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An Evaluation Of The Use Of An Online Demonstration School

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Abstract: In 2016, a change was made to the approach taken for delivery of the first practicum placement experience for initial teacher education students at [the university]. Rather than the traditional 20-day in-school observation placement, an alternative 10-day online experience, called the Online Demonstration School (ODS), was developed. The ODS provided students with a fully online practicum experience involving viewing videos of a variety of classroom situations developed in conjunction with local schools. Subsequent reflection and collaboration with peers and academics allowed targeted aspects in the classroom situations to be examined in depth. This article summarises the literature supporting this change and presents a comparison of the effectiveness of these two alternative approaches based upon an analysis of mentor teacher grading of the second practicum placement completed. The analysis indicates that there are few significant differences in grading of the second in-school practicum placement by mentor teachers based upon whether students complete the in-school placement or the ODS. The benefits of the use and possible future development of the ODS are discussed.

Introduction

Students enrolled in initial teacher education programs at [the university] are required to complete a number of practicum placements in schools to enhance their preparedness to teach and meet the Australian Professional Standards for Teachers at the Graduate level. Meeting each of the 37 Graduate Teaching Standard Descriptors (GTSDs) during the final practicum placement is a requirement for successful completion of an initial teacher education program. Historically, the first practicum placement was conducted in a primary or secondary school and involved observation only, with in-class teaching not being required until the second practicum placement. In 2016, the School of Education (SoE) at [the university] introduced an alternative approach to completing the initial practicum placement, with students completing an online professional experience in the ODS, requiring them to engage with a series of videos of in-school teaching and learning practices intended to represent a wide range of experiences involved in the classroom and broader school context. This article commences with a review of the literature relating to the use of video to enhance initial education teacher practicum placements. It concludes with an analysis of practicum placements for the 2017 academic year with a view to determining if the ODS as implemented provides a preparation for in-class teaching in the second practicum placement comparable to the previous method of in-school observation.

Aim of Teacher Education

Universities and colleges have long aimed to develop pre-service teachers' different types of teacher knowledge, including an understanding of subject matter, children, teaching strategies and school curriculum (Calderhead & Robson, 1991; Shulman, 1986, 1987). This collective knowledge, when integrated in classroom practice, aims to support the development of the practical skills of the teaching profession. Initial teacher education programs incorporate the study of these teacher knowledges, namely, content knowledge; pedagogical knowledge; pedagogical content knowledge; curriculum knowledge; knowledge of learners and their characteristics (including child and adolescent psychology); knowledge of educational contexts (including school cultures and classroom processes); knowledge of educational ends, purposes, and values; combined with classroom observations and teaching experience. Furthermore, teachers are required to identify a range of different classroom management styles and meet the learning needs of students with a range of backgrounds, abilities, socioeconomic levels and disabilities (Kirchner, Evans, & Norman, 2010; Wang & Hartley, 2003). Recent reforms of teacher education have also encouraged teachers to cultivate student discussion, pose problems and incorporate inquiry, shifting the focus from a teacher-centred to a learner-centred approach (AC&LEQ, n.d.; Bell, 2010; Cornish, Bannister-Tyrrell, Charteris, Jenkins, & Jones, 2018; Lin, 2002) that also includes students in decisions about learning intentions and success criteria (AITSL, n.d.; NSW DEC, 2014).

Current Practices and Challenges

The importance of practical (field, clinical) experience in teacher preparation has been widely accepted and thereby has formed an integral part of teacher education in order to develop classroom skills (Bacharach, Heck, & Dahlberg, 2010; Moore, 2003). Pre-service teacher practical experience has been considered the most common way to link theoretical knowledge with daily classroom practice (Bacharach et al., 2010). Nevertheless, the time invested in student practical experience varies widely across teacher preparation programs and the traditional model and views of student teaching have not changed significantly over the years. What was written two decades ago (Korthagen & Kessels, 1999) remains largely true.

Historically in Australia, teacher education students spent their initial weeks of their first in-school placement observing classroom practice. Experience in teaching was gradually introduced, eventually leading to full responsibility for the classroom (Bacharach et al., 2010). Finding suitable student-teacher placements can also be challenging during times when in-school assessments are conducted. Participating teachers are less inclined to leave their classroom or put their mentee teacher in charge during this critical time (Bacharach et al., 2010).

