they perceived as crucial to implementing innovation in teaching. This phenomenon was not observed in School B. Also unique to School A was one teacher's experience of having the opportunity to find a critical friend to examine their innovative idea and provide feedback and suggestions. This allowed the teacher to assess the degree to which their idea was suitable and the feasibility of implementing it.

Unique to School B was the opportunity for one of the teachers to introduce and elucidate their innovative ideas to colleagues in a formal setting. In addition, another of the School B teachers had the impetus to keep learning through investigation and experimentation with the aim of discovering other innovative ways of teaching so they had something novel to share with their colleagues.

DISCUSSION

Recognition of Innovative Work

Drawing on the experiences of the exemplary innovative teachers who were interviewed, recognition of innovative work is clearly essential for enabling teacher innovativeness. This corresponds with evidence gathered in the private sector by Malaviya and Wadhwa (2005), who suggest that recognition fosters employees to innovate and that organisational innovation may not prosper without appropriate recognition. Indeed, Malaviya and Wadhwa (2005) assert that innovation originates from individuals in an organisation. Employees' ability to innovate is the embryo for organisational innovation. Organisational culture is an important aspect of developing and encouraging employees' innovative ability and certain cultures in organisations enable individual innovativeness. Indeed, Huhtala and Parzefall (2007) propose that recognition is a significant predictor of innovative performance and employee innovativeness can function as a resource when the contribution of innovative employees is recognised.

Islamic principles play a role in shaping the nature of recognition, especially if recognition is considered synonymous with the demonstration of respect and appreciation, or regarded as one's effort to make others feel respected or appreciated (Alam et al., 2013). The Islamic principle stipulates that every Muslim respects not only every human being but also every creation. Respect refers to the condition of being honoured, esteemed or well-regarded, and involves treating other individuals the way we would like to be treated. It is viewed as one of the foundations of faith in Islam, originating from Hadith, the Prophet's Practices and Sayings (Imam Reza [A.S.] Network, 2014). Based on this principle, Muslims regard demonstrating recognition to an individual who has contributed valuable new knowledge as an important value. Someone who contributes new knowledge and ideas is regarded as a teacher and should be given respect as great as that of a parent (Imam Reza [A.S.] Network, 2014).

Teacher Professionalism, Commitment and Autonomy

Teachers described the culture of professionalism enacted in their schools as a powerful means of generating their innovativeness, characterised by willingness to change their professional practice and enhance the quality of services provided to students. This finding is consistent Evan's (2008) evidence that professionalism or professional culture must involve changes to professional practice regardless of whether they are consciously imposed upon education professionals or evolve as a direct or indirect consequence of prevailing circumstances.

This study's finding that the participating exemplary innovative teachers were enabled to be innovative in teaching because they worked in a culture that emphasised professional commitment, requiring them to have a high degree of commitment to the school's norms and attitudes, is in line with the findings of research by Haftkhavani et al. (2012). These authors asserted that teachers'

commitment to their school as an organisation resulted in better teaching performance and agreement with their school's organisational changes.

The teachers spoke of "freedom", a "constraint-free condition" and the "authority to make decisions regarding what and how to teach" as vital factors that enabled them to be innovative. Being free of constraints and delegating authority to decide the content they needed to teach and the ways of teaching they needed to use enabled and facilitated the teachers to take initiatives that led to the adoption and implementation of innovations in teaching. Correspondingly, research has been conducted to examine the effects of autonomy on employee attitude and behaviour in terms of innovation. That research proposed that employee innovativeness is often influenced by autonomy in a natural and indirect way (Das & Joshi, 2007; Huhtala & Parzefall, 2007). Literature discussing the implication of autonomy for organisational innovativeness claims that promotion of decision making autonomy is an important organisational innovativeness principle. It also shows far-reaching agreement among scholars that innovative organisations tend to provide their members with more autonomy in making decisions (Gebert et al., 2003).

Unplanned or Emergent, Informal Knowledge Sharing Among Teachers

The exemplary innovative teachers described their reliance on other teachers' willingness to share knowledge in order to enrich themselves with new knowledge, insights and ideas for being innovative in teaching. They also acknowledge that their colleagues' significant contributions through unplanned, emergent and informal knowledge-sharing activities enhanced their innovativeness. The significance of knowledge sharing for innovativeness in organisations has been acknowledged by Cerne et al. (2013), Gunsel et al. (2011) and Burg et al. (2013). According to Gunsel et al. (2011), knowledge sharing constitutes part of the knowledge management cycle that plays an important role in organisational innovativeness. Burg et al. (2013) provide evidence that the practice of knowledge sharing in an organisation is driven by the fact that it enhances innovativeness.

CONCLUSION

There is no doubt that Indonesian educators are under pressure to adapt to a decentralised education system that promotes local values and local scrutiny. This adaptation requires innovations in teaching practices. The adaptation also requires schools to make changes to their organisational cultures. This study has shown that schools can encourage and support teaching and learning innovations by providing teachers with organisational cultures that focus on three major innovation-inducing characteristics: recognition of teachers' innovations; emphasis on teachers' professionalism and commitment to the school, along with the autonomy to experiment with innovations to bring about change; and knowledge sharing to enrich all teachers' knowledge, and facilitate novel ideas and teaching practices.

