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Enhancing learning and assessment of pre-service teachers on practicum placements using mobile technologies with video capture

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of Pre-service Teachers on Practicum Placements
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Abstract

Across all educational jurisdictions, each year, large numbers of pre-service teachers are assessed for their suitability for teaching during their teacher education courses, in schools and institutions through practicum placements or workplace learning. Despite their widespread use, practicums can be notoriously variable and unreliable in terms of assessment (Rorrison, 2008) and in promoting professional learning (Grudnoff, 2011).

The study reported through the publications explicit or referred to in this exegesis focused on the development of a mobile application ('app') to address the problems of assessment and professional growth. It was a specific response to the emerging use of mobile devices that utilise video capture, and their impact on assessing students in the practicum component of their training. It drew on existing knowledge of higher education assessments and teacher training assessments, including formative assessments and feedback, linked to the introduction of mobile devices with video capture capabilities. This study examined how mobile technologies, such as smartphones and tablet devices with multimedia capabilities, could address some of the problems faced by pre-service teacher students, their school-based supervisors and the university academics who manage the practicum assessment. The overarching research question of the study was: To what extent can disciplined and structured use of mobile technologies for practicums impact on pedagogy and assessment of professional experiences of pre-service teachers?

The study employed a Participatory Action Learning Action Research (PALAR) methodology to address the extent to which disciplined and structured use of mobile technologies impacted on practicum feedback of professional learning experiences of pre-service teachers. The study entailed six participatory research cycles over a four-year period, each consisting of four main phases: planning, acting and observing, reflecting and replanning. A mixed methods approach was used within the observation phases of each cycle. Because of the cyclical features of action research, the study lent itself to publishing findings throughout the project, rather than a single thesis at conclusion. Thus, reports of the research following one or more cycles were published, and this document therefore, is an exegesis of the major papers that were published over the timeframe of the study. The

exegesis seeks to unify the publications and provide common themes emerging from the research project.

The findings from the several cycles showed that the introduction of mobile technologies had a major impact on the practices and outcomes of pre-service teachers' practicum experiences. The inclusion of mobile devices with video capture positively impacted on the reflective practices of pre-service teachers as well as formative assessment and feedback for pre-service teachers by providing the opportunity for more detailed, ongoing analysis of pre-service teachers' performances while on practicum. Findings from the school-based supervising teachers also confirmed the suitability of the 'app' for enhancing the practicum experience and its assessment.

Further research is required to demonstrate the impact of the application on enhancing learning through the medium of curriculum standards in the school environment. In addition, there is a need to explore more broadly applied mobile feedback systems in the context of practicum assessments.

Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

   i.   Incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;

  ii.   Contain any material previously published or written by another person except where due reference is made in the text of this thesis; or

 iii.   Contain any defamatory material.

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Christopher Ewart Dann   Date

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Use of Thesis

The Use of Thesis statement is not included in this version of the thesis.

Major Publications

1 **Dann, C**. & Allen, B. (2013). Mobile Feedback: When 'Seeing' Informs Reflection and Learning (2014) *International Journal for Cross-Disciplinary Subjects in Education, 5*(3), pp. 1727-1734 (In Chapter 2 of this exegesis).

2 **Dann, C.** & Allen, B. (2015). Mobile Video Collection in Pre-service Teacher Practicum Placements. *Journal of Technology and Teacher Education*, *23*(1), 5-27. (In Chapter 2 of this exegesis).

3 **Dann, C.,** & Richardson, T. (2015). Improving the Work Integrated Learning Experience through Mobile Technologies. In J. Keengwe, & M. Maxfield (Eds.), *Advancing Higher Education with Mobile Learning Technologies: Cases, Trends, and Inquiry-Based Methods* (pp. 154-169). Hershey, PA: Information Science Reference. doi:10.4018/978-1-4666-6284-1.ch008 (In Chapter 2 of this exegesis).

4 **Dann, C** & Richardson, T. (2015). Deepening understanding of "pedagogical outcomes" through video data collection: A catalyst for guided reflective learning conversations. *International Journal of Pedagogies and Learning, 10*(1), 62-80 (In Chapter 2 of this exegesis).

5 **Dann, C.,** Dann B., & O'Neill, S. (2018). Formative assessment via video feedback on practicum: Implications for higher education and national teacher accreditation bodies. In C. Dann, S. O'Neill, B. Dann, & T. Richardson (Eds.)*, Formative assessment practices for pre-service teacher practicum feedback: Emerging research and opportunities*. Hershey, PA: IGI Global (In Chapter 4 of this exegesis).

6 **Dann, C.,** Allen, B., & Campbell, A. (2017). Professional experience's missing link – A mobile video 'approach'. Submitted to *International Journal of Mobile Learning and Organisation. Special Issue: Mobile Learning and Knowledge Sharing*. (In Chapter 4 of this exegesis).

Supporting Publications

Books

1   Richardson, T., Dann, B., **Dann, C.,** & O'Neill, S. (Eds.). (2018). *Formative assessment practices for pre-service teacher practicum feedback: Emerging research and opportunities*. Hershey, PA: IGI Global.

Edited Book Chapters

1   **Dann, C.,** & O'Neill, S. (2018). Positioning pre-service teacher formative assessment in the literature. In T. Richardson, B. Dann, C. Dann, & S. O'Neill (Eds.), *Formative assessment practices for pre-service teacher practicum feedback: Emerging research and opportunities* (pp. 1-46). Hershey, PA: IGI Global.

2   **Dann, C.** (2018). Feedback, reflection and assessment practices in practicum placements: The underpinning research design and methodology. In T. Richardson, B. Dann, C. Dann, & S. O'Neill (Eds.), *Formative assessment practices for pre-service teacher practicum feedback: Emerging research and opportunities* (pp. 47-75). Hershey, PA: IGI Global.

3   **Dann, C.,** & Dann, B. (2018). Exemplifying formative assessment practices in the field through case study: Concepts, issues and challenges. In T. Richardson, B. Dann, C. Dann, & S. O'Neill (Eds.), *Formative assessment practices for pre-service teacher practicum feedback* (pp. 76-112): *Emerging research and opportunities*. Hershey, PA: IGI Global.

4   O'Neill, S., & **Dann, C.** (2018). Video feedback on practicum: Demonstrating effective pedagogy and making children's progress explicit. In T. Richardson, B. Dann, C. Dann, & S. O'Neill (Eds.), *Formative assessment practices for pre-service teacher practicum feedback: Emerging research and opportunities* (pp. 113-139). Hershey, PA: IGI Global.

5   **Dann, C.,** & Richardson, T.(2018). Professional standards for teachers: 'Pass the message game'. In T. Richardson, B. Dann, C. Dann, & S. O'Neill (Eds.), *Formative assessment practices for pre-service teacher practicum feedback: Emerging research and opportunities* (pp. 140-157). Hershey, PA: IGI Global.

Journal Papers

1   **Dann, C.** & Richardson, T. (2013) Using mobile technology to increase formative knowledge for the learner in classroom context. *Advancing Education Autumn 2013.* Retrieved from http://legacy.naace.co.uk/2447

2   **Dann, C.** & Richardson. T. (2014) Meeting the Challenge – Improving the Practicum Experience for Supervisors and Pre-service Teachers On Reflection – *The inclusive journal for Practitioners.* Retrieved from https://www.beds.ac.uk/__data/assets/pdf_file/0005/488948/Gaitan-Adonu-Jankowska-2014-using-patchwork-text-assessments-to-support-and-document-learning-processes.pdf

Conference Papers

1   **Dann, C.,** Toohey, E & Allen, B. (2013, July). *A mobile assessment platform: a shared space for critical discourse*, Paper presented at the 22nd National Vocational Education and Training Research Conference. NCVER, Adelaide.

2   **Dann, C.** & Allen, B. (2013). Using mobile video technologies to enhance the assessment and learning of pre-service teachers in Work Integrated Learning (WIL). In R. McBride & M. Searson (Eds.)*, Proceedings of the Society for Information Technology & Teacher Education International Conference* (pp. 4231-4238). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/p/48790.

3   **Dann, C.** (2013, November). Using mobile technology to increase formative knowledge for the learner in classroom context. Proceedings, *London International Conference on Education, London, UK.*

Conference Presentations

1   **Dann, C.,** Jones, C., Lowe, B., Toohey, E., Willis, M., & Readman, K. (2011, October). *An (App)roach to using iPhone technologies to increase consistency, reliability and equity in assessment of large work integrated learning courses*. Paper presented at Australian Technology Network – Assessment Conference, Perth, WA, Australia.

2   Dann, C., & Allen, W. (2013, March). *Using mobile video technologies to enhance the assessment and learning of pre-service teachers in Work Integrated Learning (WIL),*

Paper presented at Society of Information Technology & Teacher Education International Conference paper, New Orleans, LA.

Product Output

1 Development of Application published in Apple store, Google play and android stores. Ongoing updates from 2014 – 2016 - Personal Copyright of interface.

2 Support website developed as part of commercialization - www.cemee.com.au

Table of Contents

List of Terms

Terms	
CeMeE	The commercial software product developed through research for use in schools during placement.
Course	A 12 credit-point course is part of a program of 32 courses that make up a four-year undergraduate Bachelor of Education degree. A course runs for a semester (10-13 weeks) and is made up of teaching in lectures, tutorials and online components with various assessment items.
iOS – I Operating System	The term used to refer to the system used by an Apple mobile device. The "i" stands for the I in iPhone and the "OS" stands for Operating System.
PTT	The term used to refer to the system used by the mobile device. The Pre-service Teacher Tracker system was named by the original research team which included teachers and university academics.
Professional learning	Professional learning is any learning that occurs in a work context. Commonly used to describe the learning experiences of pre-service teachers when they visit schools during their pre-service teacher program or course.
Program	A program is a group of 32 courses that make up an undergraduate or graduate degree.
Practicum	Practicum (often called 'prac') experience refers to the placement of pre-service teachers in a school, where they are expected to engage in real classroom teaching. They are one common aspect of a professional education course required by external teacher registration/licencing bodies for program accreditation. The practicum is often an essential part of a program that students must pass and allows students the opportunity to work and learn in the environment for which they are being trained.
WIL – Work Integrated Learning	The umbrella term WIL is used in higher education to describe a combination of formal learning and workplace experience.
Mobile technology	Mobile technology refers to technological devices that allow one to connect to the Internet and collect or create documents and multimedia files.
PALAR Teams	Each PALAR cycle had a different team associated with it. For example, cycle 4 had three separate teams working together. In cycle 4each team was associated with a separate academic discipline.
Pre-Service Teacher	An individual undertaking an undergraduate degree in order to qualify for registration as a teacher. This is often referred to as a "student teacher" in the United States and is distinctly different from an "in-service teacher".
Supervisor	This term is used in this document to describe the school-based individual directly responsible for supervising the activities of the pre-service teacher while on placement. They have responsibility for providing regular feedback to the pre-service teacher while still maintaining their classroom teaching program. This term is specific to Queensland. However, other jurisdictions may call the classroom teacher the 'mentor' and the university academic who visits the school the 'supervisor'.
Mentor	In this study the word "mentor" is used interchangeably with the word "supervisor" as defined above. Where the word supervisor is used to refer to the university academic, then the school-based teacher who provides feedback to the pre-service teacher becomes the "mentor".
University Supervisor	The university supervisor was either a full-time academic assigned to the student or a part-time casual appointed by the University to monitor and support the student and the supervising teacher.

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Prologue

This thesis reports on a research journey that originated from a perplexing problem encountered in my professional experience while leading a University's practicum office. The problem can be summarised as one of several dimensions: (i) the wide variation in pre-service teachers' experience in terms of their professional learning; (ii) the wide variations and inconsistencies in the grades allocated to teachers as a result of their practicum experience: and (iii) the negative views that many pre-service teachers had of what should be a rich learning experience in the very contexts they would be working in once qualified. Contemplating these led to the realisation that an application ("app") might positively impact on the experiences of pre-service teachers and also on those individuals charged with providing feedback on the student experience. The journey commenced with the involvement of local practitioners working on a "blue sky" vision for improvements to practicum and its assessment over a 12-month period, and ultimately led to the creation of an iPhone 3 application and action research targeting students at my university. What followed was the development of intellectual property (IP) in the form of a source code, a lengthy assignment of the intellectual property (IP), an attempt at commercialising the IP, and reconfiguration of the IP to meet the demands of each new cycle until the system's stability could be verified. Thereafter the focus turned to usage.

Introductory Chapter 1 provides the background to the project and briefly outlines the problem, the resulting research questions, aims, methodology, methods and significance of the overall research study. Thereafter the thesis is divided into 2 sections. Chapter 2 presents the first stage of the prototype development and the supporting publications and major publications that emerged during the first four research cycles. Chapter 3 outlines the numerous artefacts created during the first and second stages of the study; these are presented via hyperlinks to short videos of the system's development and documents supporting the research process during stages 1 and 2. Further supporting documentation of the tools used and data collection instruments can be found in Appendices 1-5. This chapter also provides hyperlinks to ethics approvals, field notes, system review documents, and examples of online resources produced to support users of the system.

Chapter 4 presents the penultimate journal publication and a chapter of text published in response to the study, endorsing the usability and functionality of the final system called CeMeE. CeMeE is not an acronym but rather a term that represents "See me Excel", and was a move away from the original name, the "Pre-service Teacher Tracker" (PTT) in stage 1. Details of this change can be seen in the major publications, with references to supporting publications in the table of supporting publications on page viii and in the Appendices.

Chapter One | Introduction

Carefully constructed field experience enables pre-service teachers to reinforce, apply and synthesise the knowledge they gain from coursework (Hammerness, Darling-Hammond, & Bransford, 2005). In Australia, the practicum experience of university-educated, pre-service teachers remains one of the most significant aspects of initial teacher education (ITE). However, despite its tradition and significance, the practicum experience can be fraught with problems (Rorrison, 2008, 2011), raising questions about its value for students in particular, but also for other stakeholders such as schools, school jurisdictions, teacher employers and universities. This research explored the use of mobile technologies to enhance pre-service teacher practicums by improving the learning and assessment phases of these experiences. It used web-enabled technologies within a participative action research framework to encourage wider and more consistent use of formative assessment during the practicums, which in turn would enhance the quality of summative assessment processes (Black & Wiliam, 1998). To improve both formative and summative assessment processes I used a student-centred approach to refine the pedagogy of practicum (Rorrison, 2008) and more closely intertwine learning and assessment.

1.1 Research Question

This research was based on the premise that mobile technologies, such as smartphones and tablet devices with multimedia capabilities, are able to address several major problems faced by pre-service teacher students, their supervisors and the academics who organise and oversee practicum experiences. The overarching research question was:

To what extent can disciplined and structured use of mobile technologies for practicums impact on pedagogy and assessment of the professional experiences of pre-service teachers?

Five other research questions guided deeper investigation and influenced the data collection and analysis of the study. They arose from the initial development of a system called the Pre-service Teacher Tracker (PTT), now called CeMeE (See Me Excel) after having undergone continual change and evolution throughout the research process.

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PTT/CeMeE are the names assigned to a bespoke system designed in collaboration with academics, school staff and students in pre-service training programs at a small regional university in Australia. This collaboration, led by me, was the first of six PALAR (Participatory Action Learning Action Research) cycles that refined the research questions.

PTT/CeMeE was developed to improve the pedagogical practices of supervision and feedback during practicums by directly impacting the formative and feedback processes for students and supervising teachers. The guiding questions below formed the basis of investigation into three focal areas: pedagogy of supervision; formative assessment; and summative assessment.

1. To what extent can the current pedagogical approach to practicum assessment by supervising teachers be improved by the introduction of iPhone and tablet technology? (This question focused on the pedagogy of supervision and assessment and not on assessment and pedagogy as two separate constructs).

2. To what extent are the reflective practices of pre-service teachers impacted by feedback on performance delivered via mobile and web technology? (This question focused on the role of mobile technologies in the formative assessment process).

3. To what extent can the capabilities of mobile technologies enhance the ability of supervising teachers to provide formative assessment and feedback to pre-service teacher students on practicum? (This question focused on formative assessment).

4. Can information collected on video-enabled mobile and web technologies for assessment of pre-service teachers be used to support more detailed analyses of their performance than would be possible using paper and pencil? (This question focused on the summative assessment process and the impact, if any, of technology-facilitated data capture on summative decisions).

5. Does formative assessment using mobile technologies impact on summative judgments of pre-service teacher standards and national curriculum outcomes during the learning process? (This question focused on the relationship between the summative assessment and professional standards, and the impact, if any, of mobile data collection).

1.2 Problem and Background

Like many others, this research project began with a problem experienced at a personal and professional level. As coordinator for education student placements at the host regional Australian university, the assessment and supervision of pre-service teachers presented me with a number of problems. Students, academics and school-based staff reported variations in the level and quality of feedback from supervising teachers, and commented on a glaring lack of attention to criteria for learning. Inconsistencies and inequities were common themes in these practicum experience reports, including in the final assessment of pre-service teachers. Increasing negative anecdotal evidence after each practicum period led me to consider a process or intervention that would bring about deep and long-lasting change and improvement.

An initial literature review revealed that processes aimed at improving communication and partnerships between universities and schools for enhanced assessment of student-teacher practicums were few and far between. Coupled with a personal interest in technology, this lack of processes triggered the development of an application to enhance communication between schools and universities for the benefit of supervising teachers and pre-service teachers under their supervision. However, optimising communication did not necessarily solve the problem of limited formative assessment, and even less, formative feedback for review by students or teachers. Other issues that emerged included: frequent failure to use assigned criteria; weaknesses in the reliability of summative assessments; and limited understanding of practicum assessment pedagogy by supervising teachers. A consultative process highlighted the prevalence of technology in the lives of all involved in practicums, and sowed the seeds for a simple-to-operate, but effective, tool to address these problems.

Numerous problems associated with practicum placements for pre-service teachers, universities, supervising teachers and their schools surfaced in further examinations of the literature during each cycle. These problems are briefly described in the relevant sections below and further detailed in the literature review of each publication in the body of this thesis and supported by the literature reviews in the Supporting Publications list (viii).

1.3 Research Aims

The study had four major aims:

1. To investigate the impact of video-enabled smartphone and tablet technologies on enhancing pre-service teacher practicums;
2. To investigate the impact of video-enabled tablet and smartphone technologies on the formative and summative assessment processes of practicums;
3. To examine the implications of a technologically driven assessment system on standards-based criteria; and
4. To examine the impact of mobile technologies on the effectiveness of practicum supervision.