It has been reported that early career teachers (ECT) often feel overwhelmed in their initial years of teaching (Allen, 2009; Calandra, Gurvitch, & Lund, 2008; Cornish & Jenkins, 2012; Feiman-Nemser, 2001; Flores, 2006; LaBoskey, 1994; Le Maistre & Paré, 2010). ECTs have been observed to struggle when attempting to apply theoretical knowledge of content and pedagogy whilst at the same time engaging and interacting with students and dealing with the complexities of diverse classroom situations (Ball, 2000; Blomberg, Stürmer, & Seidel, 2011; Calandra et al., 2008; Koc, 2011; Seidel, Blomberg, & Renkl, 2013). Moreover, procedural concerns such as classroom management, time management and sustaining an orderly classroom that facilitates learning are considered important concerns of ECTs, rather than the actual process of teaching and learning (Cornish & Jenkins, 2012; Koc,

2011; Moore, 2003). These observations have been reiterated by ECTs themselves, commenting that they felt inadequately prepared to teach in the diverse range of classrooms with children of different backgrounds (i.e., non-English speaking, disabilities, lacking motivation and low socioeconomic disadvantage) (Stuart & Thurlow, 2000).

In the past years, university-based teacher education has been critiqued for failing to bridge the gap between theory and classroom practice (Borko, Liston, & Whitcomb, 2006; Seidel et al., 2013). Educators have been described as being disconnected with a focus on other goals such as research and enhancing promotional pathways (Borko et al., 2006). During pre-service teacher placement, Zeichner (2010) states that clinical placement is generally guided by the daily activities of the participating teacher, having no planned structured learning goals for the pre-service teacher and failing to connect practice with university education. Furthermore, teacher education has been proposed as lacking evidence-based data on teacher education student teaching experience and student learning outcomes in the classes they teach (Bacharach et al., 2010; Rovegno, 1993).

Creating an effective learning experience and environment that links theoretical knowledge to practical experience has been considered fundamental in bridging the theory and practice gap in teacher education (Korthagen & Kessels, 1999; Seidel et al., 2013). Recent reform of teacher education, encouraging individual and collaborative reflection, guided field experiences and case study analysis, has been considered an effective approach to enhance pre-service teacher learning (Korthagen & Kessels, 1999; Wang & Hartley, 2003). The use of video technologies such as television, digital video, video-conferencing and multimedia applications (i.e., internet) have all been recognised as important tools to facilitate reform and bridge the gap between theory and practice (Borko et al., 2008; Dymond & Benz, 2006; Marsh et al., 2010; Rich & Hannafin, 2009; Seidel et al., 2013; Sherin & van Es, 2005; Wang & Hartley, 2003; Welsch & Devlin, 2007).

Importantly, the need for teachers to demonstrate reflective practice has been recognised. The use of technology, such as video, has been identified as the most promising practice to develop these reflective skills (Hatton & Smith, 1995; Welsch & Devlin, 2007). The rapid growth of digital technologies has created new opportunities for learning, however, a number of challenges have also been created. How technologies are integrated into teacher education and their impact on teacher learning and practical skills are such examples (Borko et al., 2009).

Although video has been used in teacher education since the 1960s, video technology has gained interest and popularity in three main areas of teacher education; professional development, self-examination and lastly, reflection of classroom interactions (Sherin & van Es, 2005; Wang & Hartley, 2003). Sherin and van Es (2005) advocate that video technology plays a significant role in helping teachers learn to ‘notice’ classroom interactions and to develop new ways of ‘seeing’ what is happening in the classroom. The capacity to ‘notice’ classroom interactions is considered a key feature in teaching proficiency (Llinares & Valls, 2009; Sherin & van Es, 2005; van Es & Sherin, 2002) and technology can be used “to capture in real time what teachers notice in the classroom during teaching ,.. In addition, reflection interviews with teachers after instruction provide insight into why they notice the things that they do” (Luna, Russ, & Colestock, 2009, p. 1). Furthermore, integrating video in the learning experience provides access to classroom interactions which may be overlooked during the act of teaching itself (Borko et al., 2008; Sherin & van Es, 2005). Using videos ensures that all teacher education students observe the same, carefully selected practices rather than being subject to the vagaries of different experiences in different schools (Dymond & Bentz, 2006). Discussion and reflection are thereby enhanced through the viewing and analysis of the same classroom interactions.