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Anwar Amin BEd, MEd, EdD
Acting Principal of Senior High School
Modal Bangsa of Aceh, Indonesia

Michael Bell PhD
Coordinator Educational Leadership and Management
School of Education
Flinders University, Australia

HABIBURRAHIM, JANICE ORRELL AND ROBERT CONWAY

15. INTEGRATING GRADUATE ATTRIBUTES INTO ISLAMIC HIGHER EDUCATION CURRICULA IN ACEH, INDONESIA

> I am aware that this PhD terrain has shaped my academic competence, elevating my research skills and self-esteem. It has challenged me to work more independently to build up my competency and confidence to be an independent researcher and a prospective knowledge creator. I can now be a motivator whose experiences and reflections motivate other young lecturers to be potential researchers and knowledge creators like my own supervisors have done for me. (Habiburrahim)

One of the most significant current discussions in higher education is refining the concept of graduate attributes or generic skills in undergraduate student curricula. In most universities in Australia and the UK, there is an established set of graduate attributes that undergraduate students are expected to acquire as a result of their course of studies (Barrie, 2007; Chalmers & Partridge, 2013). However, in the context of Islamic higher education, especially in Aceh, Indonesia, graduate attributes are often a novel concept. What have been referred to as graduate attributes in Australian and UK universities are largely not identified within curriculum intentions in Islamic universities in Aceh. This chapter is motivated by the implementation of new policy developments in Indonesia for higher education in Aceh that call for greater integration of Islamic values, general education and attention to local community needs. In coming to some practical solutions regarding the integration of graduate attributes into the curriculum, this paper draws upon a study that sought the views and lived educational experiences of students and teachers in an English Education Department in an Islamic university in Aceh.

GRADUATE ATTRIBUTES

The focus for integrating core educational values in the form of graduate attributes lies in curriculum design and development. Curriculum is a means by which to delineate a specific educational program's philosophy, goals, objectives, learning experiences, instructional resources and assessment. It is through the curriculum that an educational institution formulates the skills and experiences its students will master after accomplishing a certain study program. Barnett (1994) urges those designing curriculum in higher education to focus not only on curriculum knowledge (knowing-that), but also on operational competence (knowing-how).

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Generic graduate capabilities are the complementary knowledge, skills and experiences students can master besides the core discipline knowledge. In the context of the UIN Ar-Raniry Islamic University, generic graduate capabilities are viewed as the general skills students can master to synergise with local and national academic and workforce requirements. Barrie (2006), Hess (2010), Karseth (2004), Laird and Garver (2010), Oliver (2010) and others argue that providing significant generic skills may assist students to survive in today's highly competitive job market. Barrie (2005) also cited Bowden et al. (2000) in acknowledging that generic skills go beyond the disciplinary knowledge, expertise or technical knowledge that has traditionally formed core courses to encompass the qualities that prepare graduates to become competent citizens in an unknown future. According to Barnett (2004), learning for the unknown future focuses not only on particular skills but also on empowering human dispositions. "Learning for an unknown future has to be a learning understood neither in terms of knowledge nor skills but of human qualities and dispositions" (Barnett, 2004, p. 247). Supporting Barrie's ideas, Hess (2010) emphasises that education has two paramount objectives at the fundamental level: a "private" objective and a "public" purpose. As a private objective, education serves as a private good in which every individual benefits from the skills and training offered by the education process. As a public good, in addition, education trains and prepares every individual in particular skills, dispositions or values to become a better citizen and neighbour. As a result, these dual education functions require higher education institutions to better equip students to develop the basic capacity to gain employment and become better community members. This aspiration for educational development reflects the foundations of the UIN Ar-Raniry as an Islamic university that has a pivotal role in producing graduates who master both Islamic education, and general education and skills (Nurdin et. al., 2010).

Academics, after close scrutiny of generic graduate attributes, have a different understanding of such outcomes (Barrie, 2005, 2006, 2007). Barrie (2007, p. 440) notes the distinctive differences held by academics, some of whom conceive these attributes to be:

> … basic precursor abilities, which provide a foundation, to which can be added the discipline knowledge of a university education while other academics' understanding of generic attributes go beyond the conception to encompass university learned, general functional abilities and personal skills that can usefully complement the discipline-specific learning outcomes of a university education.

Other academics understand generic attributes to be more than useful additional general skills. Rather, they are specialised variants of such general skills that are essential in the application of discipline knowledge and the translation of university learning to unfamiliar settings, thus usefully transforming the products of university learning. This implies that graduate attributes are still debatable issues in academia. However, the most commonly agreed generic skills to be mastered by university graduates encompass additional skills and competences that enable

individuals to apply studied knowledge in their real life, both at workplaces and in the community (Gow & McDonald, 2000). Gow and McDonald cited the Mayer Committee (1992, p. 378) in elaborating seven key competence domains that constitute significant graduate attributes: "…collecting, analysing, and organising information; communicating ideas and information; planning and organising activities; working with others and in teams; using mathematical ideas and techniques; problem solving; and using technology". They also suggested that with insecure and scarce employment, entrepreneurial ability could be seen as a promising additional graduate skill worth mastering (Gow & McDonald, 2000). Graduates possessing entrepreneurial ability have the potential to know how to create new business opportunities (Defillippi & Arthur, 2006; Gow & Wood, 1996).

A central issue in the integration of graduate attributes into higher education is that both teacher educators and faculty members are responsible for assigned tasks that will be the catalysts for students to develop the desired capabilities and dispositions. Teacher educators must understand, and are responsible for, teaching particular core courses that include these additional generic skills. Curriculum developers at the faculty level are responsible for ensuring that the curriculum integrates the faculty's required generic skills. In addition, Gow and McDonald (2000) conclude that it is equally essential for accreditation boards to ensure that the program's stated learning objectives are met.

In summary, generic graduate capabilities are viewed as the skills students should have mastered on completion of their undergraduate education. Those skills and competences include the capacity to manage general issues in a workplace, which involves planning, analysing, problem solving, using technology and communicating ideas to support the growth of the institution in which they work. In the context of social life, generic attributes may also encompass the skills to enable socialising with neighbours or the community, and the capacity to value others and abide by the law. Understanding these social values may lead students to become better citizens.

EDUCATIONAL FOUNDATIONS OF ACEH

Aceh is an autonomous province in Indonesia, with its own governmental law called UUPA (Law on the Governance of Aceh). UUPA is stipulated in national regulation number 11/2006, which affirms that Aceh is self-governing, enabling the provincial government to develop and manage its own policies. This relatively recent regulation includes provisions concerning rule of law, human rights, political issues, educational systems and economic matters (Aspinall, 2005). The Acehnese people's local political demands to be independent of the central Indonesian Government were the basis of armed conflict from 1989 to 1998 (Aspinall, 2005). Some politicians believe that regulation 11/2006 is the result of an emerging political will from the central government in Jakarta to respond to the Acehnese people's wishes in order to maintain peace.