The first aim, to investigate the impact of data collection via smartphones and tablets on the pedagogical approach to learning and assessment of pre-service teachers, focused on the capacity of mobile technologies to provide feedback and access to the feedback for pre-service and supervising teachers, as well as its impact on supervision in the classroom.

The second aim was to examine the impact of the PTT/CeMeE application (app) on the formative assessment process, in particular to develop greater alignment between formative and summative assessments. The objective was to view both assessment types through the lens of the underpinning pedagogy, with consideration for how the formative assessment practices and experiences of supervising teachers might impact on pre-service teachers' attempts to improve their professional practice and skills. Since formative assessment has implications for the reflective practice of students, linking feedback, formative assessment and the summative judgments of teachers or supervisors formed part of this objective.

The third aim of the study was to examine criteria-based assessment of standards in a technologically driven assessment system. This was necessitated by universities' adoption of external standards as criteria for measuring students' achievements in practicums. External accreditation refers to the processes governments, through their teacher regulatory bodies, put in place to ensure quality and comparability of teacher education programs across a state or

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country. The host university fell within the jurisdiction of the State of Queensland, Australia, the State teacher-accrediting body called the Queensland College of Teachers (QCT) and the national accreditation body, the Australian Institute for Teaching and School Leadership (AITSL). These external agencies have the power to accredit, or to deregister, a program and therefore they exert a significant influence on program design, assessment and teaching. As a result, fixed standards and practicum assessment criteria have been created for graduate teachers, and this study explored their effective assessment with mobile technologies.

The fourth and final aim sought to understand the pedagogical implications of assessment on pre-service teacher practicums. It was directed at understanding the assessment process from both the students' and the supervising teachers' perspectives, and explored changes to the pedagogical approach of supervisors when technology is introduced for the formative phases of the assessment.

Addressing these aims and answering the earlier research questions were expected to elicit knowledge regarding the impact of technology on the partnership between pre-service teachers and supervising teachers; between supervising teachers and university tutors or university representatives; and between universities and pre-service teachers. The study was designed to determine whether data collection by mobile phone first and tablets later, influenced the confidence of supervising teachers to make summative judgments, and the ability of students to plan for and act on feedback. This objective addressed the fifth guiding question of the study and embedded the research in the assessment phase of pre-service teachers' learning process.

1.4 Methodology

This study was a collaboration between researchers, groups and organisations in an attempt to produce a change in a real and complex context – pre-service teacher practicum. It was concerned with an intervention that sought to reduce inequities and improve practice. Since it was open-ended and subject to ongoing improvements, a Participatory Action Learning Action Research (PALAR) approach was chosen as the most appropriate methodology. PALAR focuses on small numbers of people in a community who engage in

addressing an important and complex problem collaboratively, and the primary basis for quality and reliability is 'authenticity'(Kearney, Wood & Zuber-Skerritt, 2013). In this context PALAR has three key strengths: firstly, to promote mutual learning; secondly, to foster the cascading of learning and knowledge for others; and finally, the co-creation of knowledge that is relevant, contextualised and useful.

The underlying purpose of this study was characterised by technical, practical and critical action research (Kemmis, McTaggart & Nixon, 2013). The specific type of action research used in this study was Participatory Action Learning Action Research (PALAR) and this is explained in each of the publications presented.

As the lead researcher of the PALAR study, I participated in all the action research cycles as a researcher and as the central collaborator with academics, supervising teachers and pre-service students, and over the course of these six cycles, my role changed to suit the environment. For example, in cycle 1 I participated as a university academic supervising students, and collected evidence of the system's impact on me in my capacity as supervisor. I then moved to the role of gathering evidence as a researcher during the reflection stage, where interview and survey data formed a significant element of the Participatory Action Research Process (Kemmis et al., 2013) particularly in what is known as the 'observation' stage of an action research cycle. This strengthened the authenticity of the research as joint collaborative voices were enabled to guide the study and the answers to the guiding questions.

Kemmis, McTaggart and Nixon (2013) emphasise the importance of reflection by the researcher on issues of power, and this was critical in this study as genuine partnerships were created between the researcher and schools, supervising teachers and students. To address the possibility of over-use or abuse of power and influence of the researcher, this study employed multiple cycles with various individuals representing each of these groups as well as enabling participatory voices from participants in the study. My personal involvement and roles in the various cycles focused the study as participatory action research, practical in

nature, and aligned with Critical Participatory Action research processes (McNiff, 2016; Zuber-Skerritt, 1996).

Action research is a cyclical methodology, consisting of four stages in one cycle (Kemmis et al., 2013); these are Plan, Act, Observe and Reflect. Iterative and spiral in nature, Kemmis and McTaggart's (1988) action research process has informed countless action research studies involving consecutive spirals comprised of these four stages. In this particular study, the emphasis was on "working with" research participants, viewed by Cousin (2009) as one of the most significant aspects of action research. Collaboration during the iterative process made this an ideal approach for assessing the value of PTT/CeMeE for pre-service teachers and their mentors, since they became engaged in the research rather than merely being "subjects".

An overview of the number of participants, their roles and positions in each of the six cycles and in total are detailed in the table below. The row showing the totals indicate all the participants other than the researcher.

Table 1: Participant Numbers

Indicates researcher was in this role	Development Phase using iPhone® 3			Implementation Phase using iPad®		
Support roles	**Cycle 1**	**Cycle 2**	**Cycle 3**	**Cycle 4**	**Cycle 5**	**Cycle 6**
Supervising teachers	3	5	19	14		6
School-based coordinators	2	1	4	2		3
University tutors	0	1		3*	1*	
Course coordinators	4	5*	2*			
Program leaders	3*				1	
Principals	4					
University practicum administrators	3	2	1	1		2
Students	5	5	19	14	23	6
Totals (other than principal researcher)	23	18	44	33	24	16

Legitimacy and validity of participatory action research is established through communicative action (Kemmis, McTaggart & Nixon, 2013) where the participants decide for themselves what is comprehensible, true, sincerely stated and morally right and appropriate in their circumstances. It has been argued that legitimacy is established in public spheres (Kemmis, McTaggart & Nixon, 2013) such as those created in this study. In addition to this action research impacts on the methods which can be an eclectic mix and determined by the issues of problem (Stoecker & Brydon-Miller, 2013). This legitimacy and validity has been challenged (Stoeker, 2009) because it is perceived that neither participation nor outcomes are systematically documented (Viswanathan et al., 2004). The complete and transparent documentation of action research needs to be fully disclosed for the validity and thoroughness of the whole study (Stoecker & Brydon-Miller, 2013) and an ongoing public examination, focusing on the relationships developed between the researcher and the research community, is a critical component for generating legitimacy and validity of the study.

Theoretical Perspective: Pragmatism

The research paradigm, or theoretical perspective, of a research study has a direct impact on the nature of the research, in terms of underpinning the approach taken and the nature of the conclusions that can be drawn from the study. The theoretical perspective underpinning this study was pragmatism, a philosophy that emerged in late 19th century USA but which has enjoyed something of a renaissance in the later 20th and early 21st century. This is due, in part, to a response to critiques of an overemphasis on the predominance of theory. The pragmatic approach is concerned with the linking of theory and practice, but the emphasis is on knowledge gained from experience in the 'real' world. Howell (2013) stated that "Pragmatism defines truth as those tenets that prove useful to the believer or the user" (p. 132). Thus, knowledge only has meaning and value when it can be applied to solve practical problems. As the underlying aim of this study was to develop knowledge and understanding applicable to solving a set of related problems in the real world of pre-service teachers' practicums, the theoretical perspective naturally lent itself to defining the nature of this study.

Furthermore, the pragmatic approach rejects the binary division of qualitative and quantitative methods (Tashakkori & Teddlie, in Plano, Clark & Creswell, 2008) and is more

concerned with using the methods most appropriate to the practical experience at the heart of this study. While several authors (Punch, 2009; Stoecker & Brydon-Miller, 2013) argue that action research demands a solely qualitative approach, the approach of this study uses methods using both qualitative and quantitative data. These methods have been chosen to provide the best chance of collecting the participants' experiences and beliefs (Silverman, 2010), about how they approached practicum supervision and practicum learning with the use of a mobile device. The pragmatist view of knowledge as a tool for organizing experience, and maintaining a concern for the union of both theory and practice (Schwandt, 2007) is also important. This enabled the research to utilise the logic of numbers and the voices of participants, which strengthened the research design and the ability to address the five research guiding questions. In this way, pragmatism allows a mixing of data collection methods and data analysis procedures within the research process which, in this case, is action research.

Further to this, in pragmatism, knowledge is viewed on a continuum from objective to subjective, enabling the researcher to adopt the most suitable approach to gain answers to the research question (Goles & Hirschheim, 2000). Pragmatism places the research problem at the centre of the study and, as been carefully explained in previous sections in this chapter, the methods utilized in this study were selected and developed from the research problem to enable both objective and subjective perspectives (Denzin & Lincoln, 2005). Finally, the conclusions drawn from the study are judged by the impact that they will have on addressing the problems of pre-service teachers on practicum, and enhancing their experiences.

Methods: Data collection and analysis

In action research, data collection and analysis are conducted in the observation stage of a cycle (Kemmis & McTaggart, 1988). Across the whole study, the methods of data collection and analysis varied from cycle to cycle, in that they varied according to the emphasis demanded in each cycle. In each of the publications, the methods relevant to the cycle being reported are made explicit. Nevertheless, a brief overview of the methods of data collection and analysis are provided here.

This research utilised methods of collecting both quantitative and qualitative data. Quantitative data collection involved the use of questionnaires including custom-designed Likert surveys in pre- and post-intervention phases. Qualitative data were usually collected at the conclusion of quantitative data collection, and results from the surveys were compared against data and findings from semi-structured interviews. A third set of data, that can be classified as quantitative, were those collected from the system's analytics.

Quantitative data were collected using two tools. Custom-designed Likert scale surveys were used in cycles 2, 3 and 5. In each of these cycles a 5-point Likert scale of strongly agree, agree, neither agree or disagree, disagree and strongly disagree and open free text questions was used. The questions developed for the survey were developed collectively by the researcher and participants in each of the cycles. An example of the survey is found in Appendix 6.

The quantitative data were coded for entry into SPSS software and generated tables of data (see Appendix 1). These data were then grouped into themes and aligned to the qualitative data present in the cycle and from previous cycles. A key feature of the analysis was the ongoing correlation and triangulation between cycles as well as within cycles 2, 3 and 5. This triangulation resulted in the removal of the survey for cycle 6.

Qualitative data-collection tools used included semi-structured interviews, and site observations and field notes. Semi-structured interviews were conducted in cycles 1,2,3,5 and 6. The interview questions changed for each cycle and were conducted by the principal researcher. However, a research assistant was employed when a power relationship was identified such as in cycles 3 and 6. Sample interview questions are shown in Appendix 3. One is the principal researcher's and one is the research assistant's copy of student questions.

Interviews were coded and codes were thematically organised in each cycle. An example of the codes and the themes developed can be found in Appendix 2. The results from these interviews influenced questions in the next survey and interview tool questions in the next cycle. Initial surveys and previous interviews informed the interview of participants and

the thematic direction of each subsequent interview. Content of interview questions in cycle 5 and 6 focused on the tactics and usage interactions rather than functional enquiry.

Analytics (information automatically collected by the computer system being used) was collected in cycle 3. This data was presented in detail in publication 2 and referred to in other supporting publications. Data included the times users accessed the system, how long they were on the system and which parts of the system they accessed. It also allowed researchers to see when feedback was being put into the system and when it was being viewed. It also allowed researchers to quantify the length of videos, the content of feedback and data transfer requirements of the system.

Analysis of this information analytics highlighted the patterns of the video users. For example, student users often accessed the video after 9.00pm at night and clearly identified supervising teachers' collection of video and provision of feedback between 9.30 and 11.00am on Tuesday, Wednesday and Thursdays. This data was aligned to the themes of both the quantitative and qualitative data sets in an ongoing manner.

1.5 Reasons for the Research

The need for this study emerged from the evaluation of the PTT/CeMeE concept by the Head of School of Education at the University of the Sunshine Coast, who provided initial funding for the application's development.

PTT/CeMeE was developed with the aim of making a positive difference to the experience of pre-service teachers on practicum, principally by focusing the attention of both supervising teachers and students on specific criteria to create an environment for enhanced formative assessment. It was designed to present a common set of competencies and observation tools, such as video, for the feedback phase of assessment, and built upon the work of Dearnley, Taylor, Laxton, Rinomhota, and Nkosana-Nyawata, (2013) and Gronn, Romeo, McNamara, and Teo (2013).

Another reason for the study was that the use of mobile technologies employed in PTT/CeMeE appeared to represent a real and effective solution to many of the problems

identified in practicums. However, the features of PTT/CeMeE required exploration and development on an ongoing basis, hence the use of a participative, ongoing action research approach. Since the study does not claim to prove the effectiveness of PTT/CeMeE, an experimental or quasi-experimental design was not suitable.

1.6 Significance

The significance of the study lies in development and evaluation of a custom-designed intervention to improve the pedagogy and assessment of pre-service teachers on practicums. As described by Rorrison (2008), issues associated with pre-service teacher practicum experiences impact thousands of individuals nationally and internationally, for whom assessments are required in the workplace rather than a higher education institution. The use of mobile technology in the formative assessment process of pre-service teachers impacts positively on their time and the time of their supervising teachers.

In addition, since the teaching profession is dependent on the quality of teacher training provided by programs and practicums (Darling-Hammond, 2010), improved formative assessments have the potential to maximise learning opportunities for pre-service teacher students, improve education programs, and ultimately lead to enhanced student outcomes.

Assessment of pre-service teachers against national standards has been addressed in a holistic way across the globe. In Australia, the Office of Teaching and Learning (formerly the ALTC) invested significant funding in examining these issues (Ure, Gough, & Newton, 2009) while independent organisations such as Oxfam Novib and Education International have pursued national standards in New Zealand, Canada, Chile, Brazil, India and Malaysia (Bourgonje & Tropm, 2011). In Israel, assessment is a joint procedure between the university and the school yet still high stakes (Tillema, Smith & Leshem, 2011).

This study looked at assessment from an effectiveness perspective (Race, 2013; Falchikov, 2013) in an attempt to promote student learning (Black & Wiliam, 1998), and examined formative assessments of pre-service teachers' practicum experiences as well as the processes used by classroom teachers involved in the implementation of consistent standards.

Problems associated with formative assessment of pre-service teachers in Work Integrated Learning (WIL) have been well documented in the literature by the national Office of Teaching and Learning (OLT) in Australia and JISC grants in the United Kingdom. The study is presented in two stages. Stage 1 encompasses publications from cycles 1, 2, 3 and 4, while stage 2 presents publications from cycles 5 and 6. The findings from each cycle are summarised in Table 2 below.

Table 2: Summary of Findings

Stage	PALAR Cycle	Key Findings
Stage 1	1 & 2	• Teachers accept using iPhones to give feedback (Q1) • Issues with the design of feedback interface for mobile phone (Q1) • Consistency, reliability and equity are important to pre-service teachers on practicum placements (Q4)
	2	• Acceptance and need for video feedback via mobile devices (Q1)
	3	• Adult learning can be enhanced by the transparency of a mobile video-enabled feedback system (Q5) • Linked video feedback to national standards (Q5) • The importance of teacher workflow processes and time for pre-service teacher supervision (Q2) • Fine-grained analysis of information collected by the university could assist in the development of university courses and programs (Q2) • Why reflective practice can and should be extended using mobile video-collection systems (Q2) • Focusing on the link between feedback and professional standards (Q5) • Table mobile devices are best suited to pre-service teacher supervision (Q1)
	4	• Technical issues required to be met for school use of mobile devices. (Q1 & 2)
Stage 2	5	• Extent to which the mobile video collection system can impact on students' 'Knowledge in Practice' (Q3 & 4)
	6	• A formal set of expectations is required when using video to support summative judgements (Q5) • Supervising teachers appreciate the support of evidence of practice to base conversations on (Q4) • Pre-service teachers want evidence (Q3) • High quality supervising processes are dialogic rather than monologic in nature. (Q3)

Chapter 2 | STAGE ONE

and

Chapter 3| TECHNICAL ARTEFACTS

are not included in this version of the thesis.

Chapter Four | Stage Two

Stage 2 presents the publications from the final 2 PALAR cycles and places a spotlight on the implications of the CeMeE system for pre-service teachers, supervising teachers, mentors and university academics. 2 publications summarised the findings of the research and presented the data from cycles 5 and 6. The first appeared in a book published as a consequence of the research, and was selected because it highlighted the implications for higher education. The second was a journal article that focused on the findings from cycles 5 and 6. Chapter 5 draws the thesis together with a discussion of the implications, limitations, future research directions and concluding remarks.

4.1.1 Major Publication Five

Dann, C., Dann, B., & O'Neill, S. (2018). Formative assessment via video feedback on practicum: Implications for higher education and professional teacher accreditation bodies. In T. Richardson, B. Dann, C. Dann, & S. O'Neill (Eds.), In *Formative assessment practices for pre-service teacher practicum feedback: Emerging research and opportunities* (pp.158-183). Hershey, PA: IGI Global.

Summary Statement

This publication was part of a six-chapter book on the results of the research presented here. It formed the penultimate chapter of the book and addressed specific questions about the ability of information, collected on video-enabled mobile devices, to be used for more fine-grained analyses of pre-service teachers' performance than is possible with paper and pen which is research guiding question 4. The chapter aligns the relevant findings and describes the potential impact of such data on the development and design of teacher education programs and coursework. By doing so the research was taken to a new level, by aligning it with teacher education in general and considering its implications for the design of teacher education programs. Thus building on research guiding question 5. It also explored the connections between pre-service teacher reflections and supervising teacher observations, and reflected on innovation in teacher education programs (research guiding question 2).

4.1.1.1 Abstract

University program leaders in conjunction with accreditation bodies, create Initial Teacher Education programs. These programs provide the knowledge and practice opportunities that preservice teachers need to learn and develop as teachers, and provide evidence of attaining the requisite standard required for obtaining a teaching position. This places the Initial Teacher Education programs in a unique position to lead much needed systemic change to transform the learning experiences of preservice teachers in schools. However, at the same time, there are challenges involved in creating innovative programs that align with the requirements of stakeholders, which in the first instance involve: accreditation authorities, universities, early childhood agencies and government. This chapter discusses how video feedback might act as a catalyst for change. First it addresses how it provides the conditions necessary to stimulate focused reflective dialogues that align to the graduate standards and lesson objectives, and second the implications for the field.

Keywords: Accreditation, Feedback, Feed-Forward, Initial Teacher Education, Monologue, Reflective Dialogue, Specific Learning Objectives, Standards

4.1.1.2 Introduction

Initial Teacher Education programs and courses are regularly being reviewed and modified to meet the latest requirements of the accrediting bodies in their jurisdiction. This can provide Initial Teacher Education programs providers, e.g. universities with the opportunity to lead change (White, Bloomfield & Le Cornu, 2010), and be innovative as they move through the cyclic redesign and reaccreditation process to meet the most recent policy requirements and guidelines and take account of current research in the field. As with other professions, Initial Teacher Education program providers need to engage students in a course of learning that develops their professional identity through their gradual acquisition of knowledge and skills that ultimately enables them to reach a level of teaching prowess during their final practicum that will meet certification requirements.

Currently, in the context of this research the Australian Institute for Teaching and School Leadership (AITSL) and the various state accreditation bodies develop tools to assist

in the understanding of the national professional standards. For example, AITSL has developed a website and an App called *My Standards App* that puts the standards in the pockets of educators to enable them to see illustrations of practice, upload evidence and undertake a self-assessment process. In the state of Queensland, the Queensland College of Teachers (QCT) further promulgates these standards and resources from AITSL (2011), and currently they are developing an e-portfolio creation process for teachers and preservice teachers to facilitate evidence collection and reflection on their practice. These resources are of the highest calibre and are designed to have a positive impact on teacher understanding on a systemic level. At the same time there is movement towards a final *Teacher Professional Assessment* (TPA) where preservice teachers will need to demonstrate evidence of meeting the professional standards at the graduate level within a standardized format. This may include documents, comments and videos that are moderated by persons removed from the practicum situation. However, this remains in the planning stages in the state of Queensland.

At the practice and practicum level programs and courses need to invoke learning experiences that are consistently developed over time and able to make contemporary pedagogical strategies explicit for preservice teachers. Evidence needs to be collected during practicums that directly links to the required standards, and specific learning objectives to which formative and summative assessment can relate. However, in the case of Initial Teacher Education programs, university staff are often restricted because of the requirements of multiple governing bodies and industry/community stakeholders. Thus, in this chapter key implications for program designers and program leaders that emerged from the PALAR study (Chapter 2), case study (Chapter 3) and related issues of ensuring preservice teachers acquire pedagogical knowledge and skills (Chapter 4) are interrogated with a view towards change.

There needs to be more effective study of pedagogy at the practicum level making the link between theory and practice and back again from practice to theory explicit. There needs to be an emphasis of more in depth study of how learning is effective through the study of formative learning at the child level as per Chapter 4 and then at the preservice teacher level as per Chapter 3. This has ramifications for ensuring there are linkages across program years, across discipline areas and also between discipline areas. Without this in-depth study and

awareness there will be slippage and lack of continuity between what is intended by the graduate standards and what actually happens on the practicum plus leaving practicum documentation delivered to supervising teachers a potential enabler or red herring.

Thus, the authors make two major distinctions that underpin their argument for transformation and propose a paradigm shift to a dialogic approach to preservice teacher education. The first is the need to change the traditional mindset and practice that continues to be based on a monologic view of learning to a dialogic approach on practicum, although this is difficult because of supervising teachers' lack of time as well as Initial Teacher Education program educators' need for greater input and continuity across practicums. In addition, the shift to an appreciation of the dialogic perspective as it translates at the classroom level requires an understanding of dialogic and democratic pedagogies and their relationship to social constructivist practice, the practice to which most western Initial Teacher Education programs typically aspire and promote. However, this in turn highlights the need for supervising teachers to be up-to-date with this pedagogical knowledge and associated skills, and equipped to work with Initial Teacher Education program educators as specialist professionals with the ability to 'mentor' in the context of a common understanding/approach. The second, and related to the need to adopt this social constructivist, democratic model and shift from the monologic to the dialogic, is the need to enable a shift from the idea of 'feedback' to 'feed forward'. This is because, as highlighted earlier here, a dialogic perspective facilitates different expectations of the roles and responsibilities of the supervising teacher and preservice teacher.

This is reflected in the use of CeMeE as reported here. It exemplifies how this change in role for the supervising teacher (ST) may be positively managed. The ST, while still providing a supportive learning environment, did so with more evidence and evidence that was linked to the learning outcomes and the professional standards. This practice led to increased and focused dialogue around practice and what particular aspects of teaching entail.

In addition, the use of CeMeE provided the preservice teacher with improved and more frequent opportunity for reflective dialogue with the supervising teacher, that related

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directly to various artefacts of the pedagogy. This included viewing personal practice through the additional lens of 'an outsider' (in contrast to that of 'insider' implementing the teaching), therefore adding a deeper approach to self-evaluation in conjunction with the supervising teachers' guidance. This improved practice and skills required for teaching and achieving the graduate level of the professional standards. Thus, in order for such improvements to take place, Initial Teacher Education educators need to address a number of factors that influence preservice teacher performance outcomes that have been highlighted within current educational models, and to which are typically subscribed. For example, these include life-long learning, authentic learning and self-directed learning (Rushton, 2005). The present research also found that ITEPs need to address supervising teachers' personal pedagogical preferences when planning practicum experiences, and lead the much needed shift from monologic to dialogic feedback, including how this aligns with the professional standards and as it relates to preservice teachers' learnings in a program-wide approach to improve consistency.

Practicum experiences are the vital component of Initial Teacher Education programs in being the key link between preservice teachers' study of theory and how it is experienced in practice and vice versa. It is not surprising that research (Rorrison, 2011) advocates a paradigm shift as outlined above because of the well-recognized problematic nature of the practicum. To achieve this the need for closer partnerships between universities and schools to help provide a solution (Fullan, 1993; Smedley, 2001) is reinforced by this research. This chapter adds to the pursuit of a discourse that promotes decisions on teacher preparation that are based on research-generated dialogue. The dialogue, in this case, refers to communication that represents reflective dialogue between ITEP educators about the creation and design of programs and courses that will be based on this new paradigm as proposed here. The need to adopt non-traditional approaches has been widely acknowledged in the past (Ferrier-Kerr, 2009; Le Cornu & Ewing, 2008) but to date there have been various limitations and constraints. However, based on the present research a paradigm shift through the leveraging of the use of mobile technologies as a tool to engage with pedagogical data and to stimulate focused reflective dialogue where assessment feeds forward to improve practice is proposed.

4.1.1.3 Instigating Change in Practice

As the previous chapters have discussed the advantages of the collection of video data and artefacts of pedagogy for assessment of preservice teachers via mobile video technology implications have emerged in terms of both opportunities and challenges for university program leaders in education as well as accreditation bodies and the range of stakeholders. Thus, the next section examines these in relation to beginning the change process with the ITEP educators and the program, course and practicum designers in the form of six principles that can be applied to invoke change. These principles are:

1. Data management.
2. Targeted conversations to stimulate reflective dialogue.
3. Demonstrated knowledge and skill alignment with practicum expectations and expected standards.
4. Practicum assessment moderation processes that would ensure more objectivity and feed forward.
5. Accessibility of practicum data to university staff and accrediting bodies for learning analysis.
6. Building in of action research and ongoing professional learning of supervising teachers/mentors.

4.1.1.4 Data Management

Preservice teachers want and need effective and timely feedback on their teaching. Supervising teachers use their expertise and experience as a basis for providing such feedback (Hegender, 2010). Universities hold the certification responsibility and this requires them to have access to evidence of preservice teacher development, especially when there are disputes between the supervising teacher's opinion and the preservice teacher's opinion. Typically, teacher educators moderate results when in a course work context but the moderation of summative judgments provided by supervising teachers in disparate locations increases the focus on the management of practicum assessment. The authors contend that this focus on the summative judgment has resulted in a focus on the management of the reporting process rather than the management of data used to create the summative report. This distinction illuminates a new issue. If the use of video for formative feedback is to be

introduced and used to provide evidence for supervising teacher summative judgment-making, then from this, significant opportunities emerge for the academic staff attached to program design and the teaching of Initial Teacher Education coursework to refine and structured, sequential practicum experiences that enable much deeper learning.

It was made clear in Chapter 3 that supervising teachers may choose the focus areas and feedback areas according to their own preferred ideas about teaching. Sometimes supervising teachers had their own interpretation of the assessment criteria and at other times these criteria were not used as a guide during the teaching practice so, when it was time to complete the preservice teacher assessment report, some areas were not considered during the placement. Instead a mark was given based upon the preservice teacher's view in general.

The Challenge

The management of data on practicum varies with each school placement. One main challenge is to find a systematic manner to collect and store data about preservice teacher performance during the formative phase of assessment while on practicum.

Opportunities

An opportunity to create a centralized location to house data from practicum so it can be used to inform program change is emerging due to technical advances. Centralized viewing of formative feedback of preservice teachers on practicum has benefits for program and course designers. For example, if a cohort of preservice teachers receives overwhelmingly negative feedback about the use of behavior management strategies and body language techniques then the course design could be changed to meet this need within the university. Thus, this would then help better prepare preservice teachers for success and facilitate the refinement of programs and their delivery in a way that can assist in aligning theory and practice more effectively and efficiently. This constructivist view results in an evidence based development approach to program adjustment and development.

Secondly, CeMeE provides the supervising teacher with the opportunity to set preservice teachers' goals and strategies to achieve the assessment criteria requirements. Allowing Initial Teacher Education providers access to this information could present the

program designer and course coordinator with increased knowledge of the collective wisdom of supervising teachers. This would then facilitate specific training and information sessions for supervising teachers that would be better able to assist in aligning program expectations with their personal understandings and expectations.

4.1.1.5 Targeted Reflective Dialogic Conversations

It is well established that dialogue between preservice teachers and supervising teachers that is specific and connected to the teaching and learning experience of classroom students more effectively shapes the learning and development of the preservice teacher (Chalies, Ria, Bertone, Trohel & Durand, 2004; Tochon, 2013). However, the dialogue between the supervising teacher and the preservice teacher and evidence of subsequent growth is rarely recorded or documented in-depth although it is well established, as noted in Chapter 1, that preservice teachers need to learn to be aware of the nature of the pedagogical dialogue they create and how it reveals knowledge about their teaching and the quality of children's learning (Edwards-Groves, Anstey & Bull, 2014; O'Neill & Geoghegan, 2012). Added to this then is the new opportunity for preservice teachers to view and learn from the dialogue between the preservice teacher and classroom student. Effective feedback to the preservice teacher on their teaching and planning performance, as well as all other facets of being a teacher, are vital to their development. Feedback that contributes to deep reflection of their practice is most valuable, however often neglected (Hegender, 2010).

Experienced teachers are professionals in their own right and have developed a personal understanding of how to teach and manage a classroom successfully. This expertise is often what teachers rely on while supervising preservice teachers rather than having a strong dependence on the university requirements. Additionally, supervising teachers tend to choose feedback practices that suit their professional strengths (Chapter 3). Doing so can interfere with the development of valuable skills that need to be demonstrated and evidenced against the teacher standards.

Since supervising teachers are time poor, opportunities for frequent targeted and specific dialogue around the teaching and learning experiences with preservice teachers are typically limited. Therefore, the establishment of a pedagogy of assessment that can be implemented across a program is essential to ensure the success of developing effective formative assessment (Rushton, 2005). Key issues for many supervising teachers included depth of feedback, facilitating preservice teacher reflection on teaching and learning but these need to be set with an emphasis on the processes of assessment rather than the existing emphasis on procedures and products (Rushton, 2005).

Opportunity

The collection of practicum teaching dialogue as well as feedback evidence in the form of comments, notes, videos and photos that were stored on CeMeE (see Chapters 3 and 4) allowed for targeted conversations and potential for greater reflection and deeper reflection about practice against the assessment criteria. The ability for the preservice teacher to see and hear their teaching dialogue anytime and anywhere was found to encourage further reflection outside of the classroom setting, and usually in connection to planning for teaching. The research found that the combination of the feedback and conversations, and the preservice teacher's constructive relationship with the supervising teacher were crucial to the depth of development of the preservice teacher. It is hypothesized for continuation of the present research that an increased exposure to being able to critically and dialogically reflect on their teaching dialogue on a systematic basis has the potential to impact positively on improving their professional practice. CeMeE proved to be an effective way to compile and coordinate feedback, the evidence and the conversations between the preservice teacher and the supervising teacher, which can be described as fine grained when compared to traditional pencil and verbal feedback processes.

Use of CeMeE can allow supervising teachers to provide fine-grained feedback that can be presented in a variety of forms with greater accessibility for the preservice teacher. It is generally understood that preservice teachers have extremely fast-paced, busy days while in the classroom and have little time to reflect on the day, and their teaching and the

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subsequent feedback. This reflection usually occurs later while at home planning for the next day's lessons (Dann & Allen, 2015). For this reason, the ability to use technology to access the feedback anytime, anywhere, and reflect is critical to the overall development for the preservice teacher.

Conversations and communication form the catalyst for changes in preservice teacher performance. Figure 7 shows how reflective dialogue is positioned as part of the overall ongoing feedback process that can help reduce the gap in knowledge between theory and practice. This can be identified as a non-traditional approach to improving preservice teacher practice while on practicum (Allen, 2011) the concept of which emerged from the analysis of the data in Chapter 3.
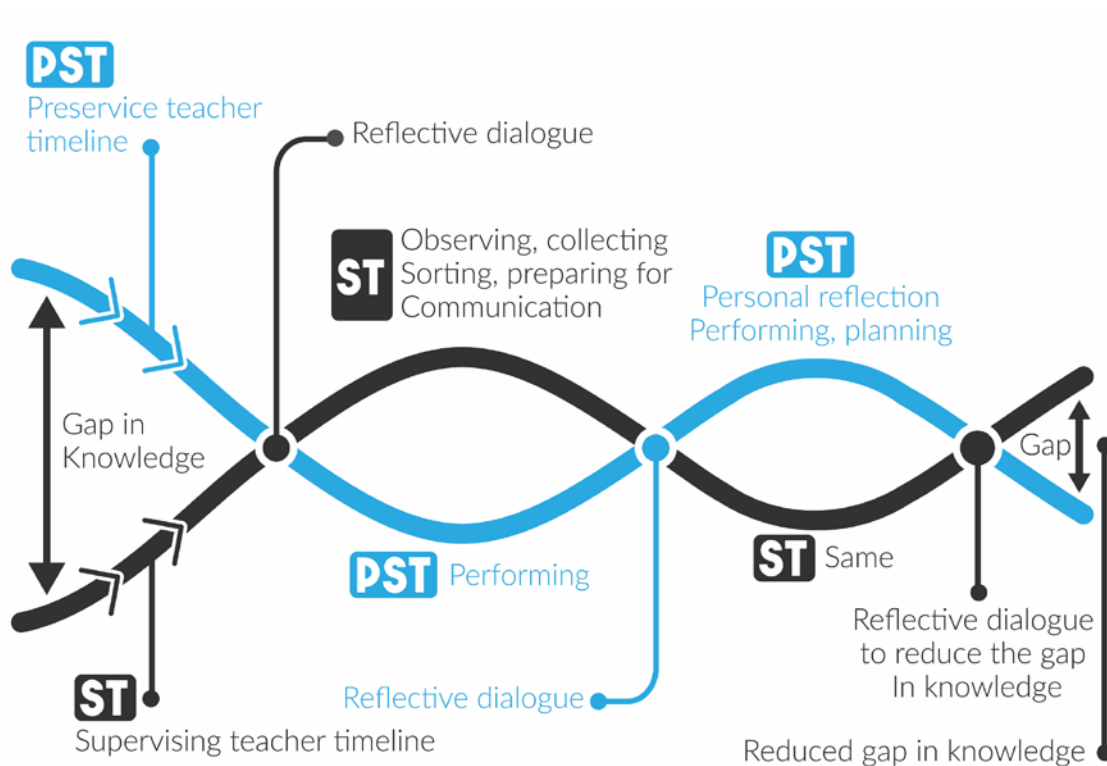
Figure 7: *Communication on Practicum - Reflective Dialogue in Feedback Processes with Video Evidence*

4.1.1.6 Alignment with Practicum and National Teacher Standards

Preservice teachers need to demonstrate all teacher standards at graduate level by the completion of their education program. Supervising teachers tend to focus more on the teaching, learning and assessment components of the standards than others. University personnel leave assessment with the supervising teachers and trust they are knowledgeable and thorough in their implementation of them.

Challenge

Preservice teachers are under greater pressure than ever to demonstrate knowledge and skills against national or state standards, and particularly at the completion of their final school placement. At the same time, Initial Teacher Education programs continuously endeavor to ensure their preservice teachers are 'work ready' and are achieving or reaching beyond the graduate level teacher standards.

Opportunity

The use of CeMeE (such as described in Chapters 3 and 4) can help to provide a variety of feedback aligned to professional standards that can be accessed anywhere and anytime. CeMeE also ensured a strong connection between practice evidence and the teaching standards. This ensured guidance during joint reflective conversations that were focused on the achievement of the graduate level of the national teacher standards.

Preservice teachers must demonstrate teaching skills that align with the national teacher standards at graduate level by the completion of their final school placement. The case study in Chapter 3 indicated that CeMeE forced the supervising teacher to align the teaching evidence with a teaching standard. That is, in order to place a comment about the preservice teacher performance it can only be placed with a standard. This practice means the ongoing evidence will accumulate against the standards providing up to date feedback to the preservice teacher. This could help to alleviate omission of feedback on standards that is required to meet the learning objectives of a practicum experience. It can also address supervising teachers' potential to focus on their personal preferences towards particular teaching and learning foci.

4.1.1.7 Moderation of Assessment

Teachers at all levels of education, including university level are expected to moderate assessment tasks of the students to ensure accurate and balanced marking between teachers, cohorts of students and schools.

Challenge

The preservice teacher's placement is assessed differently mentor-to-mentor and school-by-school. Often there is no moderation process. Students who are seen to have failed the placement, often only have the supervising teacher's verbal comments and very little written comments to explain their areas of concern. There is a lack of effective assessment and assessment understanding by the stakeholders involved in practicum (Allen, 2011; Patrick, Peach & Pocknee, 2008).