Acehnese view education primarily from an Islamic perspective because the Aceh region is inhabited by a 99% Muslim population. The Islamic view of education is that it constitutes a form of worship (Qanun No. 23, 2002) and means:

> … a lifelong process of preparing individuals to actualise their role as a Khalifah (vicegerent) of Allah on earth and thereby contribute fully to the reconstruction and development of their society in order to achieve well-being in this world and hereafter (Hashim & Langgulung, 2008, p. 1).

From an Acehnese cultural perspective, the purpose of education is to empower students' holistic development and, in the process, contribute to forming an Acehnese society at large that is civilised and has dignity (Qanun No. 5, 2008). Education should be an active social vehicle for translating religious and scientific values into improved community lives. Therefore, higher education is expected to nurture students' growth, not only in scientific knowledge and understanding but also, more importantly, in moral principles. The UUPA regulations articulate the expectation that universities should play more visible roles in local communities' educational, social and economic wellbeing (Jongbloed et al., 2008).

Strategic planning of Aceh education aspires for all secondary and higher education graduates to function effectively in increasingly competitive global, regional, national and local labour markets. Aceh's long term strategic plan seeks to have university graduates who are well prepared to contribute to the development of Aceh's social, economic, political and community life (Aceh strategic planning 2012–2017). Teachers, for instance, as a result of their education, should be able to teach students appropriately, meaning they should demonstrate skilfulness in their field of disciplinary study as well as being exemplary social models who abide by the law and exhibit tolerance, care towards others, honesty, generosity and trustworthiness.

CURRICULUM DEVELOPMENT IN INDONESIA

Indonesia has an education system that is managed by two educational ministries: the Ministry of National Education (MoNE) and the Ministry of Religious Affairs (MoRA). Previously, when developing curricula, Indonesian higher education institutions were required to refer to the MoNE Decree number 045/U/2002 regarding the core curriculum. Higher education institutions were expected to adopt a competency-based curriculum that emphasised the acquisition of particular disciplinary skills. Students studying teacher education, for example, were expected to acquire sufficient pedagogical skills (Ministry of National Education Decree No. 045/U/2002).

This regulation, while authorising higher education institutions throughout Indonesia to design and develop their curriculum in line with their mission and the disciplinary focus of the programs they offer, also expects the curriculum to address local needs, paying attention to particular local conditions and geographic circumstances. It identifies particular competences, including: attitude formation; acquisition of knowledge and skills; mastery and application of knowledge and

skills; and knowledge of community social lives. In the case of an English Education Department, for example, students are expected to learn particular English courses as their core competence. Core courses consist of four English language skills: listening; speaking; reading; and writing. In addition, as teaching students, they are expected to learn certain pedagogical courses – teaching methodology, teaching evaluation and curriculum analysis – to support their competence as graduate teachers. Other additional competences emphasise local values and traditions as well as the institution's visions and missions. To this end, the UIN Ar-Raniry offers Islamic courses ranging from Islamic law to Quranic interpretation and recitation that students can elect to study.

As stated in Indonesia's national strategic planning policies, the focus of national educational empowerment relies on three conceptual frameworks: affective; cognitive; and psychomotor (National Educational Ministry Regulation, 2010). The regulation affirms that the affective domain should nurture learners' spiritual values, noble *akhlak* (morals) and other aesthetic values. The cognitive domain, on the other hand, should sharpen the learners' competences in empowering intellectual functioning to master, develop, and apply specific knowledge and technology. Finally, the psychomotor domain stresses learners' ability in terms of specific technical skills acquisition and kinaesthetic competency. Regulation No. 22/1999 and the *KKNI* oriented curricula in principle provide the opportunity for all educational institutions throughout Indonesia to accommodate the needs, heritage and culture of their own schools, people and community without facing significant interference.

Article 216, Point 1 of UUPA confirms that education in Aceh is to be developed in accordance with current technological and educational advances. The regulation stipulates that technology – the key skills students should master to succeed in future life – is a critical element of educational development. This regulation acknowledges the critical role of technology in empowering Acehnese human resources. As such, Acehnese students as well as the general Acehnese population must master adequate technological competences to empower themselves in seeking a better life in this world and the hereafter: "Every Aceh community deserves to have a quality and an Islamic education in accordance with the advancement of knowledge and technology" (UUPA, 2006).

Point 2 of article 216 signifies the importance of an education system in Aceh that honours human dignity, includes human rights, and provides quality education as well as emphasising local acculturation embedded in Islamic principles. In the national context, Point 2 of the article also indicates that the educational approach in Aceh needs to consider the heterogeneous community living in this region. Some members of the community are non-Muslim, as indicated in the following statement: "The education mentioned in article 216 Point 1 is implemented based on democratic principles and welfare by highly honouring the human rights, Islamic values, culture, and the pluralistic nation" (UUPA, 2006).

Education in Aceh needs to be developed in line with contemporary knowledge and technology. In doing so, Aceh can adopt and adapt innovative educational curriculum frameworks from any country throughout the world. However, it must

be aligned with the Acehnese context. Since Aceh does not have an educational conceptual framework to accommodate graduate attribute components into Islamic higher education institution curricula, this province has the opportunity to refer to western educational institutions, such as those in Australia, the UK and the USA, which have systematically introduced generic skills as expected outcomes of undergraduate programs. The application of generic skills to curriculum development at Islamic universities in Aceh does not mean that this reforms the traditional educational purview. Rather, it puts a new emphasis upon skills and competence in the curriculum, inviting experiential and problem-based forms of learning (Nicholls, 1995). Importantly, there are few mechanisms in place or guidelines to ensure that these significant, newly articulated intentions and regulations will be embedded in enhanced curriculum design, implementation and evaluation.