Opportunity

The non-traditional use of mobile devices to collect and sort video evidence, images and comments about preservice teacher progression towards the summative assessment criteria allows for the creation of a database of this information. The authors propose that the collection of an entire cohort of data collected by supervising teachers in all locations would create an opportunity to moderate preservice teacher learning against learning outcomes from the university thus reducing the need for the supervising teacher to make the final summative judgment. This impacts directly on the duality of practicum. Removing the summative judgment role of supervising teachers can increase their effectiveness in the support role and reduce tensions that exist due to the judgment process. Perhaps this should be considered as a way to strengthen mentor-mentee relationships and to develop dialogic reflection during practicum.

Viewing preservice teachers' classroom teaching videos will present an academic with a new perspective on their preservice teachers' performance and will provide evidence of theory into practice that can be used by a program leader or course coordinator to understand the preservice teachers' progress towards learning outcomes/specific objectives. This can reveal strengths and concerns for the preservice teacher, the supervising

teacher/mentor and others to assist with moderation if using this non-traditional feedback process. In addition, CeMeE can be used as a storage place for all comments, videos and photos and other artefacts of practicum that also link to the specific teacher standards. The examples provided in Chapters 3 and 4 have identified the usefulness of CeMeE to assist in using formative developmental teaching examples to lead to a holistic summative diagnostic assessment of preservice teacher performance while on school placements. In addition, when the supervising teacher allocates evidence, CeMeE forces the assessor to choose the teaching standard to which the practice aligns. In doing so, summative judgments against the expected criteria become very clear. This may also be made available as evidence when there are disputes about the preservice teacher performance level. It is this evidence that the authors propose can be used in a moderation process or at the very least used to highlight students of concern, thus providing for early intervention that has specific targeted learning outcomes.

4.1.1.8 Accessibility of Practicum Data to University Staff

Data provided from placements could help to inform discrepancies in the program as well as areas that meet and exceed the program expectations. This data can also be used to support supervising teachers that often get little or no support (Craven, 2014). Universities must report annually to the state level accreditation body on program outcomes and changes.

Challenge

Currently there are limited processes for collecting data from the classroom where the nexus of teaching and learning occur for strategic evidenced based dialogue to enhance practicum effectiveness (Southgate, Reynolds & Howley, 2013). A reality of working in a university is the policy and procedural constraints applied to programs and program development by external accreditors and internal program approval processes (Simon, 2013) that seem at times to the authors to be at odds with the effort to tactically resolve practicum issues (Southgate, et. al., 2013). Essentially, these programs are a high stakes construct given that institutions can have their program deregistered if they do not meet the demands of accreditation bodies. Deregistration of a program can be costly to a university. The divide between university and supervising teachers and the disjointed communication add to the complexity of practicum assessment (Allen, 2011; Taylor, 2008).

Opportunity

Changes to programs may be government-sanctioned changes but will first filter through other agencies such as accrediting bodies that oversee and enforce the changes. These organizations will take time to understand a new policy and will often rewrite the policy into their frameworks and then send them out to universities. Once received by universities, they too try to understand the new policy and then rewrite it to fit into the university/program structure. This policy may be rewritten again in order to be added to the information given to supervising teachers and partner schools, whereby supervising teachers will attempt to understand the policy change as noted in the case study in Chapter 3. By this time, the potential for the 'pass the message game' referred to in this study (see Chapters 1 and 5) has truly increased as the policy change is filtered down through the system.

The data indicate a disparity between program expectations and the experiences of preservice teachers in classrooms in keeping with Hughes (2009). Reducing disparity will most likely mean making changes to programs. For example, feedback data, if collected from the placement, may indicate students need particular subject area content added to university course work. Further, feedback data might reveal a need to connect university coursework with the classroom experience while on placement or even involve changing the placement period. Changes, such as these, may take significant time that is required for 'jumping through university hoops and red tape' to receive approval.

There are also accrediting bodies that have influence over the programs and have their own set of expectations to follow, such as providing evidence of program assessment tasks to check alignment to expectations. CeMeE was an unobtrusive way to collect data about the practicum experience for the preservice teacher. It could help identify areas of strength and weakness in a program. Program designers can also use this technology to have up-to-date and real-time information about practicum processes and outcomes that would inform program changes. The expectation that program leaders provide the accrediting bodies with evidence of assessment across the program courses and practicum placements presents a new area for research where this use of technology is highly applicable.

In addition, involving supervising teachers in university teaching or as co-planners for the placement requirements and expectations can assist in shared understanding (Allen, 2011). For example, employing teachers to teach education courses could help to develop a greater understanding of the university context and also develop partnerships between schools and the university. University and school partnerships are on the rise and can help to align expectations and understanding between supervising teachers and university staff if there is clarity in defining roles, responsibilities and the expectations around the practicum experience (Allen, 2011), particularly around effective assessment procedures. Close communication and ongoing partnerships between universities and supervising teachers could also help improve and align feedback processes, learning experiences and assessment processes for preservice teachers. Partnerships with schools and supervising teachers can help to create an understanding of the expectations and standards for preservice teachers' learning within programs. Identification of concerns from the bottom up would provide opportunities to focus on the learner and improve links between theory and practice.

When areas of weakness in programs can be identified through the accumulation of such highly pertinent data, systemic and systematic changes can be more easily applied within Initial Teacher Education programs that will lead to greater demonstration of alignment to professional standards/graduate standards. Doing so would help to strengthen programs and improve preservice teacher knowledge of discipline area content, teaching strategies, planning for diversity, classroom management, and so on (Mattsson, et al., 2012). If the university could capture information like this across all practicing experiences, they would have a wealth of information to guide their program development and partnership development.

4.1.1.9 Management of Documentation

Challenge

The ever-growing demand by professional teacher accreditation bodies for preservice teachers to demonstrate knowledge and skills to teach effectively by the completion of their program means that the feedback, development and documentation of learning that occur during school placements are critical. This demand places responsibility to manage

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documentation with universities initial teacher education programs thus leading to opportunities and challenges in meeting the demands of multiple stakeholders. Initial Teacher Education educators are motivated to meet this challenge because practicums are considered one of the most influential aspects of preservice teacher education (Haigh, 2001).

Opportunity

There is a plethora of technological systems such as Blackboard, Moodle, and Pebble pad, and numerous other systems available to support the management of learning today. New systems such as SONIA are now being introduced because of the increase in practical experiences in universities. These systems manage the communication between the university, school, supervising teacher and preservice teacher on the market that are being used by universities to manage the movement of documents between the university, the school and supervising teachers and preservice teachers. Unfortunately, the focus on management of procedures has not been replicated with the management of learning data, such as feedback and learning evidence. It is here that the opportunity exists to make significant improvements to learning and assessment of practicum and preservice teachers' requirements to meet professional standards. CeMeE provides an indication that feedback on teaching and evidence collected about teaching can be used to both support preservice teachers' learning and the documentation of final reports and processes that currently consume so much of the time of supervising teachers, preservice teachers and university academics.

4.1.1.10 Accessibility of Practicum Data to University Staff and Accrediting Bodies for Learning Analysis

Schools are leading the interrogation of learning matrix and data resulting from learning processes yet the very institutions that are promoting this deep analysis of learning-data have not advanced the opportunity to follow the same principle and analyze the formative learning data of preservice teachers at a university and the accrediting bodies at the state and national level.

There are numerous challenges embodied in the idea that practicum data can be used by universities, state and national bodies. Such challenges include: security of data, management and analysis of data to distil relevant issues and other ethical considerations currently identified within the macro-system as explained by the Bronfenbrenner model that is central to the argument presented in Chapter 5.

Opportunity

Each of the challenges has an opportunity that needs to be met if the non-traditional approach initiated by the CeMeE system is to be followed up. CeMeE does not claim to directly meet these challenges, rather it alludes to opportunities that are emerging to address because of technological advances. CeMeE offers what many technological systems now take advantage of, which is secure Cloud server space. This allows data collected in classrooms to be made available to others if they have the appropriate credentials. The provision of access to these data beyond the personal needs of the individual, for example, by state and centralized authorities leads to the next challenge. This raises the question of how it might be analyzed to improve the current system of Initial Teacher Education and what other related needs it may assist in meeting. This also has implications for ongoing research if practices are to be improved and refined to adhere to and authenticate professional standards.

4.1.1.11 Building of Action Research and Ongoing Professional Learning of Supervising Teachers/Mentors

Action research is a highly recognized approach for practitioners and has been the basis for the iterative development of the CeMeE system.

Challenge

The introduction of technology by its ubiquitous nature can be readily present within a phenomenon and at the same time challenge all involved. The question arises as to how best it can be embedded to support action research into the practice and habits of supervising teachers/mentors and schools. Having the intention to promote action research as a system wide activity can have a collective impact on the quality of teaching and the professional learning of those practitioners and schools who embrace and recognize its ability to

contribute to improvement (O'Neill, 2013). Similarly, in relation to both practicum learning and in-service teacher professional learning the issues here suggest an action research pathway should focus on shifting monologic cultures towards more dialogic practices and processes that promote feed forward as opposed to feedback.

Opportunity

This challenge needs to be recognized and if it is to be met it can present new opportunities for practitioners, preservice teachers and education systems and the work of all stakeholders. Teachers as practitioners, who begin to conduct action research using mobile video technology to collect, analyze and critique evidence of their pedagogy and practice can be the most powerful influence on facilitating school wide change and improving learning outcomes for students (Andrews, Crowther, Morgan & O'Neill, 2012).

4.1.1.12 Discussion

The literature review in Chapter 1 identified the field of practicum assessment as problematic, highlighting issues of validity, reliability and lack of formative feedback because of the duality of the practicum role in the Initial Teacher Education program. Confusion over supporting and assessing in a high stakes environment conflict the supervising teacher and impact on his or her final summative judgement. Further to this, the importance of dialogue between the supervising teacher and the preservice teacher was identified as critical if preservice teachers are to attain the appropriate level of expertise in teaching. Chapter 3 uncovered the barriers faced by one preservice teacher and her supervising teacher and these were supported by the literature. Such barriers to preservice teacher learning included unclear practicum expectations (Allen, 2011), weak collaboration between schools and universities (Johnson, 2010) differences in understanding the graduate level teacher standards (Chapter 3, Dann & Allen 2015) and difficulties with being able to facilitate the development of skills (Hughes, 2009).

Chapter 4 highlighted the importance of the dialogue between the teacher and children/students and how a non-traditional approach using CeMeE could enhance the preservice teachers' learning of critical skill sets through communication/focused reflective dialogue. It demonstrated how this can help preservice teachers to grasp the pedagogical

metalanguage, and be aware of their cognitive moves when teaching, and the significance of planning and collecting evidence in this way (recording the artefacts of their practice) for the purposes of formative assessment. These issues were further problematized by the assertions of Chapter 5 that the intention of national Professional Standards for Teachers are disrupted by the multiple interpretations of stakeholders involved in the practicum context.

This research of non-traditional approaches to practicum assessment and the social constructivist approach to learning in the context of dialogism and democratic pedagogy has now led to the following key understanding that underpins the pedagogical shift promoted here.

Table 7: Refocusing Learning Outcomes, New Practicum Metalanguage, Actions and Exemplars

Communication Concepts	Resultant action	Exemplar
Dialogic mentoring	Supervising teacher and preservice teacher generate feed forward goals/specific learning objectives.	Supervising teacher and preservice teacher view evidence together and jointly develop goals for future practice.
Dialogic feed forward	Written Verbal Visual Data generating goals	Teacher and student discuss the evidence provided and jointly and individually plan for improvement in practice.
Dialogic reflection	Metacognition about written, verbal and visual	Evidence is collected and both supervising teacher and preservice teacher discuss the practice in terms of professional standards.
Dialogic feedback	Verbal supported by written and visual information	Supervising teacher and preservice teacher discuss deficiencies in the preservice teacher practice using evidence provided.
Monologic feed forward	Written Spoken	Supervising teacher creates suggested improvements in the preservice teacher practice and delivers these to the student verbally or in writing without explicit explanations and deconstruction of the commentary from the supervising teacher.
Monologic feedback	Monologic written Monologic spoken	Supervising teacher provides comments about evidence of preservice teacher achieving planned goals and delivers these to the student verbally or in writing without explicit explanations and deconstruction of the commentary from the supervising teacher.

This pedagogical shift calls for a refocus on learning outcomes and the process of attaining this in a practicum experience through reconceptualising communication. In bringing this together we begin to see the emergence of new metalanguage about communication for practicum that includes dialogic mentoring, dialogic feed forward, dialogic reflection, dialogic feedback, monologic feed forward and monologic feedback.

Further exploration of these communication concepts is made by placing them in a matrix as displayed in Table 8 that the authors believe show their preferred/most productive combinations. The matrix is divided into four sectors with *preferred practice* at the *top right* and least preferred practice bottom left. The closer the supervisory practice to the top right we assert the more dialogic reflection and metacognition is involved for the preservice teacher (Orland-Barak & Yinon, 2005). This increased metacognition and dialogic reflective practice results in increased alignment with learning intentions and greater reliability and validity of the practicum if learning goals of the practicum are applied.

Table 8: How Choice of Communication Concepts Impacts on Dialogic Reflection and Metacognition of Practicum

Right thing - wrong way	**Right thing - right way**
Feedback and Feed forward - Monologic	Feedback and Feed Forward - Dialogic
Feedback and feed forward information is provided in a Monologic manner without involvement of the preservice teacher.	Feedback and feed forward is provided via dialogic practices using verbal, written and visual with feed forward goals being set based on professional standards.
Wrong thing - wrong way	**Wrong thing - right way**
Feedback - Monologic	Feedback and Feed Forward - Dialogic
No feedback related to criteria is provided.	Personal opinions of practices unrelated to learning outcomes based information based on teacher constructed basis rather than learning outcomes given in written and verbal and visual via dialogic practice.

4.1.1.13 Conclusion

The Australian professional standards for teachers have been in existence since 2011. However, while they intend to guide the direction of teacher professional development and

professional learning of preservice teachers and are freely available online the research here suggests that this is a highly challenging task. Delivery of these standards and their facilitation nationally has been enhanced by the excellence of the work of the national and state bodies involved. Yet, as this research suggests, there is more work to be done if education, as a societal construct, is to fully leverage the impact of the use of these standards. For instance, it has been shown that teachers and preservice teachers are actively engaging with the standards and that through technology it is now possible for national and state organizations to collect and examine data produced through this uptake.

Increasing the opportunity for teachers and preservice teachers to explore their dialogic practice with regard to children's learning as described in Chapter 4 is deemed as ethical and appropriate, if not a necessity, if we are to attempt to achieve the ultimate impact on teaching quality. This study of CeMeE has shown that it is possible to make explicit the teaching practice of teachers and preservice teachers. It is therefore imperative that we leverage this opportunity and attempt to undertake a systematic approach to using this to the advantage of Initial Teacher Education programs and the development of aspiring teachers. The PALAR and case study that provided data for discussion throughout this text has provided a number of key challenges and opportunities for academics, preservice teachers and policy makers who impact on initial teacher education programs but particularly the practicum assessment. The discussion gave voice to practicum participants, their supervising teachers and all the participants of the PALAR and case studies. These voices have been combined with current literature about the formative assessment, summative assessment, and judgment making, and the management of the practicum criteria and its association with national and state requirements to identify implications for change.

There are particular nuances about the supervising teachers and the way they manage the experiences in their classrooms that tend to make a greater impact on preservice teachers' development (Mattsson, et al., 2012). These include: feedback, conversation and relationship. Kemmis and Grootenboer (2008) reported that practice is shaped through specific regulations, tasks and practices and could be described as "practice architecture" that defines and cultivates the context of the preservice teacher learning and helps shape their teacher

identity (p. 57). According to Mattsson et al. (2012), practicum should be carefully managed and the outcomes clearly articulated. In this way preservice teachers have greater opportunity to improve their learning with deep conversations and careful observations facilitated by supervising teachers' insightful understandings. "Together, this could lead to transformation and true change" (p. 63). They advocate a much-needed shift in thinking as outlined above, and learner focus with an intention to stop moving boxes to fit holes in programs and meet outside expectations. Based on the present research it is asserted here that such change needs to involve the use of mobile devices with a system installed that can increase supervisor alignment with the specified criteria and learning outcomes.

The case study in Chapter 3, and the four-year PALAR study reported by Dann and Allen (2015) both point to the conclusion that mobile technologies can play a strategic role in the development of a comprehensive approach to the alignment of theory and practice in Initial Teacher Education. The use of mobile technologies can provide a catalyst towards achieving the significant paradigm shift in thinking and in turn practices that are required to improve the quality of preservice teachers' tertiary experience and equip them with the pedagogical knowledge and skills to meet the required standards at the graduate level. This need for change is reinforced by the research of others in the field (Davis, 2003; Heap et al., 2014) however, the question remains, whether there is sufficient resolve within the multiple governing bodies and industry/community stakeholders, such as accreditation authorities, early childhood agencies, government policy makers, universities and Initial Teacher Education program designers, together with education systems and schools, to prepare the way for change and reset the goal posts. Shifting the present 'community' to a non-traditional approach and creating an informed and supportive culture that is embedded in processes and practices, within the new paradigm as proposed here looms as a difficult process. It requires strong leadership and intent at all levels, with collaboration and a deep appreciation of this as a common goal. Of course, there are challenges as noted above. While these are identifiable now, others may arise along the way such that there is a need to continue to learn and refine processes and practices in keeping with the principles formulated from this research. Continuous collaboration and reflective dialogue between stakeholders and the iterative strength of PALAR has been identified as an effective way to contribute to and enable a high

level of sustainability of future changes to practice. All stakeholders must be vigilant and actively contribute to the necessary changes to transform preservice teacher learning and in turn improve teaching and learning in schools.

4.1.1.14 Stimulating Reflective Dialogue

Use the following activities and questions to reflect on your own experiences and how you in your role might contribute to transforming current practices that are contrary to the new paradigm outlined here.

1. Describe three to five situations applicable to your education context where you have observed practices that reflect a more traditional monologic approach to pedagogy and learning in preservice teacher education and/or children's learning or other related area.
2. Describe three to five situations applicable to your education context where you have observed practices that reflect a more democratic and dialogic approach to pedagogy and learning in preservice teacher education and/or children's learning or other related area.
3. Describe three to five situations applicable to your education context where you have observed formative assessment practices that (a) focus on feedback as opposed to feed-forward and (b) where there are examples of feed-forward or you have ideas to adapt your practices to ensure 'feed-forward' is in operation.
4. Share or exchange your responses with a colleague and take a few minutes to explain your response and how you might approach contributing to change.
5. Write a reaction to this chapter (approximately 750 words). Share this with two like-minded colleagues and formulate a research question to develop an action research project to take the first step to stimulating positive change.
6. You may wish to share your experience and seek discussions with the authors. If so, please make initial contact via e-mail to Chris Dann: info@cemee.com.au

4.1.1.15 Giving Voice to Pre-Service Teachers and Supervising Teachers

In our conclusions to this book we advocate a shift in practice that is underpinned by the following six principles. Working collaboratively with colleagues and relevant

stakeholders and drawing on the data that you have generated from the previous chapter workshops examine how you can embed these principles into your practice.

1. Data management.
2. Targeted conversations to stimulate reflective dialogue.
3. Demonstrated knowledge and skill alignment with practicum expectations and expected standards.
4. Practicum assessment moderation processes that would ensure more objectivity and feed forward.
5. Accessibility of practicum data to university staff and accrediting bodies for learning analysis.
6. Building in of action research and ongoing professional learning of supervising teachers/mentors.

Follow through with a focus on (a) how you will ensure the provision of evidence of preservice teachers' performance against the relevant standards and sub-goals, (b) how you will enable both the supervising teachers' and preservice teachers' ongoing professional learning in relation to understanding pedagogy, the importance of dialogue and feed forward in formative assessment, and practicum requirements, and (c) how the gathering of data such as that outlined here with the CeMeE App can also provide the opportunity to examine more closely students'/children's progress in learning.

4.1.1.16 References

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Key Terms and Definitions

Accreditation: Part of the quality assurance process in tertiary education where a degree program, such as a Bachelor of Education, is accredited by an independent body as meeting specific criteria.

Feedback: The process implemented by the supervising teacher during a practicum where following the preservice teacher's implementation of a pre-planned lesson the supervising teacher indicates in some way the extent to which he or she achieved what she planned to achieve.

Feed-forward: The process of giving suggestions to a learner to assist them in closing the gap between where they are and the planned learning outcome. This may include the reformulation of goals, further breakdown into sub-goals and specific learning objectives to help understand the task more deeply and proceed step-by-step to bridge the gap.

Initial Teacher Education: Formalised education that prepares tertiary students to be teachers in mainstream schooling applicable to K-12.

Monologue: Monologue is a one-way communication. In education, it relates to a traditional view of learning as the transmission of information.

Reflective Dialogue: Reflective dialogue refers to the quality of discussion and exchange of ideas. Here there is deep, thoughtful engagement and common purpose. It is vital for instance for supervising teacher and preservice teacher professional conversations aimed at providing feedback and feed forward advice on practicum, where new knowledge is constructed in relation to reflective dialogue about the artefacts of the preservice teacher's practice.

Specific Learning Objectives: Specific Learning Objectives (SLO) are precise specific tasks within a professional context. SLOs are also relevant, objective, result oriented, feasible, observable, measureable and indicate the minimum level of performance acceptable.

Standards: Standards refer to specific knowledge and skills that preservice teachers and inservice teachers are required to demonstrate to be registered with teacher registration bodies, and form the basis for the assessment of preservice teachers' suitability to be employed in the profession and gain registration. They are typically developed at the national level to guide and achieve consistency in practice.

4.1.2 Major Publication Six

Dann, C. Professional experience's missing link – A mobile video 'app' supporting more than just the students. Submitted to International Journal of Mobile Learning and Organisation. Special Issue on: "Mobile Learning and Knowledge Sharing"

Summary Statement

This major publication drew the entire study and its findings to a close and responded to each of the original research questions as outlined in chapter 1. The paper examined the fifth and sixth cycles of the PALAR study and identified the five major lessons from the research.

The article argues for the effectiveness of the application as a critical link between all stakeholders involved in practicum assessment processes. It explains the context, methodology and methods used, and provides specific information about the participants in the PALAR cycles. The findings were framed around cycles 5 and 6 of the research and gave

a voice to the students in the study, in harmony with the voices in the initial publications. It delivered data that built on the research guiding questions 1, 3, 4 and 5.

The core feature of this article is its clarification of the complexities of the practicum assessment process, and how these can be positively impacted by the use of a mobile video collection system such as CeMeE. The discussion touches on current pre-service teacher assessment processes, as well as the emergent EdTPA (Education Teacher Preparation Assessment), the TPA (Teacher Preparation Assessment) in Australia, and the recent release of the Queensland College of Teachers' "iTunes U" channel. These budding platforms encouraged student teachers to upload and collect video from practicums, and reinforced the contribution of this study to transforming pre-service teacher practicums.

4.1.2.1 Abstract

Pedagogy and assessment within school-based practicums remain problematic. We report on centrally placing a bespoke, app-based video tool within the practicum for mentors and student teachers. The app used seamless video capture on mobile devices to enhance formative assessment practice, which in turn led to improved judgments in summative assessments. Feedback through the app was synchronous and non-synchronous between student teacher, mentor and supervisor. Findings show the app proved highly effective in enhancing practicum experiences. We argue that the app become a pivotal link between practicum stakeholders to develop an evidence-based approach towards improving the quality of the school-based practicum.

4.1.2.2 Introduction

Few areas in teacher education attract more controversy, both within teacher education institutions and outside, than the supervision, pedagogy and assessment of student teachers' practical professional experiences. The most important element of a student teacher's learning should be exposure to a quality practicum experience that models continual professional development (Duncan, 2007). Nevertheless, the experiences are problematized by the fact that hundreds, if not thousands, of students from each teacher education institution face as many schools, mentor teachers and university assessors (Rorrison, 2007) as they seek

to provide appositive learning experience and arrive at common judgements. In the research reported here, the whole research project was driven by an attempt to use mobile technologies to develop some common standards around the practicum experiences, particularly with regard to assessing student teachers to agreed professional standards, and providing high quality formative assessment practices that would aid the professional growth of the teachers as they went through practicum. Mattsson, Eilertsen & Rorrison (2009) called for a 'turn' in thinking about the practicum experience and theorised that a new paradigm was required because of practicums' known impact on the learning of student teachers and its potential for linking theory with practice. Although a new paradigm is called for, there has been limited literature or practical applications using practical bespoke systems that attempt to address the issues within the formative practices of practicum.

To address the problems and to create the necessary 'paradigm shift', the researchers developed an application to use on mobile technology. The project, employing a participatory action research model, encountered several problems within the best-intentioned of processes, but finally two cycles have been successfully completed that confirm that such an 'app' can have significant impact on the quality of the pre-service teachers' practicum experiences. This paper reports on these two cycles, where the capabilities and benefits of using the app became fully apparent, to the satisfaction of the three main parties in the practicum experience: the pre-service teacher, the school's mentor teacher; and the University's supervisors.

4.1.2.3 Context and Problem

This study was based at the University of the Sunshine Coast, in Queensland Australia and involved practitioners from the University's School of Education, local schools and student teachers in undergraduate and graduate programs collaborating to undertake an examination of practicum learning using mobile devices as feedback support tools. Each of the parties involved brought to the table their concerns with practicum. These included: the formative assessment processes of practicum, or lack of them; lack of clarity in communicating the practicum learning goals; more general communication issues during practicum, and in particular concern about the *ad hoc* nature of feedback for student teachers;

issues of equity; and the reliability of the judgments made about students in their final summative assessment. These judgments are vital to the future employment prospects of pre-service teachers yet, as Rorrison (2007) argued so forcibly, there are few assessment systems that allow such a range of untrained assessors to make such high-stakes judgments on so many students.

This argument is further strengthened by the assertion of Gronn, Romeo, McNamara and Teo (2013) that practicum experiences are a vital part of the preparation of future teachers, therefore playing a significant role in the student teachers' acquisition of pedagogical knowledge and skill (Craven, 2014). Student teachers are striving to reduce the gap in professional knowledge (Dann & Richardson, 2015) and are continually seeking feedback on their performance. McGregor, Merchant and Butler (2012) emphasised the need for this feedback to be timely, meaningful and specific. Further, written feedback has been shown to be too cryptic (Gibbs & Simpson, 2004) leading to the need for timely, quality feedback that is clear and usable for the student teacher.

The development of a mobile application ('app') CeMeE was technically challenging and evolved as data from participants and system data was received. The first version of the system was the Preservice Teacher Tracker (PTT) (Willis, Dann, Jones, Toohey & Lowe, 2011) which was designed for an iPhone™ 3, using its video collection capabilities. The system proved difficult for teachers to use due to the small screen size and limited internet access in classrooms. These issues were resolved with the redevelopment of a second version on an iPad™, with tablet size screen and direct access to internet from the device without attempting to use the school's and/or department's internet connections. Supervising teachers had averaged 2 min of video when capturing student teacher performance over cycles 2 – 4, so this resulted in a re-coding of the system to limit video collection to a maximum of 10 minutes.

4.1.2.4 Methodology and Methods

This study employed a participatory action learning, action research design to examine how practicum experience could be improved through the use of the CeMeE app.

Focus was particularly on mentor-teacher to pre-service teacher feedback to encourage formative assessment processes during practicum. Furthermore, there was an associated intention that this would impact positively on the quality of judgements by mentor teachers and university supervisors of the in the final, summative assessment of the student teachers. What follows in this section are two parts. First there is an overview of the PALAR methodology and second, there is a brief, concise outline of the data collection and analysis methods of the observation stage of the cycles, which include the use of semi-structured interviews, surveys and analytics.

PALAR

Participatory action learning action research (PALAR) sits within the action research methodology but recognizes the active contributions of participants and their learning during the research process. It allows for an holistic view of learning that in that all practitioners can create knowledge (Zuber-Skerritt, 2015). The PALAR methodology is ideal for workplace, project-based and learner-centred inquiries (Zuber-Skerritt, 2015), and these characteristics distinguish it from traditional action research characteristics (Zuber-Skerritt & Teare, 2013).

This study focused on the partnership between the University and representatives of local school communities who provided the practicum learning experiences. The methodology aimed to translate an existing process, in this case, the assessment of student teachers, into a community of practice and thus produce an improvement (Cameron, 2015). A methodology was required that could disrupt the traditional notions of practice and PALAR has been described as such a process. Essentially, this study was built on the concrete experiences of PALAR teams created for each cycle to "critically reflect on their experience, formulate abstract generalizations from it, and test these newly created concepts in new situations—thus gaining new concrete experience, and continuing the next cycle of experiential learning and knowledge creation" (Kolbe, 1984, p. 21).

As a result, the study was characterized by small PALAR teams in each cycle of the action research process actively learning and contributing to solve problems and gain a deeper understanding of the practicum assessment processes. Central questions for

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collaborators were: What are we really trying to do?; What is stopping us from doing it?; and What can be done about it? (Revans, 1992, 1998) and these established a thread throughout the cycles.

The overall study involved six cycles; the first four are best described as dealing with significant, if unexpected 'teething' problems, but each cycle still contributed to the overall development of the CeMeE application. Findings from the other cycles have been reported elsewhere (Dann & Allen, 2015; Dann &Richardson, 2015; Dann, 2013; Dann, Dann & O'Neill, 2017) and are beyond the intent of this paper.

Cooperation from, and collaboration within the university enabled this study to proceed with financial support from university grants. Further support from the university was given through the tireless efforts of University tutors, liaison officers, course coordinators, program leaders, and university practicum administrators over the four years. The inclusion of such a broad range of collaborators increased the objectivity and rigour of the study and provided various perspectives on the findings and outcomes.

Each cycle of the PALAR involved the four stages of a traditional action research model: plan, act, observe and reflect (Kemmis & McTaggart, 1988; Kemmis, McTaggart & Nixon, 2014). The observation stage of each cycle involved collection of data on which reflection and subsequent planning occurred and it is to the outline of these methods of data collection that the paper now turns.

Participants

Purposive sampling (Cohen, Manion & Morrison, 2007) was used in each of the cycles to select student teachers and supervisors who were in undergraduate and postgraduate programs at the University. All participants were informed of the voluntary nature of the study and that all data would be de-identified after collection in accordance with the Ethics Application (A/10/268).

The feedback experiences of 63 student teachers, 33 supervising teachers and 24 university-based staff, including four university tutors, ten course coordinators and two

program leaders, supported by eight different practicum administrators, informed the creation of first the PTT, and finally CeMeE. These contributions provided a broad data source from which the research was able to evaluate the capacity of mobile devices and the apps to enhance formative assessment, feedback processes, the final judgement of summative assessment, and other issues of the practicum experience identified by participants.

The student teachers invited into this study were from courses with a practicum component from the University's undergraduate and graduate education programs and did not involve first year or final semester students. The School of Education, with the research team, determined that final semester students should be removed from the pool due to the high-stakes nature of those placements and possible implications from the nature of the 'trials'.

Supervising teachers were approached in two ways during this study. Initially, the student teachers who had volunteered to collaborate on the system invited their supervising teachers to become collaborators. In the final cycle, supervising teachers were approached first and student teachers were then given the opportunity to withdraw if they were concerned with the process of being videoed. Over the period of the study 33 supervising teachers provided what they learnt about the capacity of mobile devices to support their work as a supervisor.

Data Collection and Analysis Methods

A variety of data were collected within the observation phases of the two PALAR cycles reported here. Qualitative data were collected from semi-structured interviews and from open-ended responses in the pre- and post-intervention surveys and data recorded by the system in order to reduce the inherent bias of the researcher and to provide deep and rich data (Winter, 1998). Quantitative data were collected from the same surveys and from the analytics that 'sit' behind the mobile technology.

Semi-Structured Interviews

Two research team members conducted the semi-structured interviews before and after the practicums during cycles 5 and 6. The data were recorded, transcribed, coded, and themed according to the methods outlined by Miles, Huberman and Saldana, (2014). The

research team analyzed the data and used transcripts to inform new questions for 'before' and 'after' surveys in subsequent cycles. Cycle 5 interviews were situated in a university tutorial undertaken by the lead researcher; these had the potential to increase the possible bias of the researcher, a problem addressed by the use of a second researcher to record interviews. These, too, were transcribed and data analysis undertaken in the same way.

Surveys

Survey questions focused on the interface of the CeMeE 'app' as well as the feedback processes of supervisors. Surveys were triangulated to other data forms due to their inherent limitations (Cohen & Manion, 1998) and included open-ended questions in the post-intervention survey to allow for increased collaborator comment and to deepen the focus on the perceptions around the capacity of video-enabled mobile devices. Survey data were coded and entered into SPSS and used to identify perceptions and ideas that collaborators perceived as significant.

Analytics

Analytics involved the use of data generated by the system about user activity. Analytics provided the research team with information about how often a user accessed the PTT and provided data about times used, data input into the system and even the parts of the system used (Dann, 2015). Importantly it provided the collaborators with the time and duration of interaction with PTT by student teachers and supervising teachers (Dann & Allen, 2015). Analyses of the early analytics, surveys and interviews were consolidated and used to create the new CeMeE system. Analytics was not built into CeMeE although all input was time stamped.

4.1.2.5 Results

A number of outcomes had emerged from the first four cycles of the project. One was the number of unexpected barriers to the in-class, in-school implementation of the PTT and later CeMeE apps. Nevertheless, each cycle ended with unshakeable faith among all participants that the system had the capability to achieve what was hoped for and had been planned. In the final two cycles, reported here, that faith was realised and the findings reveal

the ways in which the app could contribute to enhancing the practicum experience of all parties, and in particular the pre-service teacher. Findings from cycles 5 and 6 are presented in this section with overall findings and observation of the study presented in the discussion and emerging issues section.

Cycle Five

Plan

Following the difficulties with implementing the 'app' in the previous cycles, which were largely to do with in-school protocols, the plan in this cycle was to take the applications out of schools and to use it solely in an 'intra-university' setting. The aim was to implement the actual processes that CeMeE was designed for. The plan was to involve pre-service teachers using the system as part of their tutorial activities. A cohort of 23 pre-service teachers in a classroom used CeMeE to provide feedback to each other about their demonstrations of teaching by negotiating the feedback topics between each other, and collecting video evidence that aligned with these feedback areas. This provided a shift from the technical aspects of the interface and system stability and moved it to the focus on learning via feedback and gaining an understanding of how and what pre-service teachers wanted to do with the system. This new direction in study proved to be critical and prompted renewed concentration in understanding the mechanics of using mobile video devices to support learners, regardless of the context of observation.

Act

An ethical variation was sought and granted to cover the use of the CeMeE in a tutorial run by the lead researcher. The approach taken to utilize CeMeE during the course was to emulate a scenario similar to a practicum supervision process within the ten-week course and ensure it was separated from the course assessment. 23 student teachers volunteered to collaborate as a PALAR team in the following five-step process.

Firstly, a generic practice task was negotiated with the team and second, in pairs, students developed a list of key areas that they wanted peer and tutorial leader feedback on, and which they thought would be aligned to their practicum. The third step was to install the

lists in the application and set up the login details for each student teacher and the tutorial leader so that students could be trained in its use. Finally, the student teachers and the tutorial leader were encouraged to us the system on their personal devices or their university device so that each student received some video feedback. Each time a student performed for observation the application was used, and paper and pencil notes were provided so that each student had access to receiving video feedback and giving video feedback.

Observation

During the observation phase of this cycle, a survey across all participants was conducted to ascertain the capacity and perception of the mobile video systems on the student teachers. Tables 9 and 10 show the mean of the fourth-year early childhood student teachers and their responses in a 5-level Likert scale to seven of the survey questions and interview questions used as a follow up to the survey. The results show that students clearly found the video feedback useful, and that they would like to use it in a genuine practicum experience.

Table 9: Mean Rating of Student Teacher Responses Using Likert Scale

Mean rating of student teachers response to five point Likert scale survey

1	I believe video with comments on a mobile device as feedback can be useful while on practicum	4.2
3	The system would be useful in the hands of a trained supervising teacher	4.2
7	Systems such as this can increase the formative feedback information during placement	4.1
2	I would use this system in other courses that have practical assessment if I could	3.7
6	The feedback impacted on my perception of myself as a teacher	3.6
4	This system had an impact on my reflective practices	3.5
5	This system improved my learning	3.2

These semi-structured interview questions led to and guided participant discussion during the interviews, as well as maintaining the focus of the interview on the research questions. The researcher used data and findings from previous cycles and triangulated the data to build the interview with the support of these questions. Participants indicated that they envisaged using the video during school times and liked that they could see their "body

language and how I presented myself and interacted with my students." Two students wanted to "hand it to my supervising teacher and say "please record me during this lesson" which indicated that student teachers were actively seeking increased evidence of their performance. Another said they were a "visual learner…. I'd rather see myself back" and watched themselves "many times".