INTEGRATION AND ISLAMIC EDUCATION

According to Lubis et al. (2009), the philosophy of integrated Islamic education intends to train students' minds, bodies and souls based on Islamic values and divine revelation (Lubis et al., 2009). In Figure 15.1, they illustrate the concept of integrated Islamic education as a distinct equilibrium between *akhlak* (ethical moral) or spiritual development and personal achievement in life through the development of cognitive, affective and psychomotor aspects. In their opinion, the integration of Islamic education requires four substantial elements: knowledge-based; physiological; civic; and spiritual.

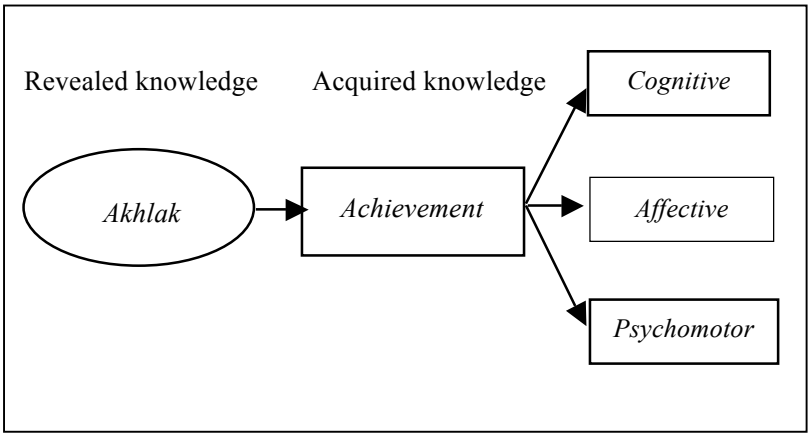

Figure 15.1. The relationship between the components in the objective of an integrated Islamic education (Lubis et al., 2009, p. 53)

The Lubis et al. proposal regarding an integrated Islamic education is central to the findings of a study that is the basis of this chapter, in which the views of students

and teachers regarding their lived experience of Islamic teacher education in an English Department were captured through interviews, discussions and a survey. The study's findings were examined closely in relation to the UUPA policies. For students in particular, the distinctive foundation of education in Aceh relies on the development of *akhlak,* or the spiritual component, as the core values empowering this Islamic community. However, students reported that they were open to diverse approaches to the integration of general and disciplinary knowledge with Islamic education, and believed that UIN Ar-Raniry graduates expect to master broader skills, including life skills, to survive in the competitive employment arena in the future. They were aware that "being 'smart' in English is not enough to get a job. We need to have other competences such as leadership and management, and communication and computer skills" (S.3:5).

Students suggested that Islamic teaching materials could be delivered by a submersion approach in the curriculum that sought to teach English language skills. Such an approach would enable them to acquire English comprehension while at the same time gaining an understanding of Islamic teachings. They also proposed integration of Islamic values into the department's curriculum "as the local legacy". They pointed out that the department needs to explicitly integrate all three significant elements – local culture, Islamic values and English skills – into its curriculum, along with a career focus:

> … it is important provide more flexible strategies in teaching and to let students think about their future by providing a subject about future career overview, and also to integrate Islamic subjects with other subjects – they shouldn't be taught separately – in an ideal future department curriculum.

The English Education Department teachers also advocated for Islamisation of English Education:

> The teaching and learning materials for students need to be modified, for example the given materials are not solely adopted from general knowledge and information, but they should be taken from Islamic reading resources; namely the resources that elaborate the Islamic religious values. When we teach English, we do not only teach or ask students what English is. Yet, when we teach English, we can simply teach them ample noble Islamic values by distributing Islamic reading materials which are written in English by Islamic scholars throughout the globe.

The above comments exemplify that integrating general and disciplinary education with Islamic education can be implemented through Islamisation of English language teaching as an immersion program. However, to ensure academics' and students' acceptance of this Islamisation of English language teaching, the Institutional and Departmental leadership must officially endorse it in the English Education Department curriculum.

Other suggestions were that the integration of education could be carried out by implementing an interdisciplinary curriculum. Ausberg (2006) refers to interdisciplinary curriculum and learning as an approach that consciously applies

methodology and language from more than one discipline to examine a central theme, issue, problem, topic or experience. Most literature identifies that at the heart of an interdisciplinary teaching approach lies a developed knowledge that students want to persevere to enrich their intellectual capacity and to ensure that their knowledge is linked with the real world (Tchudi & Lafer, 1996). Repko (2012) takes this idea further, arguing that integration is the key characteristic of interdisciplinary learning. Students want to be taught English and education as disciplines as well as other generic capabilities, but at the same time they want these courses connected with religious values as a specific activity and focus (Lonning, 1998). Aina (1979, cited in Al Hassan, 2012) points out that knowledge integration can be applied within and across disciplines. In the English language discipline at the UIN Ar-Raniry English Education Department, integration need not be confined to Islamic values and English language skills and pedagogy. Currently, the five English language skills – grammar, reading, writing, speaking and listening – are also taught separately. They can be integrated in the future. Likewise, integration within the religious knowledge disciplines is possible. Quranic interpretation can be integrated into Ulumul Quran and ilm al-hadīth into Hadīth.

It is clear from this study that the context now needs, and is ideally placed, to engage in a radical review of the curriculum design and delivery processes utilising the concept of integration as its core, with a central goal to enrich students' competence in generic skills not limited to language learning and pedagogical skills. In order for integration to happen, however, the institution needs clear policy statements, guidelines and support to empower its leaders to engage in such radical change. The changes needed are not intuitive. There is a need for substantial supporting professional learning aligned with the policy changes to assist academic teachers to make the necessary changes to their curriculum design and their instructional strategies.