Table 10: Semi-structured Interview Questions (Capacity and Perception Questions)

Do you think the system gave you more information than paper and pen feedback?
If so, how?
Do you think this system impacted on the way you reflect on your professional practice?
Were you the subject of a video session?
Did you watch your video and what did you learn?
How do you think video could help your learning?

The students said that clarity of feedback information was most important. An example of such comments was a lot of people were saying to me, 'You're very relaxed and very, like, not stressed and calm,' like, that sounds great but then watching it in a video I was like, mmm, I can see how that comes across now. Another participant also said "I think we could use this in courses where I have to do presentations, because we have lots of those."

Reflection

Findings from the observation phase of this cycle confirmed that the application could meet its educational requirements in practicum. The tutorial leader and student teachers were able to undertake formative assessment support as had been intended and envisioned in the initial planning of the application. The system interface and security issues had been stabilized prior to cycle 5 and the student teachers' favourable responses and requests to use the system again reinforced the value of the application.

It was clear that student teachers believed that the use of video could be useful on practicum when used by a trained supervisor and that it would increase the formative feedback information they had to work with while on practicum placement. Therefore, it was

now imperative to trial the system once again in schools and see if the system would actually meet the intended outcomes planned for it. The outcomes of this cycle are now reported.

Cycle Six - Alignment to Practicum Administration/Assessment

This cycle was the crucial "capstone" cycle that would determine if CeMeE could work in a school environment and achieve the outcomes intended at the beginning of the study. CeMeE had undergone four years of development, gaining data on its impact on the practicum experience; so this was intended to be the final step in the action research process to determine the extent to which CeMeE could impact on formative feedback practices and address other issues in the practicum experience of student teachers.

Plan

Cycle 6 planning was focused on providing a stable, reliable interface for mentor teacher, pre-service teachers and university supervisors when used in the school environment. All schools in this cycle were carefully tested for wi-fi capabilities before using the mobile technologies. Pre-practicum workshops were undertaken with the pre-service teachers who would be using the system and parallel, school-based training sessions were held for school-based mentor teachers.

Act

All three parties, student teachers, mentor teachers and university supervisors, employed the app on their respective mobile devices as intended. Take- up and use were enthusiastic and universal. Mentor teachers were encouraged to experiment with the frequency of the system's use. During the period of the practicum placement all teachers (school and pre-service) were supported via telephone and visited by the researcher at least once.

Observation

Observations included school visits and discussions with the supervising teachers and student teachers: field notes were taken to complement the interviews conducted at the conclusion of the practicums. These data were compared with data from previous cycles. Interview questions for supervising teachers (Table 10) and interview questions for student

teachers (Table 11) were devised to extend the data from the previous five cycles and to focus on the process of use rather than CeMeE as a system.

Table 11: Interview Questions to Student Teachers

What do you think of the idea of being videoed on practicum?
So how did you get feedback in this prac then? What was the process?
What was the process of getting feedback?
How much would feedback would I like?
Do you think using this system would help your learning?

This cycle collected data on the perspectives of the system from the student teachers and the supervisors. Student teachers collectively indicated their belief that the system demonstrated the capacity of video-enabled iPads to facilitate formative feedback to student teachers; evidence was from comments such as: "(Y)ou could video yourself over the week teaching that lesson in sequence, or even professional development. You could go, well, this is what I did and this is what I did to back it up." They reported that videos were useful in showing what the student teacher needed to act on, as reflected in the comment: "So you've got the video about yourself teaching this child …that you don't know what you're doing and then you see yourself and you've got what you're going to do to fix it." Further to this, student teachers indicated that the evidence was used as part of conversations with peers and supported their memory of their teaching practice as described by one: "When you're up front you only remember certain parts" and "seeing your performance from another perspective is really good". Student teachers also stated that "you could go back and review it" and that supervising teachers can be more specific with their comments when you are able to "see it from their perspective". In terms of value to student teachers, one participant believed that it was "priceless". One student teacher wanted to use the system to get a clearer picture of what they have to achieve.

The school-based mentor teachers felt that using mobile devices to video practicum experiences was "the way of the future that is here now" and made comments such as: "the application focused my attention on the criteria and the collection of video kept me on track

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through the practicum." The interview data from the six mentors revealed a positive stance toward video use on practicum. The focus of this cycle was not application reliability; rather it focussed on the interface combined with the processes used to support student teachers' learning.

Table 12: Teachers' Interview Questions to Mentor

How helpful do you think it was to have final report items on the system as part of the indicators for feedback?
Could you describe the process that you used when taking video for feedback?
Do you think it's had an impact on her reflective practice?
Do you think it would be different using it if you had a grade 2 one?
Do you think that the indicators that you would prefer to see in there would be explicitly related to the national teacher standards, or to something else?
What do you see as an appropriate amount of time commitment to this process, and how you see mobile devices may be having a positive impact on your time commitment?

In addition to this, one mentor teacher believed that their "expectations would be a lot clearer" and with a structured approach mentor teachers believed it would be "beneficial" in the feedback on mathematics and science. It also played a role in "narrowing in" on aspects of the student teachers' performance. One supervisor felt that the device allowed the student teacher to "see the elaboration of the national teacher standards".

4.1.2.6 Discussion

These findings are complex; they contribute and refer to a large number of inter-related issues such as feedback, assessment processes, student to teacher feedback, practicum partnerships, assessment standards, mentorship and mentor training. For example, feedback in practicum, linked to formative assessment experiences (Rushton, 2005) is not an isolated event, as it connects to other areas of the practicum experience, and needs all participants engaged in the process (Tara, 2003). This discussion is focused on the interplay between these, as they apply to the capacity of the application when a system built by practitioners is implemented; hence the presence of numerous perspectives in this discussion.

We argue that despite the many unexpected constraints and roadblocks in its design, development and implementation, the app met its intended expectations and most importantly, the stakeholders embraced it. It provided a highly effective means of addressing many of the problems currently faced in delivering quality practicum feedback and guided formative assessment practices in such a way that they were structured and systematic rather than *ad hoc* and disconnected with the learning intentions of the student teacher. This assertion is developed here under five key connected themes:

1. Formative assessments;
2. Better feedback and more disciplined dialogue between rhe parties – especially mentor teacher and pre-service teacher, use of video as the basis of more informed dialogue;
3. Better judgements in summative assessments;
4. Adherence to standards;
5. Ubiquitous advantage.

Formative assessment using video based feedback has been shown to effectively support student teachers through a non-traditional approach to the formative assessment practices through evidence-based dialogue (Ferris- Kerr, 2009). The study reported in this paper created a system that drew the users into a non-traditional pedagogy that structured supervision and mentoring and leveraged video use in the formative process. Formative practices in practicum previously have been unstructured and often the rubric and or criteria have been unclear to both the student teacher and the supervising teacher.

CeMeE has provided the opportunity for both parties to clarify what is meant by the assessment criteria for practicum and to collect ongoing evidence to reduce the student teachers' gap in knowledge between what is expected and what they display. While this is possible without an 'app', the systematic approach provided by the CeMeE app gives structure and consistency to the whole process. The app does increase the chance, with guided training and a set of expectations for its use, that student teachers will receive ongoing, structured and targeted support during their learning rather than the current *ad hoc*

approach that often limits the summative judgment process as well. Better feedback and more disciplined dialogue between the parties has been demonstrated to be possible with the CeMeE video system, especially when the mentor teacher and student teachers use video as the basis of more informed dialogue rather than the traditional monologic approach. The CeMeE application was shown to focus the mentor teachers' attention on the learning outcomes as evidenced by comments such as "this really focused my attention on the criteria of the practicum and I could see what I had missed". Wiliam (2011) put learning objectives as central to formative assessment and feedback only has value when it is linked to the learning objectives, as feedback to 'feed forward'.

Better judgement in the summative assessment of the student teachers on practicum can impact on the quality of teachers entering the profession. There is an issue of timely, meaningful and specific feedback (McGregor, Merchant & Butler, 2008 and facilitation for both mentor teacher and student teachers in the teaching and learning process. This study has also shown that supervising teachers believed that time is needed for university staff to review and monitor the *teaching* of student teachers while on practicum. The study showed that a mobile device can capture video evidence and be sorted by the mentor teacher on site with little effort, leading to the aggregation of this information for the student teachers in the first instance, the mentor teacher in the second instance and then external stakeholders as required such as the university and program accreditation personnel. The increased access to such data increases the ability of all three stakeholders to be confident in the final summative result of the student.

Adherence to the standards that are the basis of the assessment processes has often been influenced by the individual interpretations of supervising teachers and student teachers (Rorrison, 2007). The need to establish non-traditional approaches to practicum (Ferrier-Kerr, 2009 in Allen, 2011) requires leadership from the university in the pedagogy of practicum assessment. Rorrison terms this a 'practicum turn' (Mattsson, Eilertsen & Rorrison, 2011). The CeMeE system has shown that video collection during practicum is possible and can be leveraged to support this change. The CeMeE transforms the process and can reduce the work load of a mentor teacher if video is too become part of the emerging evidence collection

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process used in the EdTPA (Education Teacher Preparation Assessment,) and the TPA (Teacher Preparation Assessment) emerging in Queensland Australia. The recent release of the Queensland College of Teachers' "iTunes U" channel, encouraging student teachers to upload and collect video from practicum, is further evidence that a seamless video collection tool is required.

The opportunity to use CeMeE in a tutorial environment led to data collection from a complete cohort of student teachers who experienced CeMeE over a ten-week period leading up to their final placement. Further focus on summative practices is being generated through the focus on certification requirements and this app has shown that it is now possible to engage the learning needs of individuals while maintaining a community of common practice in such a regulated environment. CeMeE decreased the ambiguity of assessment criteria and contributed to reducing the inherent variability of practicum experiences. Practicum learning is not well leveraged (Darling- Hammond, 2010), and evidence for the effectiveness of practicum is unclear because of its inherent variability (Ingvarson et al, 2014). However, it can be disrupted through the use of mobile devices in the supervision process. Southgate, Reynolds and Howley (2013) describe the process of finding a systematic evidence base for practicum experience development as a 'panacea to struggles between stakeholders' (p. 21) and this paper represents part of this struggle. This study contributes to the disparate understandings of practicum assessment (Patrick, Peach & Pocknee, 2008) and needs to be viewed cautiously due to the immersion of the researcher as part of the practicum experiences of collaborators, tutorial leader and finally as commercial developer of the system.

Student teachers who received evidence of their practice via video have shown that they reviewed their vision and evidence during school hours, during school breaks, after school and in the evenings as well as discuss their vision with their peers at times that suit. The increasing presence of video evidence impacts on the breadth of feedback options available to supervising teachers and multiplies the reflective opportunities for each student teacher. This study found that when video evidence was used, it also impacted on the written feedback provided to student teachers. The language used by supervising teachers markedly changed to 'feed forward'; further the cognitive load of supervising teachers was reduced by having the video available. Both parties agreed that this was preferable and provide more

specific information that could be viewed multiple times which increased the reinforcement of the learning. It also allowed the student teacher to 'see' their changes in behaviour and pedagogy.

This study exposed the limitations of cumbersome pen and paper approaches and/or ad hoc conversational feedback currently being used in the feedback process and professional learning of student teachers by their mentor teachers. Endeavouring to leverage this data driven pedagogy will be a step towards an environment of co-participation in practicum (Ferrier-Kerr, 2009) and will require a focus on mentoring skills and training (Hudson, 2010).

4.1.2.7 Conclusion

This study has found that when video snippets are collected and aligned to formative and summative feedback, student teachers report that they learn more about their performance than they have before. Student gained insights into their personal professional practices and were able to more accurately improve performance based on supervising teacher feedback that accompanied the vision. Student teachers clearly sought increased evidence upon which they could reflect, and CeMeE allowed student teachers access to the feedback they received that increased the bank of feed-forward information. One conclusion drawn from this study is that broad scale trials of a systematic formative feedback/feed forward system is required to examine further the impact of formative video feedback on student teachers learning.

Doubts about teachers using video were initially overcome by individual schools and since the start of this study the systemic attitude has changed. Teachers were able to use the system in classrooms and recognised video capture as a 'way of the future' with Education Queensland (the State's employer of teachers) now actively supporting the use of video of student teachers in Queensland schools. This new attitude to video use in classrooms signals an opportunity for teacher education providers in Queensland, Australia, to refine the integration of video in the practicum experiences.

The alignment of formative evidence against national teacher standards highlighted the variation in supervising teacher understanding of the "graduate teacher standards'. CeMeE increased the supervising teachers' focus on the graduate standards and the learning

outcomes of the practicum that was an unintended outcome because the initial system was focused on the learning outcomes of the practicum rather than the graduate standards that is now driving the practicum assessment process.

CeMeE created a non-traditional 'turn' in practicum assessment processes. It had positive impacts on the formative assessment processes which in turn improved the confidence in the summative processes for student teachers. The opportunity to collect performance evidence and make this accessible to the student teacher, the supervising teacher and the university as well as the accrediting body creates an exciting possibility that exceeds the possibilities of paper and pen feedback traditionally afforded to student teachers. This study began with investigations into the use of an iPhone 3 system and has concluded with the use of iPad tablets and the presence of iPhone 6™ in the marketplace. Digital technologies are changing the way we interact with our environments. CeMeE has shown that technology can now be leveraged to improve the practicum experiences and utilises practicum evidence collection for more than certification purposes while improving student teacher learning for the better.

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Chapter Five | General Discussion

5.1 Introduction

This research investigated the use of a custom-designed 'app' for use on mobile devices, such as iPhones and iPads, in supporting pre-service teacher practicums. It began with a particular focus on formative assessment and feedback processes in the practicum, but went further, to examine the impact of mobile video collection on the enhancement of pre-service teachers' and supervising teachers' experiences.

It will be remembered that the central question that drove the six action research cycles was: To what extent can disciplined and structured use of mobile technologies for practicums impact on pedagogy and assessment of the professional experiences of pre-service teachers? This central question was supported by five research guiding questions which were:

1. To what extent can the current pedagogical approach to practicum assessment by supervising teachers be improved by the introduction of iPhone and tablet technology?
2. To what extent are the reflective practices of pre-service teachers impacted by feedback on performance delivered via mobile and web technology?
3. To what extent can the capabilities of mobile technologies enhance the ability of supervising teachers to provide formative assessment and feedback to pre-service teacher students on practicum?
4. Can information collected on video-enabled mobile and web technologies for assessment of pre-service teachers be used to support more detailed analyses of their performance than would be possible using paper and pencil?
5. Does formative assessment using mobile technologies impact on summative judgments of pre-service teacher standards and national curriculum outcomes during the learning process?

The PALAR research was conducted in conjunction with pre-service teachers, academics and administrators at the University of the Sunshine Coast and personnel from

schools partnering with the university by providing practicum opportunities for pre-service teachers. These collaborators offered their knowledge and workplaces as a real-world environment for this study, hence the participatory aspect of the action research methodology.

The overall study comprised six cycles of action research (Kemmis & McTaggart, 1988) and was completed over 2 stages. Stage 1 commenced with the aim of addressing local issues faced by pre-service and supervising teachers, including the questionable reliability and validity of current feedback and assessment processes. This led to the design, development and testing of a prototype software system called the Pre-service Teacher Tracker. Stage 2 focused on the effects of the mobile device on the experiences of pre-service and supervising teachers.

This exegesis brings together the six major publications covering these two stages, supplemented by 14 supporting publications, including one book, five book chapters, two journal articles, three conference papers and four conference presentations. What follows is to connect the several publications, their themes and findings, to the overall study and to link them to the main research question and research guiding questions.

5.2 Discussion related to the research questions and publications

The six-participatory action learning action research cycles (PALAR) in this study indicated that mobile devices have a positive impact on the learning of pre-service teachers undertaking practicums. To contextualise and clarify the findings across the six cycles and the related publications, Table 2 from Chapter 1 is restated below.

The first stage included development of the Pre-service Teacher Tracker (PTT) system, and found the use of video influential in developing pre-service teachers while they were in their practicum. This relates directly to guiding question 3, and is also a topic in major publications 2 and 3. The findings also revealed that video-capture assisted the supervising teachers in the practicum, which goes towards addressing the extent to which current pedagogical approaches to practicum assessment could be improved and how the

reflective practices of pre-service teachers could be impacted by the use of video in the feedback process. These are referred to in major publications 1, 2 and 3.

Table 2: Summary of Findings

Stage	PALAR Cycle	Key Findings
Stage 1	1 & 2	• Teachers accept using iPhones to give feedback (Q1) • Issues with the design of feedback interface for mobile phone (Q1) • Consistency, reliability and equity are important to pre-service teachers on practicum placements (Q4)
	2	• Acceptance and need for video feedback via mobile devices (Q1)
	3	• Adult learning can be enhanced by the transparency of a mobile video-enabled feedback system (Q5) • Linked video feedback to national standards (Q5) • The importance of teacher workflow processes and time for pre-service teacher supervision (Q2) • Fine-grained analysis of information collected by the university could assist in the development of university courses and programs (Q2) • Why reflective practice can and should be extended using mobile video-collection systems (Q2) • Focusing on the link between feedback and professional standards (Q5) • Table mobile devices are best suited to pre-service teacher supervision (Q1)
	4	• Technical issues required to be met for school use of mobile devices. (Q1 & 2)
Stage 2	5	• Extent to which the mobile video collection system can impact on students' 'Knowledge in Practice' (Q3 & 4)
	6	• A formal set of expectations is required when using video to support summative judgements (Q5) • Supervising teachers appreciate the support of evidence of practice to base conversations on (Q4) • Pre-service teachers want evidence (Q3) • High quality supervising processes are dialogic rather than monologic in nature. (Q3)

Stage 2 confirmed the findings of stage 1 in greater detail and with enhanced thoroughness, and prompted the establishment of a more user-friendly supervisor platform that illuminated the possibility that a more detailed approach to formative assessment than by

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using 'paper and pencil' was possible. These have been described fully in major publications 4, 5 and 6. The research cycles in stage 2 also provided more detailed data for pre-service teachers and their supervisors to support the achievement of graduate standards (research guiding questions 4 and 5). The evidence for this was presented in major publication 5 in the discussion of the impact of video capture using mobile technologies on higher education teacher training programs.