CONCLUSION

Curriculum design and delivery plays a pivotal role in setting a deliberate agenda to assist students to attain critical competences that will equip them to succeed in their personal life, engage in the competitive labour market, and become moral and contributing citizens after studying at an educational institution. Curriculum designers are challenged to engender wider generic transferable skills and competences to provide a pathway for students to attain the mastery needed to achieve these goals. Within the context of education in, and for, Aceh, Indonesia, the integration of Islamic values and generalist learning into a curriculum that has other professional and general education goals is imperative. Islam does not segregate worldly and Islamic education. Both educational purviews are expected to support each other to ensure the Islamic community has balanced educational development. Religious education is regarded as the pathway to purifying humans' *akhlak*, and general education is conceived as the vehicle for understanding worldly issues. It is understood that by mastering general education, members of the Islamic community have the capacity to become critical Islamic thinkers, with

the ability to interpret, analyse and weigh up information to make prudent decisions. Hence, the integration of these two educational spheres will allow the Islamic community to obtain both Islamic and general education together.

The term integration is used liberally within the Islamic education community, but as a curriculum concept it needs more detailed examination as to what it means in curriculum implementation. The same is true in developing commonly agreed notions of Islamic education graduate attributes. Institutions need to establish curriculum review systems to oversee the implementation of the integration of Islamisation of disciplines and graduate capabilities. Infrastructure, such as systematic professional learning for academic teachers to better understand what is required of them in designing their courses and instructional approaches, is also essential. Finally, there is scope for practice-based research to develop these ideas for the advancement of a modern concept of Islamic higher education.

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Habiburrahim PhD
UIN Ar-Raniry
Darussalam - Banda Aceh, Indonesia

Janice Orrell PhD
School of Education
Flinders University, Australia

Robert Conway PhD
School of Education
Flinders University, Australia

ERNEST NGENDAHAYO AND HELEN ASKELL-WILLIAMS

16. RWANDA'S NEW COMPETENCE-BASED SCHOOL CURRICULUM

New Approaches to Assessing Student Learning Needed

> My ideas and beliefs in my abilities to publish were far from optimal. However, encouragement from my lecturers made me revisit my self-beliefs and realise that publication was not only a possibility for me but also an obligation to give back to the knowledge community. (Ngendahayo)

Rwanda has embarked on curriculum reform to improve the quality of education. This is a crucial step in the direction of Rwanda's ambition to "develop a knowledge-based society and the growth of regional and global competition in the jobs market" (REB, 2015). An important shift has been to move away from a "knowledge-based curriculum" to a competence-based curriculum[i], and from knowledge and skills acquisition to knowledge creation and application. The aim is to develop students' independent, lifelong learning habits; appropriate skills and knowledge; and applications to real-life situations. There is growing recognition of the potential of competence-based education, unlike traditional subject/content-based education, to develop the capabilities/competences that are deemed essential for success in both academia and today's knowledge-based economy (Darling-Hammond, 2012; Scardamalia et al., 2012).

Rwanda's proposed competence-based curriculum is similar to programs that seek to develop generic capabilities, such as those discussed by Yeung et al. (2007) and McNeil et al. (2012). The competences proposed for Rwanda's educational system include critical and problem solving skills; creativity and innovation; research; communication in official languages; cooperation, interpersonal management and life skills; and lifelong learning. Rwanda has adopted the term "competence-based curriculum", therefore the terms "generic skills", "generic capabilities-based" and "competence-based education" will be used interchangeably in this chapter, using the acronym CBE.

ASSESSMENT AND COMPETENCE-BASED CURRICULUM

Testing Culture vs Assessment Culture

The value that students and teachers place upon various components of the new curriculum will be influenced strongly by the components that are targeted for

J. Orrell and D. D. Curtis (Eds.), Publishing Higher Degree Research: Making the Transition from Student to Researcher, 155–165.

evaluation. Two different evaluation cultures influence the curriculum; testing culture and assessment culture (Birenbaum et al., 2006). In the testing culture, the main focus is on the end results. The means that lead to the ends may be given little or no consideration (Hamade, 2009). This culture is summative assessment and its variants, such as assessment *of* learning or high-stakes assessment (e.g. Stiggins, 2002). Scardamalia et al. (2012) argue that summative assessment is the common function that most people associate with assessment. Summative assessments are usually administered after major events, such as standardised tests at the end of a unit of study or final exams at the end of a course, or before important events like university entry tests (Shute & Becker, 2010). The tasks and items in summative assessments come in different forms, such as multiple choice tests and other short answer questions, open-ended essays and student presentations.

Summative assessments play an essential role as an accountability mechanism for schools, teachers and students, but the information they generate is less timely and useful for informing the day-to-day processes of teaching and learning (Scardamalia et al., 2012). Grades or marks, perceived as "golden stars", and related decisions such as students' ranking, serve as the primary incentive for students (Black & Wiliam, 1998). Summative assessments pressure teachers to teach to the test, which in turn results in a "narrowed curriculum" (Popham, 2004). Teachers may turn to transmission teaching styles with well-structured learning activities (Harlen & Deakin, 2002) around what is tested or likely to be tested to maximise their students' test scores (Popham 2001).

In contrast to a testing culture, a formative assessment culture focuses upon assessment *for* learning and assessment *as* learning (e.g. Stiggins, 2002) with a view to improving teaching and learning. According to Shute and Becker (2010), formative assessments are embedded in the curriculum that is delivered in the classroom, and generate real time information that can be used to revise instruction to promote learning in a timely way. Teaching and learning in a formative assessment culture emphasise what students can do (students' performances), not simply what they know (content) (Lachat, 1999).

Systems need summative types of assessments to monitor growth and identify areas needing attention at meso and macro levels, while students and teachers need formative assessment information to monitor individual students' growth and identify areas needing attention at micro levels (Atkin et al., 2001).

THE CURRENT CONTEXT OF EDUCATIONAL ASSESSMENT IN RWANDA

Curriculum and assessment in Rwanda have been fundamentally summative in nature, using end of term/year examinations; national examinations at the end of primary, lower secondary and upper secondary school; and school-based continuous assessments (e.g. homework, quizzes). The assessment system is so centralised that teachers' involvement is limited. Selected teachers mark and moderate the national examinations in marking centres. Although some moderation exists in some schools, there is no school-wide or system-wide moderation. Thus,

teachers' local contextual expertise and knowledge of individual students barely influence assessment designs.

Rwandan school-based examinations are competitive and are high stakes for schools, teachers and students because they inform selection, orientation to different types of schools and sections/courses, certification and promotion/retention. To some extent, schools and teachers are held accountable for their students' performances in the national/external examinations. It appears that teaching and learning are largely oriented towards increasing students' scores on the external assessments, with the possibilities of "teaching to the test" or even "teaching the test" emerging as preferred practices. This may lead to unhealthy levels of competition between, and within, schools and students (Sahlberg, 2010).

The high-stakes testing approach is also typical of day-to-day classroom-based assessment. Most classroom assessments are norm-referenced. At the end of every term and year, students of every class are ranked from first to last in their class according to their average score across all subjects. In most cases, high performers are celebrated during proclamation of marks ceremonies at schools, at home or in the larger community. Implicitly, and in some cases explicitly, lower performers are personally blamed for their poor school results. Such judgements may have very serious consequences due to their potential negative effect on students' affect and emotions, as well as their academic achievements (Bandura, 2001).

A STUDY OF RWANDAN TEACHERS' CONCEPTIONS OF ASSESSMENT

Teachers' beliefs exert considerable influence on their practices (Patrick & Pintrich, 2001). If educational reforms are to be achieved, one area that must be addressed is teachers' beliefs and conceptions about assessment. Assessment conceptions are "systematic frameworks for understanding assessment and they include people's attitudes towards it" (Brown et al., 2008, p. 1). Teachers' assessment related beliefs matter for how, and why, assessment is implemented (Brown & Remesal, 2012). Such belief systems are context-specific. Therefore, it is crucial to understand them when making inferences about behaviour and practice (Gebril & Brown, 2014).

The introduction of CBE will require better understanding about Rwandan teachers' conceptions of assessment. Thus, the remainder of this chapter reports results from a study, guided by two research questions, that investigated Rwandan secondary and primary school teachers' practices and conceptions of assessment:

1. What practices do Rwandan teachers most associate with assessment?
2. What conceptions of assessment do Rwandan teachers have?

Ethics Approvals

Permissions were obtained from the Principal of Rwanda Teachers College and Head Teachers of schools to conduct the research. Participants were provided with Information Sheets and assured that their participation was voluntary and their responses anonymous and confidential.

Participants

Participants included primary and secondary school teachers, identified through convenience sampling. Participants came from a range of schools and districts. Some of the participants were also enrolled in a two year Diploma in Education program at Rwanda Teachers College.

Instrumentation

Brown's (2004) *Conceptions of Assessment* (CoA-III) questionnaire, consisting of 27 items measuring four factors (school accountability, student accountability, improvement and irrelevance), was used for this study, with each question written in English and Kinyarwanda. CoA-III uses a 6-point, positively-packed rating scale (i.e., from 1=strongly disagree to 6=strongly agree). CoA-III also proposes a list of 12 common practices and asks teachers to indicate each practice that comes to their mind when they think about assessment.

RESULTS

Five Hundred questionnaires were distributed, from which 417 were returned (response rate 83%). Poorly completed questionnaires were discarded. A final set of 385 questionnaires was suitable for analysis (215 male; 156 female; 14 no gender recorded). Participants taught across the range of primary and secondary school subjects. Apart from one item which had 20% of missing data, the missing data per item ranged from 1% to 5% and was not replaced.

Perceived Assessment Practices

Participants were asked to select from 12 options to indicate the practices they have in mind when they think of assessment. As shown in Table 16.1, respondents mostly associated assessment with practices that primarily serve summative purposes. The majority of teachers (78.3%) perceived assessment as teacher made tests, while 80.1% and 72.6% perceived assessment as student written work and marked homework respectively.

Table 16.1. Frequencies and percentages of the practices perceived as assessment

Assessment practices	**Yes: N (%)**	**No: N (%)**
Unplanned observation	25 (8.4)	273 (91.6)
Oral questions & answers	248 (83.5)	49 (16.5)
Planned observation	154 (50.8)	149 (49.2)
Student written work	241 (80.6)	58 (19.4)
Marked homework	220 (72.6)	83 (27.4)
Student self- or peer-assessment	228 (71.5)	91 (28.5)
Conferencing	46 (15.5)	251 (84.5)
Portfolio/scrapbook	30 (10.1)	268 (89.9)
Teacher made test	242 (78.3)	67 (21.7)
Standardised test	208 (68.0)	98 (32.0)
Essay test	217 (72.6)	82 (27.4)
1-3 hour examination	184 (62.0)	113 (38.0)

Conceptions of Assessment

Principal Components Analysis of the CoA-III failed to replicate Brown's (2006) 4-factor structure. Three items did not achieve criteria for inclusion and were removed from the analysis. A 6-factor structure, with four items in each factor, accounted for 52.52% of the variance in the model (KMO .814; alpha .73). The frequencies, percentages, means and standard deviations for the 24 items are presented in Table 16.2. Participants "mostly & strongly" agreed that assessment "indicates quality" and "gives feedback" to students. They also largely agreed that assessment is a "tool for accountability". Similarly, a large majority of participants "mostly & strongly agreed" with the items related to the need for cautious use of assessment information. Worth noting too is that a substantial number of the teachers agreed that assessment measures "students' higher-order thinking skills".

DISCUSSION AND IMPLICATIONS

The findings indicate that Rwandan teachers hold mixed conceptions about assessment. They seem appreciative of the relevance of assessment with regard to instruction and learning, including higher-order learning. They largely agreed that assessment improves learning and teaching, and that assessment can be used to hold schools and students accountable. While such conceptions are adequate for the 21st century competences envisaged in the Rwanda CBE, such results are to be interpreted with caution because research has shown that positive attitudes and beliefs about CBE do not necessarily translate into relevant assessment practices (e.g. Kafyulilo et al., 2013). In particular, the results show a mismatch between the conceptions listed in Table 16.2 and the perceived assessment practices listed in Table 16.1. The current examination-dominated, high-stakes assessment system in Rwanda may partially account for this mismatch, as similarly reported by Gebril and Brown (2014) in research in Egypt. The Rwandan approaches to assessment will need to undergo fundamental changes if assessment practices are to respond to the new goals and demands of CBE (Ogan-Bekiroglu, 2009).