This research has provided critical insights into the role of mobile devices in the assessment process of practicums and particularly on the pedagogy of practicum supervision which was the central focus of research guiding question 1. The study established iPads as the preferred platform for supervising teachers to input evidence of pre-service teachers' performance and represents part of the answer to guiding question 3. These themes were central to major publications 3 and 4; they confirmed that video captured on mobile devices closely aligned with the explicit standards for graduate teachers stipulated by accreditation authorities, provided students with increased awareness of their own performance versus practicum requirements for their reflective practices. They also allowed students to be more informed of their professional learning than by ad-hoc processes using 'paper and pencil. These findings address research guiding questions 2 and 4.

Discussion of this enhanced approach and practice towards professional learning, discussed in publications 5 and 6, extended the implications of this finding to the impact it could have at a course and program level as well as the personal level. In stage 1 the research initially focused on the system's interface and user requirements, and once established, shifted attention to user processes and perceptions. This was reflected in the central themes of publications 1, 2 and 3 which focused on details of user experience, while publications 4 and 5 moved the discussion to the methods that were employed by users and the implications for teacher education programs. These implications include: refinement of practicum mentoring processes; academic awareness of practicum learning and professional practice issues faced by pre-service teachers; the systematic communication of practicum expectations and standards; the establishment of formative communication protocols; cohort-level moderation opportunities by university based academics. All of these lead to enhanced professional

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learning for pre-service teachers while on practicum which has been the overall aim of the action research study.

Cyclical usage patterns were reported in the major publications 2 and 3 and were further supported by user perceptions and the themed data in stage 2. This, in-turn, strengthened the findings that mobile devices do enhance the ability of supervising teachers in the processes of providing formative assessment and feedback to pre-service teachers. Pre-service teachers experienced increased self-awareness in the final two cycles which impacted positively on their reflective practices, and both pre-service and supervising teachers believed the system had benefited their roles. These were reported in major publications 3, 5 and 6 and together they provide evidence of the extent to which a disciplined and structured use of mobile technologies for practicum does impact on pedagogy and assessment of the professional experience.

In cycle 5 of the PALAR action research process, the system was also found to facilitate feedback in other higher education courses with embedded practical presentation tasks which relate directly to the final guiding research question. This research question became the focus of the fifth major publication and was further explored in the final publication, where the implications for future research and teacher education practicum practices were considered. In addition, the study found student teachers had an appetite for increased video feedback and access to comments captured on mobile devices in their learning environments. This emerged in each of the first three cycles and was further consolidated in cycles 5 and 6.

This research led to the conclusion that video feedback, facilitated by the capabilities of the CeMeE system, has had, and likely will have, a positive impact on the learning of pre-service teachers and those providing feedback. This directly answers the first research guiding question and was discussed in the final two major publications presented in this exegesis. By addressing the guiding questions of the study, the findings illuminated the following key points:

- A systematic, system wide criteria-based feedback process using mobile-enhanced pedagogical approaches can improve practicum feedback and consistency of

summative judgements made in assessments through the use of iPhone and tablet technology. This approach focuses supervising teachers' feedback on relevant performance criteria rather than their own personal interpretations.

- The use of an application that houses all performance criteria focuses supervising teachers' feedback on relevant performance criteria rather than their own personal interpretations. This decreases the variability of summative judgements and the reliability of the assessment process for the cohort of students undergoing the particular practicum.

- The reflective practices of pre-service teachers are profoundly impacted by feedback via mobile and web technology. The ability to set goals, strategies and timelines for each individual assessment statement multiple times over during the practicum period, supported by visuals of performance, impacts on pre-service teachers' professional view of themselves. It also influences the reflective processes of pre-service teachers.

- Video-enhanced feedback increases the confidence of supervising teachers as they make judgements on student progress and focuses their conversations with pre-service teachers on closing the gaps in their knowledge specifically related to the performance criteria of the practicum.

The ubiquitous nature of mobile technologies has facilitated the provision of formative assessment feedback to teacher students on practicum. Pre-service teachers are afforded opportunities to review visual recordings and commentary on their performance when their cognitive abilities are at a peak. Furthermore, mobility provides easy access to performance data in learning environments without impacting student behaviour since they are familiar with mobile devices.

The study has also confirmed that systematic feedback and the data collection capabilities of mobile devices provide for more finely-grained analyses of performance than is possible using traditional 'paper and pen' approaches. A key finding of this study was that mobile technologies particularly impacted on the summative judgments of pre-service teachers in a systematic, criteria-based testing environment focused on graduate standards, where supervising teachers have a clear direction and good understandings of the standards expected by the university and the teacher accreditation bodies.

The potential effect of the implementation of such a system includes increased reliability of summative results and a moderated set of results built on data collected from the classrooms of pre-service teachers. The system also has the potential for the university to see, aggregate and analyse the formative comments from supervising teachers for course and program development at the university. The consistent use of a system that presents the performance criteria on a daily basis to supervising teachers would potentially increase the supervising teachers' exposure to the practicum requirements and reduce the personal perspective supervising teachers often hold when providing feedback to their pre-service teacher.

This research is situated within the field of practicum assessment and adds to our current knowledge of how technological solutions can influence the quality of practicum experiences for pre-service teachers, their mentors and supervisors. It opens up possibilities for teacher training organisations to gather data directly from the schools about pre-service teachers' progress, assessment and professional learning. However, further investigation is needed to fully understand the extent to which this type of classroom data can influence program and course structures at university and in teacher training curricula.

Chapter 6 | Conclusion

This study set out to improve: pedagogy of practicum; the extent and quality of pre-service teacher reflection during practicum; enhanced processes of assessment, both formative and summative; enhanced feedback to pre-service teachers; to reduce the miscommunication between schools and university; communication of learning standards and expectations. All of these are in essence supporting students' ability to maximise the outcomes from their school based practicum experience which as stated earlier is the capstone experience of teacher education. It employed a PALAR methodology which suited the intentions and aims of the study, and raised new questions, allowing for continual improvements and technological solutions whilst simultaneously involving other colleagues and ensuring learning at all levels of participation. Pre-service teachers, supervising teachers, and myself as the central researcher and as a university representative, all developed a deeper understanding of practicum assessments. I will conclude this exegesis by considering the implications and limitations, including the methodological limitations of the overall study. These are followed by considering the directions for future research.

6.1 Implications

This research has implications for the management and assessment practices of pre-service teachers on practicum placements, with increased scrutiny of teacher graduate standards prompting a sharp focus on processes. Currently, assessments require significant effort from academics and school-based staff; however personal professional experience suggested that the problem was, since the focus had turned to standards expected of pre-service students, alignment between theory and practice has widened. The evidence for this came from innumerable informal statements from disillusioned supervisors and pre-service teachers. This informal evidence reflected the findings of Rorrison's (2008) research. This research has shown that a mobile device with video capture capable of focusing supervisors' attention on specific criteria, has had a positive impact on practicum management by:

1. Enhancing existing formative feedback processes;
2. Exposing links between formative feedback to pre-service teachers and the summative judgements made by their supervising teachers;

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3. Providing a structural support mechanism for supervising teachers;

4. Being capable of interfacing with existing managerial systems and databases; and

5. Providing access to relevant data from which to moderate and inform university courses and program design.

The implications from these findings are that widespread disciplined use of mobile technologies employed by three stakeholder groups in the practicum experience can make enormous contributions to enhancing the quality of practicum experience for supervising teachers, university supervisors and most importantly the pre-service teachers.

Supervising teacher and schools may experience increased support from universities due to the universities awareness of feedback and formative commentary, there may be increased understandings of expectations from the university which in turn reduces the time wasted by supervising teachers and school based coordinating staff. In addition, the increased confidence of supervising teachers to make summative judgements and have supporting evidence of their judgement could increase the number of teachers volunteering to undertake supervision

The implications for the university include a strengthened partnership between the school and the university as well as a more focused assessment of performance standards expected of the practicum experience. This would significantly impact on the program and student learning progression through a program and the overall satisfaction of pre-service teachers which is becoming a key aspect of university measurement. Armed with the system program leaders would have real time, aggregated formative data upon which to assign additional support to struggling pre-service teachers in the schools. This would impact on the substantial budgets being used by universities who currently blanket all pre-service teachers on practicum in an effort to ensure support is offered to these struggling students. Conversely outstanding students can be recognised for their work in schools.

Pre-service teachers are the centre of this phenomenon and would be enabled and empowered by the presence of video of their performance and the opportunity to constantly reflect on their practice in terms of the standards they are being assessed against. They will be able to undertake dialogue with their supervising teacher based on this new information and increase their rate of learning in the areas required by the practicum rather than the areas

the supervising teachers are personally interested in. Finally, the pre-service teacher would also be held to account for their performance and their actions in relation to ongoing feedback from observers. This may be seen as a negative component but, as this study has shown, this situation brings both the supervising teacher and the pre-service teacher together in clarification of the standards which is, in itself, a professional development activity with deep learning implications. Such abundant implications justify disrupting today's ad hoc, hit-and-miss approach to practicum assessments so pervasive in current practice.

6.2 Limitations

The study encountered financial, operational and organisational limitations. Financial limitations have posed a challenge since completion of cycle 3, and while cycle 4 was funded, it was insufficient for further design and coding of the CeMeE application and web interface. Operational limitations stemmed from participants' perceptions of CeMeE as a secondary system because they were already using an existing system. In addition, since each state has different assessment criteria for its pre-service teachers, it must be stated that this approach was trialled in only one state.

Financial limitations impacted on development of the system, and specifically restricted the transition from stage 1 to stage 2. This coincided with the host university assigning the license to the researcher which meant further activities had to be self-funded. First, this restricted the study to a manageable privately funded doctoral study. Second, this reduced the impact of participant data on the ongoing development as some aspects required funding. This also led to the move to focus on user tactics and methods of use rather than increasing efficiencies in the interface of the system.

Operational limitations included the inability to involve large numbers of supervisors due to doubling up of assessments for supervising teachers. Further study is recommended to extend implementation and more fully understand the impact of such systems on learners and organisations alike.

Organisational limitations were evident early in the research when the effort required to transmit formative data was seen as less important than the expectation of initial teacher

education organisation to transfer results (summative data). Another organisational limitation was the inclusion of only second and third year students in the research, which meant that high-stakes assessment and reporting of student learning was not undertaken in their penultimate year. This could be seen as a limitation because the motivation of final year students may be stronger than those who participated in the study.

Methodological Limitations

When evaluating the impact of an intervention in an educational setting using social science research methods, there are two main ways of doing so. One is to use experimental – or quasi-experimental – research design (deVaus, 2001). This research design is based on employing an experimental group, on which the intervention is applied, and a control group which does not experience the intervention. A statistical comparison between the two groups is made and the significance of the data across the two groups, from pre-test and post test data collections, is analysed and conclusions drawn. This design, also known as RCT (randomised, controlled trial) is the 'gold standard' for testing the value or success of an intervention.

Action research is another way of assessing the value of an intervention. This second approach is an iterative approach, one where an intervention can be trialled on several occasions, in the form, if you will, of a 'trial and error' approach. This approach was selected, - and approved by proposal reviewers - to assess the value of using mobile technologies with video-capture in school-based practicums in this particular study. The advantages of action research are that the iterative process allows detailed observations over a period of time; it recognises the importance of making adjustments to the intervention as it progresses; and it still allows carefully collected and analysed data to be used in the evaluative process. On the down side, there is of course no control group against which to evaluate the success or otherwise of the intervention, and this can be considered a major limitation. To the empirical, deductive researcher, action research certainly has limitations in that the data cannot produce the confidence levels and significance that an experimental design can.

In the light of the context of this project, being the development of a technological application 'in situ', action research can be justified. In each of the first four cycles there were 'moments' that brought the research to an incomplete ending and demanded a further cycle of evaluation. The fact that six such cycles of research were used bears testimony to the thoroughness of the process and to this can be added the peer-review process applied to each publication that emerged from the research. Further, action research has become a widely accepted field of social science research with its own tests of thoroughness, transparency and credibility (Stoecker & Brydon-Miller, 2013). As Pring (2004) states powerfully and succinctly:

> …the research called 'action research' aims not to produce new knowledge but to improve practice – namely, in this case, the 'educational practice' which teachers are engaged in. The conclusion is not a set of propositions but a practice or a set transactions or activities which is not true or false but better or worse. (Pring, 2004, p. 133)

As discussed in the section below, there are now opportunities to evaluate the application using a form of experimental design, in a larger scale project.

6.3 Directions for Future Research

The impact of ongoing video collection over four years is a critical area for further research in order to provide a longitudinal understanding of the impact on pre-service teachers' perceptions of their performance and how they align with expected professional standards. Parallel to this is the need to examine the dialogue and textual feedback, supported by video and photographic evidence for building a picture of the feed-forward information provided to the student. A baseline of feedback data would have to be created before capturing further evidence of video feedback comments. All these suggest that the next stage of research into the impact of mobile technologies with video capture on practicum experiences has to be through larger scale studies, likely to involve experimental research designs or longitudinal research designs. These will give more 'scientific' evidence to the value of such systems.

This mobile video application is valuable for all parties involved in practicum learning and assessments, from national bodies responsible for implementing graduate teacher standards through to pre-service teachers who are striving to attain these standards, school coordinators and university assessors. Ongoing improvements have already reduced inconsistencies in the process on national and state levels in Australia, and further research will continue to support national efforts to increase the quality of practicums. While existing research focuses on the delivery of information and administrative alignment, this study places a spotlight on the practical feedback for formative assessments of pre-service teachers in such a way that all parties are fully informed about the expected standards of performance.

Further study is warranted in the area of evidence collection methods for feedback on practicum. This study examined one method. As new methods emerge, study of their usability, alignment to performance criteria and data accessibility will require examination. Further understanding of the impact on pre-service teacher learning and the depth of links made by the student between theoretical knowledge and practical knowledge when such a system is utilized is also in need of examination.

Further study is also advised in the area of feedback tactics by supervising teachers. This will require examination of dialogic practices of supervising teachers, the use of this dialogue by pre-service teachers and the influence mobile devices have on this process. Greater understanding is needed in the area of time management and impact on supervisory practices when just in time delivery of performance criteria and practicum learning expectations is implemented at a cohort level.

6.4 Coda

The project began with the intention of improving the practicum experiences of students at one university who were concerned about the pedagogy of practicum because it included assessment. They felt that some students received more feedback than others and feedback was often unrelated to the required performance standards. This led to the development of an app which has since undergone a series of modifications to ensure that feedback to students is directly related to performance standards and the summative

judgements of their supervising teachers. The central issue remained - how a mobile app with video collection and communication capabilities can best be utilised in the feedback process to enhance summative evaluation and improve the outcomes of practicums. This research shows how video collection via a mobile application enhanced the learning of pre-service teacher students, and additionally revealed the benefits of informing teacher education programs and courses.

This journey began as a search for fairness and quality in the feedback process for students and found a way through the use of structured feedback via a mobile application that also captures evidence in the form of visual images. The search went on to create a structured process for enhancing the formative assessment process currently undertaken in practicums. The content of the feedback was positively influenced by the forward-fed information provided to students and added value for student teachers by affording better understanding of their students' performance.

The research also found mobile technologies impact on the way in which practicum assessments are undertaken, in particular the influence of mobile devices on the reflective practices of pre-service teachers and the formative assessment/feedback provided to them in the form of a more detailed analysis of their performance on practicum. It is clear from this study that formative assessment using mobile technologies does impact on the summative judgements of pre-service teachers' performance in relation to required standards; however, further research will be needed to demonstrate a similar impact on learning school curriculum standards.

This study was triggered by students whose voices were heard throughout, along with those of supervising teachers, academics and school personnel. The ongoing pursuit of fine tuning teacher education courses and programs will continue to push the boundaries of mobile video usage, because, in the words of one pre-service teacher with three years of practicum experience: "it (video with feedback based on the criteria of my practicum) definitely helped me go to a deeper level, because when you're in your own head you see

things differently, but if you have an outside view, you pick up things you might not ever have noticed".

Capturing one "unnoticed" event can have a profound impact in our profession. It is time to challenge the status quo and refuse to accept substandard practices born of an era when mobile video feedback opportunities did not even exist.