Table 16.2. Frequencies, mean scores and standard deviations for CoA III items

Item No.	*Factors and items*	*Disagree N (%)*	*Agree N (%)*	*Strongly agree N (%)*	*Mean (sd)*
Factor 1					
1	Assessment feeds back to students their learning needs	23 (6)	44 (12)	314 (82)	5.2 (1.3)
2	Assessment establishes what students have learned	27 (7)	65 (17)	288 (76)	5.0 (1.3)
3	Assessment is a way to determine how much students have learned from teaching	38 (10)	94 (25)	245 (65)	4.7 (1.5)
4	Assessment is assigning a mark or category (e.g. A, B+)	52 (14)	68 (18)	261 (61)	4.7 (1.6)
Factor 2					
5	Assessment interferes with teaching	312 (83)	34 (9)	32 (8)	1.7 (1.4)
6	Assessment is an imprecise process	325 (87)	25 (7)	22 (6)	1.6 (1.2)
7	Assessment results are consistent	305 (82)	33 (9)	33 (9)	1.8 (1.4)
8	Assessment results are filed & ignored	305 (81)	32 (8)	40 (11)	1.9 (1.4)
Factor 3					
9	Assessment results should be treated cautiously because of measurement error	44 (11)	110 (29)	228 (60)	4.5 (1.5)
10	Teachers should take into account the error and imprecision in all assessment	76 (20)	114 (30)	188 (50)	4.2 (1.6)
11	Teachers conduct assessments but make little use of the results	226 (60)	96 (26)	52 (14)	2.5 (1.6)
12	Assessment information modifies ongoing teaching of students	9 (3)	46 (15)	254 (82)	5.2 (1.0)

Table 16.2. Frequencies, mean scores and standard deviations for CoA III items (cont.)

Item No.	*Factors and items*	*Disagree N (%)*	*Agree N (%)*	*Strongly agree N (%)*	*Mean (sd)*
Factor 4					
13	Assessment results can be depended on	56 (15)	111 (30)	207 (55)	4.3 (1.5)
14	Assessment helps students improve their learning	5 (1)	47 (12)	327 (86)	5.4 (0.9)
15	Assessment allows different students to be taught in different ways	33 (9)	99 (26)	254 (68)	4.8 (1.3)
16	Assessment results are trustworthy	45 (12)	178 (49)	144 (39)	4.0 (1.4)
Factor 5					
17	Assessment is integrated with teaching practice	13 (3)	37 (10)	322 (87)	5.4 (1.1)
18	Assessment places students into categories	25 (7)	49 (13)	305 (80)	5.2 (1.3)
19	Assessment provides feedback to students about their performance	18 (5)	33 (9)	320 (84)	5.3 (1.2)
20	Assessment provides information on how well schools are doing	35 (9)	84 (22)	258 (68)	4.8 (1.4)
Factor 6					
21	Assessment measures students' higher order thinking skills	23 (6)	99 (11)	254 (68)	4.5 (1.5)
22	Assessment is a good way to evaluate a school	37 (10)	87 (30)	257 (67)	4.8 (1.4)
23	Assessment is an accurate indicator of a school's quality	20 (5)	78 (20)	283 (74)	5.0 (1.3)
24	Assessment determines if students meet qualifications standards	29 (8)	43 (23)	297 (78)	5.1 (1.3)

Note: 'Disagree' includes the strongly and mostly disagree responses; Agree includes the slightly and moderately agree responses; Strongly agree includes the mostly and strongly agree responses

School-based Continuous Assessment

If Rwanda's CBE is to succeed, a stronger focus will need to be placed on classroom assessment and teachers', and especially students', involvement in development of assessment goals and criteria, and in the use of those criteria to monitor learning progress in self-assessment and peer-assessment (Darling-Hammond & Pecheone, 2009). While the teachers in our study mostly associated assessment with traditional methods requiring recall of factual knowledge, new practices should encompass assessment methods that promote higher-order learning, such as portfolios, projects, problem solving and performances to collect timely information on students' learning. In order to avoid negative effects on students' self-concept and perceived abilities to learn, assessment in CBE should be more connected to individual student progress. According to Darling-Hammond (2012), many countries are increasingly emphasising such assessments because of their potential to strengthen teaching and to support lifelong learning.

Effective Use of Assessment Information

Rwanda's education system is expected to become more information rich with the introduction of CBE. District assessments and the assessment of achievement in Rwandan schools, anticipated in Rwanda's CBE initiatives, will add to existing national examinations and other school-based assessment practices to generate more assessment information. Such information, usually used to regulate the education system as a whole, could also be used at school and classroom level to improve teaching and learning. Using summative assessment information for formative purposes should become a critical skill for teachers (Shute & Becker, 2010). It is essential that teachers develop relevant skills and competences to leverage such information to promote students' learning.

Assessment Legislation

It is important that there is an enabling environment for a new assessment culture to take root, and to ensure the sustainability of its quality and effectiveness (World Bank, 2010). The introduction of CBE provides an exciting opportunity for development of a national assessment policy and guidelines based on the curriculum content. This exercise should involve Rwanda's education managers, assessment, learning and education specialists, and other key stakeholders.

Standardisation

Experiences from countries that have adopted CBE and formative assessment indicate the need for standardisation of the regulations, curricula and procedures (e.g. South Africa, Tanzania). Development of clear, understandable assessment standards, in addition to clearly defined, expected learning outcomes at each education level and for

each subject is at the heart of an assessment system. Involving teachers more actively in developing and monitoring standards would embed the latter more thoroughly into teachers' instructional habits (Adamson, 2011).

Pre-service and In-service Teacher Training

Effective assessment in CBE will rely heavily on teachers' professionalism. Pre-service and in-service teacher training programs should address teachers' ability to use assessment data to identify students' learning needs and teachers' ability to respond to students' needs. In fact, educators' poor assessment literacy has been described as a stumbling block to the implementation of CBE in African countries such as Tanzania and South Africa (e.g. Paulo & Tilya, 2014; Kafyulilo et al., 2013). One of the reported reasons behind this failure is the teachers' misunderstanding of the CBE concepts (Kafyulilo et al., 2013) and their failure to adopt assessment practices appropriate for the demands of CBE (Paulo, 2014). Such scenarios could be somewhat alleviated by implementing a competence-based curriculum in pre-service and in-service teacher training programs across Rwanda.

Limitations

The sample available for this study was a convenience sample. Care should be taken with any generalising statements.

CONCLUSION

Using assessment in the service of student learning becomes an imperative and crucial skill for teachers in an era in which Rwanda has embarked on a competence-based reform process to improve the quality of education. The new CBE curriculum requires competence-based assessment, described as tasks that present real-life challenging situations to students and require students to apply acquired knowledge to overcome them (REB, 2015). Developing an environment in which to realise this mission requires enabling legislation; standardisation of policies, procedures and curricula; alignment between curriculum, teaching, learning and assessment; teachers' professional development for improved school-based assessment; and effective use of formative and summative assessment information. Teachers' assessment practices are highly dependent on their conceptions of assessment. Therefore, their assessment belief systems, attitudes and competences should be given serious consideration during professional development and other training programs.

NOTE

[i] The proposed "competence-based curriculum" is not to be confused with basic skills types of "tick the box" certificate of competency checklists (e.g. see DMP, n.d.)

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Ernest Ngendahayo MEd
College of Education, University of Rwanda, Rwanda

Helen Askell-Williams PhD
School of Education, Flinders University, Australia

CONTRIBUTORS

Carol R. Aldous PhD BSc(Hons), DipEd, Grad Cert Maths Ed
Senior Lecturer
School of Education, Flinders University, Australia

Alfian MEd, EdD
Department Chair of Language and Literature
The State Institute for Islamic Studies (IAIN) STS
Jambi, Indonesia

Anwar Amin BEd, MEd, EdD
Acting Principal of Senior High School Modal Bangsa of Aceh, Indonesia
School of Education, Flinders University, Australia

Anthony Arrowsmith EdD
School of Education, Flinders University, Australia

Helen Askell-Williams PhD, GradDip AppPsych
BEd (Spec Ed) (Hons), BA, AMusA
Associate Professor
School of Education, Flinders University, Australia

Michael Bell PhD
Coordinator Educational Leadership and Management
School of Education, Flinders University, Australia

David D. Curtis BSc (Honours), Grad Dip Inst. Comp., MEd, MA, EdD, PhD
Coordinator, Associate Professor
School of Education, Flinders University, Australia

Robert Conway PhD
Adjunct Professor
School of Education, Flinders University, Australia

John Guenther PhD, BAppSc (Chem), Dip Th (Missiology)
Principal Research Leader, Remote Education
Cooperative Research Centre for Remote Economic Participation
School of Education, Flinders University, Australia

Habiburrahim PhD, MS
The Head of Language Development Center
UIN Ar-Raniry, Darussalam - Banda Aceh, Indonesia

R. John Halsey, EdD, MEd, Grad Dip Ed Admin, Dip T (Sec), FACE
Professor, Rural Education and Communities
School of Education, Flinders University, Australia

Joy Higgs PhD AM PFHEA
Strategic Research Professor in Professional Practice
The Research Institute For Professional Practice, Learning & Education (RIPPLE)
Co-Director, Strategic Development, The Education For Practice Institute
Charles Sturt University, Australia

David Jeffries BEd/BSc (Secondary), BEd (Hons)
PhD Candidate, School of Education, Flinders University, Australia
Teacher, Port Lincoln High School, Port Lincoln, Australia

Michael J. Lawson PhD
Emeritus Professor
School of Education, Flinders University, Australia

Carol Le Lant PhD
Lecturer in Special Education
School of Education, Flinders University, Australia

Bernard Mageean PhD
Adjunct Lecturer
School of Education, Flinders University, Australia

Marethabile Mapitso Ignatia Masakale MEd (Leadership and Management)
Lecturer, Lerotholi Polytechnic
Lesotho, Southern Africa

Soni Mirizon EdD
Lecturer, Faculty of Teacher Training and Education
Sriwijaya University, Indonesia

Ernest Ngendahayo MEd
Lecturer, College of Education
University of Rwanda, Rwanda

Peter Nielsen BEc, BA(Hons), BEd
PhD Candidate, School of Education, Flinders University
South Australian Department for Education and Child Development, Australia

Janice Orrell PhD
Professor of Higher Education
School of Education, Flinders University
Adjunct Professor, The Education For Practice Institute
Charles Sturt University, Australia

Shaileigh Page BEd (Hons), PhD
Principal and Christian Education Director
Faith Christian School, Walhalla, Victoria, Australia

Muhammad Nur Akbar Rasyid PhD, MPd, M.Ed
Specialist Staff of Center for Quality Assurance and Development
Universitas Islam Negeri Alauddin Makassar, Indonesia

Marietta Rossetto PhD, MEd, BA
Adjunct Lecturer
School of Education, Flinders University, Australia

Trudy-Ann Sweeney PhD, MEd, BEd
Senior Lecturer
School of Education, Flinders University, Australia

Emily Tam, BEd(EC) (Hons), BA
School of Education, Flinders University, Australia

Philip Townsend
PhD candidate
School of Education, Flinders University, Australia

Ben Wadham, PhD, GradCert Public Policy, BA (Hons)
Associate Professor
School of Education, Flinders University, Australia

Mirella Wyra PhD, BEd (Hons), BA
Lecturer
School of Education, Flinders University, Australia