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Appendix 1
Survey Themes and Tables Cycle 5

Preservice Teachers' Views on the timing and usefulness of CEMeE in ITE

%	SA	A	Neither	D	SD
1. I believe video with comments on a mobile device as feedback can be useful while on practicum.	91	60.9	8.7	0	0
2. I would prefer to get video feedback leading up to practicum rather than on practicum.	65	34.8	30.4	4.3	0
3. I would prefer to get video feedback on practicum more than leading up to practicum.	24	19	33.3	33.3	9.5
4. I would use this system in other courses that have practical assessment if I could.	74	60.9	17.4	8.7	0
5. I believe the system would be useful in the hands of a trained supervising teacher.	87	52.2	8.7	4.3	0
6. I believe the time it took me to provide feedback to my peers would be similar to the time it would take a supervising teacher.	61	43.5	26.1	8.7	4.3

Preservice Teachers' Views on the Impact of CEMeE on their Personal Practicum Learning

View – Agreement scale	SA	A	Neither	D	SD
3. Did this system have an impact on your reflective practice?	50	40	40	10	0
5. Did the feedback impact on your perception of yourself as a teacher?	53	31.6	36.8	0	10.5
6. Did this system improve your learning?	47	21.1	36.8	10.5	5.3
7. Did the process of creating the feedback list of items for the application assist in your reflection process?	70	35	30	0	0
17. Did you notice teaching techniques in the video that you did not have when using verbal and written feedback?	43	42.9	42.9	0	14.3

View – Agreement scale	SA	A	Neither	D	SD
18. Were you able to identify new information about my skills that you had not known before using this system?	53	26.7	33.3	6.7	6.7
19. Did the video provide more information than verbal and printed feedback?	50	33.33	27.8	16.7	5.6
24. Could you capture student progress towards curriculum outcomes in a classroom or early years setting?	91	47.6	4.8	4.8	0

Preservice Teachers' Views on the Viability of CEMeE for use on Practicum

View – Agreement scale	SA	A	Neither	D	SD
1. Do you think this sort of technology should be used in practicum experience in school?	65	56.5	26.1	8.7	0
8.Do you think that supervising teachers could use this system in a school setting?	74	65.2	17.4	8.7	0
12. Do you think this or an improved version of this mobile technology should be incorporated into practicum feedback?	69	47.8	26.1	4.3	0
16. Do you think a system such as this can increase the formative feedback information during placement?	86	50	9.1	4.5	0
11. Did you see this feedback as part of your assessment?	64	40.9	22.7	13.6	0

Preservice Teachers' Views on the Easy Use of CEMeE and Peer Collaboration

View – Agreement scale	SA	A	Neither	D	SD
2. Do you think that peers should be able to provide practical video supported feedback during the semester in a subject that has practical assessment task/s?	65	43.5	26.1	8.7	0
4. Did the use of mobile devices in the tutorial enhance your ability to provide feedback to your peers?	64	54.5	22.7	9.1	4.5
13. Did you find giving feedback using the system was not time consuming?	44	19	33.3	19	4.8
14. Did collecting feedback not interfere with the teaching and learning in the room?	74	36.8	5.3	15.8	5.3
10. Do you think mobile systems with video capture should be incorporated into tutorial feedback?	74	52.2	17.4	8.7	0

Preservice Teachers' Views on CEMeE as Assisting in Building Professional Capital

View – Agreement scale	SA	A	Neither	D	SD
15. Was video captured during tutorials and practicums useful in a portfolio for applying for a teaching position?	59	36.4	31.8	4.5	4.5
20. Do you believe video can improve your practicum results?	76	61.9	19	4.8	0
21. Do you believe that having ongoing video feedback can give you a better chance of transitioning into the work force?	63	40.9	27.3	4.5	4.5
22. Do you believe that video feedback can improve your practicum results?	76	47.6	23.8	0	0
23. Could you demonstrate some of the professional standards for teaching using video captured during your undergraduate degree?	86	57.1	14.3	0	0
9. Do you believe this application should be used in other practical courses?	70	47.8	26.1	4.3	0

Preservice Teachers' Views on the Timing and Usefulness of CEMeE in ITE

View – Agreement scale	SA	Neither	D	SD
1. I believe video with comments on a mobile device as feedback can be useful while on practicum.	91	8.7	0	0
5.I believe the system would be useful in the hands of a trained supervising teacher.	87	8.7	4.3	0
4. I would use this system in other courses that have practical assessment if I could.	74	17.4	8.7	0
2. I would prefer to get video feedback leading up to practicum rather than on practicum.	65	30.4	4.3	0
6.I believe the time it took me to provide feedback to my peers would be similar to the time it would take a supervising teacher.	61	26.1	8.7	4.3
3. I would prefer to get video feedback on practicum more than leading up to practicum.	24	33.3	33.3	9.5

Preservice Teachers' Views on the Impact of CEMeE on their Personal Practicum Learning

View – Agreement scale	SA	Neither	D	SD
24. Could you capture student progress towards curriculum outcomes in a classroom or early years setting?	90	4.8	4.8	0
7.Did the process of creating the feedback list of items for the application assist in your reflective process.	70	30	0	0
18. Were you able to identify new information about my skills that you had not known before using this system?	57	33.3	6.7	6.7
5.Did the feedback impact on your perception of yourself as a teacher?	53	36.8	0	10.5
19. Did the video provide more information than verbal and printed feedback?	50	27.8	16.7	5.6
3. Did this system have an impact on your reflective practice?	50	40	10	0
6.Did this system improve your learning?	47	36.8	10.5	5.3
17. Did you notice teaching techniques in the video that you did not have when using verbal and written feedback?	43	42.9	0	14.3

Preservice Teachers' Views on the Viability of CEMeE for Use on Practicum

View – Agreement scale	SA	Neither	D	SD
16. Do you think a system such as this can increase the formative feedback information during placement?	86	9.1	4.5	0
8.Do you think that supervising teachers could use this system in a school setting?	74	17.4	8.7	0
12. Do you think this or an improved version of this mobile technology should be incorporated into practicum feedback?	70	26.1	4.3	0
1. Do you think this sort of technology should be used in practicum experience in school?	65	26.1	8.7	0
11. Did you see this feedback as part of your assessment?	64	22.7	13.6	0

Preservice Teachers' Views on the Easy Use of CEMeE and Peer Collaboration

View – Agreement scale	SA	Neither	D	SD
14. Did collecting feedback not interfere with the teaching and learning in the room?	74	5.3	15.8	5.3
10. Do you think mobile systems with video capture should be incorporated into tutorial feedback?	74	17.4	8.7	0
4. Did the use of mobile devices in the tutorial enhance your ability to provide feedback to your peers?	64	22.7	9.1	4.5
2. Do you think that peers should be able to provide practical video supported feedback during the semester in a subject that has practical assessment task/s?	55	26.1	8.7	0
13. Did you find giving feedback using the system was not time consuming?	43	33.3	19	4.8

Preservice Teachers' Views on CEMeE as Assisting in Building Professional Capital

View – Agreement scale	SA	Neither	D	SD
23. Could you demonstrate some of the professional standards for teaching using video captured during your undergraduate degree?	86	14.3	0	0
20. Do you believe video can improve your practicum results?	76	19	4.8	0
22. Do you believe that video feedback can improve your practicum results?	76	23.8	0	0
21. Do you believe that having ongoing video feedback can give you a better chance of transitioning into the work force?	64	27.3	4.5	4.5
9. Do you believe this application should be used in other practicum courses?	60	26.1	4.3	0
15. Was video captured during tutorials and practicums useful in a portfolio for applying for a teaching position?	59	31.8	4.5	4.5

Appendix 2: Themes and Codes

Data themes and coding OLTGP trial 2012

The following items are from the text of interviews that are sorted into themes.

These were generated from the interviews with Teachers who used the PTT software over a four week primary placement. All users were in primary schools.

Feedback (general)	Use of technology	Concept comments	Navigation	
Prefer verbal feedback	Don't like using computers	Good idea	Long list of criteria too hard	Usage time (location and time allocation)
Prefer paper feedback	Required time to get used to the system	The way forward	Want to see the last prac feedback	Used after teaching time
Verbal is given more often	This is the way forward	Children acted silly on video	Liked the sensory aspect of the system	students who use teacher in class can't get the benefit
I like to walk and give feedback on playground	Changes of habits are required	Streamlined the process	Too much to navigate around for only 4 weeks at school	Difficult to use when teaching
Normally I give notes on the lesson plan	Input saving was an issue	See the positives for the teacher and the student	Want a video area to find videos easier	Too time consuming
Verbal is instant feedback	Uploading was an issue	More benefit to the student than the teacher	Take time to find criteria	Reviewed mostly at night
Verbal feedback required privacy – mostly at lunch time				Reflected overnight
Feedback Focus	**Usability**	**Criteria**	**Video**	
Focused my feedback	Easy to use	Need examples of each	Benefits of video are clear	Lunch time feedback
Focused students on the feedback	Hard to use with a smart board in the room	Prefer less criteria statements	A good reflection tool	Time consuming
Want to have student giving their own feedback into the system	Requires some training	Criteria not helpful	Benefit of video t teacher too	Intended for student to use at night
Uni advisors needed to assign a standards	Support material is needed	Too many criteria	Helpful to student	
Good to have if I have a difficult student	Web was not usable when teaching because of the computer being on the classroom smart board	Criteria were too long	2 min long videos	
Can show transitions in the video and focus on these	Had an output issue with the dates	Used to set goals for the student	Low volume when playing back video	
	A distraction from actual	I need to know all of them	3 min video	
		Too much with the interim report also expected (external doc from SPE	Hard to anticipate when an incident worth videoing will occur	

Helped me stay focused on the criteria	observation process Want to save to a USB Want an area for storing video so I can get to them easily I like to have the record Video was easy Hard to use at home	office) Requires searching which take time Used them more than the video and pictures Kept a focus on observations Too many Prefer less criteria	See the benefit tot eh student The strength of the system Kids were well behaved when videoing Hard to plan for	Not time efficient Student used at home

Appendix 3
Interview Questions

Questions for Interview

Does this improve the assessment process of wpl practice ~~such as teacher education~~?

Has the PTT changed the way you provide feedback to students? If so in what way has it changed?

Kind of feedback

What changes did you have to make to use the PTT?

frequency of feedback

How long did you spend providing support to yoru student over the placement? What percentage of time did you use toprovide feedback verbaly adna electronically?

Do you think the PTT increased the feedback you provided to the student when comapred with previous reporting systems?

What aspects of the process would help reduce the time spent on administraion of a student and increase the feedback time?

Would you like to see self assessment by the student as part of the PTT process?

What did you find most useful about the PTT? Web, iphone, criteria?

Does the PTT improve your ability to make jugements about the students progress while on placement?

Do you think using the PTT improved the quality of feedback to students?

How often did you use the PTT web system?

Student

- How did your mentor use the PTT system?

- Did you access the information from Web? explain.

- Did you assist your mentor in using the PTT? explain.

- Tell about the feedback given.
  - frequency
  - aligned w/ course obj.?
  - verbal / written / digital
  - photos? video?

- How helpful is the PTT in supporting:

  • your teacher / mentor relationship?

  • your growth during prac?

  • specific feedback in a timely fashion?

source / references.

Qu. Overarching

What did Participants learn through Action

Qu.1
impact on Reflection

Qu.3
enhancing formative

Qu.4

Qu.1

- Feedback frequency
  - 5/24 — Feedback frequency
  - (S) Comments
    - 5/20 — (S) comments
  - 2/34 — Areas to feedback
  - 5/44 — (T) comments
  - 2/18 — timing pref.

78 — (T) Comments
10/17 — Feedback areas
  - 6/102 — (T) Feedback areas
  - 5/44 — Reflective Prac.
  - 9/24 — Focus gp.
    - 5/42 — timing
6/29 — Focus questions
8/50 — timing
  - 7/50 — Supervision issues

Qu.4
support fine grain
8/24 N.T. Standards

impact on

- Feedback Areas
  - (T) 10/117
  - (S) 2/34
- Positive comments
  - (T) 6/63
  - (S) 10/41
- Knowledge of formative 5/16
- Supervision issues 12/73

+ve comments
  - (T) 8/65
  - (S) 10/41
Focus Qu. 6/29

(T) comments 2/13
(S) comments 8/51

Program impact
  - Assessment 3/7
    - Program impact
      - Assessment 11/62
      - H.Ed Doc. 11/53

references
+21
37%

references
342
30%

349 ref
30%

257 ref.
23%

44 ref.
3%

Total Number of references. = 1131

Appendix 5

So using the stars?

PARTICIPANT:

Yeah. And then that gave me a chance to look through in my own time and see where I was at and where I needed to go to with my direction.

own time to reflect

INTERVIEWER:

Ok, good.

PARTICIPANT:

So I thought it was good. I read the feedback as well and that was very clear and direct so it was good. It gave me direction on what to, yeah. I thought it was really good. We sat down every day and had a reflection as well, but it was more structured on the (1:10) I knew exactly what I needed to do to get where I needed to be.

feedback gave direction.

- everyday

INTERVIEWER:

Yeah so it lined up with the criteria that you needed to focus on?

PARTICIPANT:

Yeah. And I think it let the teacher know to what specifically was required of us during prac.

- aligned (T) feedback.

INTERVIEWER:

Yeah excellent. How often would she go in and use the PTT?

PARTICIPANT:

Probably not as much as she could of but just due to the time of the year that it was she was gearing up for reporting and stuff, so, I'd say she probably used it a couple times. But, we only had 3 weeks of the teaching prac so I think she would have reported maybe at the end of the first week or and then again at the end of the second week. Just to give me a progressive thing though I think she would have done a lot more if her load wasn't as high at the time of the year so (1:56) think she would used it more just time availability was a big thing.

- used PTT weekly

- used as progress

INTERVIEWER:

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Appendix 6

Your Name: _____ Date: _____

This section will be removed from your responses. Codes will be used to match responses. Your name will not be kept with your responses.

- ✂ - - - - - - - - - - - - - - -

2. What are your expectations of the pre-service teacher?

3. What do you see as your greatest strengths as a mentor?

4. What do you see as your greatest challenges as a mentor?

Ensuring work lost is covered during teaching prac.

Making sure I keep an eye on students teachers confidence

5. What would be your ideal model for successful professional learning experiences for pre-service teachers & teacher mentors?

Environment where pre-service teacher feels comfortable in approaching me about a issue, big or small

6. What evidence do you use to make decisions?

Lesson plans   *Colleague observations*

Student work

Observations during lessons

Your Name: _____ Date:_____

Researcher to Complete:	
ID Code	
Class Code	

This section will be removed from your responses. Codes will be used to match responses. Your name will not be kept with your responses.

- - - - - - - - - - ✄ - - - - - - - - -

Survey Questions - Teacher

Pre-service teacher tracker:

These are to be answered one week before placement.

Researcher to Complete:	
ID Code	
Class Code	

Part A: Respond to the following:

Male ☐   Female ☐

Age: Under 20 ☐   20-25 ☑   over 25 ☐   over 35 ☐   over 45 ☐

How long have you been teaching?

0 -3 Yrs ☐   3- 5Yrs ☑   5-10 Yrs ☐   10-20 Yrs ☐   20+ Yrs ☐

List the types of students you have supervised previously? (eg: first year, second yr, final year, Grad dip)

FIRST YEAR _____   _____   _____

Approximately how many students have you supervised in your career?

0 – 5 ☑   5 – 10 ☐   10 + ☐

I own a smart phone. (Yes)/ No

If Yes to above, what model is the smart phone (eg Apple iPhone, Nokia N97): *Apple iPhone*

Questions for Teachers Pre PTT

Teacher Mentor:

1. Describe your perception of the role of the teacher mentor.

> My role as a master teacher is to ..
> provide a safe and encouraging environment
> Pass on professional knowledge to pre-service teacher
> check constructive feedback on lesson plans and
> lesson implementation

------------------------------------ ✂ ------------------------------------

7. How much time does it take to make a fair overall judgement?

(handwritten, illegible)

8. How much time do you spend giving feedback?

- I don't know what feedback given each lesson taught
by previous teacher
- Half a page to a page au notes per lesson

9. How do you give feedback?

- Verbal
- Written notes/observations

10. How often do you give feedback?

- After every lesson

Your Name: _____ Date: _____

This section will be removed from your responses. Codes will be used to match responses. Your name will not be kept with your responses.

✂

11. Where do you typically give feedback?

(handwritten response, largely illegible)

12. When do you record your feedback?

(handwritten response, largely illegible)

13. Do you set feedback sessions with your students?

(handwritten response) No, more of a 'when we get time' structure but always allow time each day for feedback.

Your Name: _____ Date: _____

This section will be removed from your responses. Codes will be used to match responses. Your name will not be kept with your responses

Survey Questions - Teacher

Pre-service teacher tracker:

These are to be answered one week after placement.

Part A: Respond to the following:

Male ☐   Female ☑

Age: Under 20 ☐   20-25 ☐   over 25 ☐   over 35 ☐   over 45 ☑

How long have you been teaching?

0-3 Yrs ☐   3-5 Yrs ☐   5-10 Yr ☐   10-20 Yrs ☐   20+ Yrs ☑

List the types of students you have supervised previously? (eg: first year, second yr, final year, Grad dip)

___first___   ___second___   _____   _____

Approximately how many students have you supervised in your career?

0-5 ☐   5-10 ☑   10+ ☐

I own a smart phone. (Yes)/ No

If Yes to above, what model is the smart phone (eg Apple iPhone, Nokia N97):

Questions for Teachers Post WIL experience.

1. How helpful are the criteria in the PTT tools for writing comments on the PST reports?

   > Good .

Your Name: _____ Date: _____

This section will be removed from your responses. Codes will be used to match responses. Your name will not be kept with your responses

2. Please describe the clarity of the PTT criteria in assessing PST progress?

> *[handwritten, illegible]* ... helping ... PST progress.

3. Please describe the usefulness of the PTT criteria in assessing PST progress?

> Very useful.

4. Are there criteria that you would add or delete or change? Please give details.

5. How helpful are the criteria in setting goals for PST development?

> Clear . My PST clearly know her expectations

Please tick the box that most reflects your answer.

	5 Very Often	4 Often	3 Sometimes	2 Very Little	1 Not at all
I believe the PTT indicators are clear?	✓				
I needed to collaborate with others to determine the meaning of the PTT indicators?					✓
To what extent did you and the preservice teacher (PST) discuss performance first then choose the matching indicator?			✓		
To what extent did you and your mentor need to discuss the criteria to gain a joint understanding?			✓		
To what extent were you able to use the indicators for PST assessment?	✓				
To what extend were the indicators helpful for the PST to identify personal teaching skills?		✓			

Your Name: _____ Date: _____

Researcher to Complete:	
ID Code	
Class Code	

	5 Very Often	4 Often	3 Some	2 Very little	1 Not at all
To what extent did you use the PTT website to record student progress?			✓		
To what extent did the PTT guide your discussions with the PST?		✓			
To what extent do you believe using the PTT increased consistency when discussing the criteria to be measured?		✓			
To what extent did the criteria direct your mentoring of the PST?		✓			
To what extent did you rely on the PTT data to make your final determination about the students' success in the Prac?		✓			

	5 Very Often	4 Often	3 Some	2 Very little	1 Not at all
To what extent did you use the mobile device			✓		

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Researcher to Complete:	
ID Code	
Class Code	

to record student data?					
To what extent did the mobile device assist your discussions with the PST?				✓	
To what extent do you believe using the mobile device increased consistency with the PST when discussing the criteria to be measured?				✓	
To what extent did you use the mobile device as part of the mentoring process with the PST?				✓	
To what extent did you rely on the PTT data to make your final determination about the students' success in the Prac?		✓			

Given my current experience of the PTT, I believe that using it helped me:

	5 Strongly agree	4 Agree	3 Neither agree or disagree	2 Disagree	1 Strongly disagree
Keep track of student information			✓		
Assisted in the mentoring process			✓		
Be a better mentor			✓		

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Make best use of Mentoring time available			✓		•
Direct my attention to the students' learning needs			✓		
Make the final decision for the WIL experience			✓		
Understand the needs of the student			✓		

I believe that :

	5 Strongly agree	4 Agree	3 Neither agree or disagree	2 Disagree	1 Strongly disagree
PTT was easy to navigate			✓		
The layout of PTT helped me in my role as a mentor			✓		
I do not need PTT to collect data			✓		
The PTT screens helped me enter data			✓		
Having PTT increased the data I could collect.			✓		

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Your Name: _____ Date: _____

PTT allowed me to make a better overall judgement of the students' progress					
PTT helped me stay focused on the learning outcomes of the WIL experience					