Capturing permanent records of classroom interactions allows pre-service teachers to view and analyse these interactions at any time, on multiple occasions, and the derived experiences can be accessed remotely without the need to rely on memory (Borko et al., 2009; Hong & Trepanier-Street, 2004; Rosaen et al., 2008; Sherin & van Es, 2005; van Es & Sherin, 2002). Video records also create a novel experience where students or teachers can reflect on practices and interactions in their own time (Sherin & van Es, 2005). Additionally, video excerpts can be used to focus on particular features of teaching and be manipulated to guide conversation, interpretation and reflection of classroom practices (Borko et al., 2008). Dymond & Benz (2006, p. 111) caution that "[t]echnology, in and of itself, does not enhance learning. It is what we do with it, and how we choose to use it during instruction, that ultimately has potential to strengthen pedagogy, and in turn, student outcomes".

Conversely, video-based learning requires teachers and teacher educators to continually keep up with ever-changing and developing technologies (Borko et al., 2009). Educational institutes must also maintain resources to support this technology as it advances or when updated. An ongoing financial investment by universities is thus required to support technology advancement in this area (Borko et al., 2009).

Video-based Professional Development

Professional development (PD) is considered fundamental to support reform and the everyday practice of teaching. Dede et al. (2009), however, stated classroom teachers often become frustrated with PD as it is either considered ineffectual or requires a large investment of time. Additionally, evidence-based data on how to provide high quality PD is limited (Borko et al., 2008). A PD program that can fit with a teacher's busy schedule and provide an interactive authentic experience has directed focus on technologies such as video and online support programs (Borko et al., 2008; Borko et al., 2009; Dede et al., 2009; Stuhlman et al., 2009). The same situation would be considered to apply to initial teacher education students (Coffey, 2014), many of whom at [the university] are mature aged, have families and existing work commitments.

The use of more contemporary technologies is thought to augment PD programs as they have the capability of supporting large numbers of teachers and potentially at a lower cost (Borko et al., 2009). For example, the annual cost of PD in Chicago was estimated to range from $US2,000-7,900 per teacher; that is $193 million in 2002 (Hamre et al., 2009). Additionally, video recordings are considered unique as they highlight aspects of classroom interactions including conversations that may not be noticed by an observer or when conducting a lesson (Borko et al., 2008). Permanent records of classroom practice support PD programs allowing teachers to analyse them when time permits (Borko et al., 2008).

A range of video-based programs such as *Virtual School Field Experiences, Video Analysis support Tool (VAST), Video Analysis Tool (VAT)* and *Video Clubs* have been designed specifically for PD and are often seen integrated in mathematics and science teacher education (Dede et al., 2009; Rich & Hannafin, 2009; Sherin & Han, 2004; Sherin & Van Es, 2009; van Es & Sherin, 2002; Wilkens et al., 2014). Video-based learning has been acknowledged as enhancing teachers' professional vision, reflection and interpretation of classroom practice thereby improving teaching practices (Blomberg et al., 2011; Borko et al., 2008; Welsch & Devlin, 2007). Video-based programs may involve the assessment of other teachers' classroom instruction or of their own classroom instruction (Borko et al., 2008). Nevertheless, not all instructive approaches are considered suitable for video-based learning; some may be more effective via face-to-face teaching (Dede et al., 2009).

A video-based mathematics professional development study conducted over a two-year period, *Supporting the Transition from Arithmetic to Algebraic Reasoning* (*STAAR*), was designed to use video in a structured manner and address specific goals (Borko et al., 2008). The study concluded that teachers learnt new pedagogical strategies during video-based discussions and the participants realised that they all struggled with similar issues or concepts. Overall, participants found video-based PD a positive and valuable experience (Borko et al., 2008). The ability to stop and re-play select classroom scenes provided a range of interactions for PD leaders to focus their teaching and learning and foster discussion (Borko et al., 2008; Welsch & Devlin, 2007).

Video Clubs, incorporating a group of teachers to collectively watch and discuss excerpts of their classroom recordings, have also been considered an effective method to enhance PD and support reform (Sherin & Han, 2004). This method engages teachers in collaborative reflection in a way that is very different from their usual classroom practice. It enhances inquiry, learning and critiquing of peer classroom practice (Sherin & Han, 2004). Furthermore, teachers learn to focus their discussions on pedagogical issues in terms of student thinking (Sherin & Han, 2004; Sherin & van Es, 2005).

Hong and Trepanier-Street (2004) described how utilising video technology provides a rich problem-solving context that fosters thinking and reflection by both children and teachers. In situations where children were involved in social conflict, video recordings viewed together, by the children and their teacher, supported discussion on feelings and reflection on their behaviour. This experience also facilitated teacher reflection upon children's development and their role as a teacher (Hong & Trepanier-Street, 2004).

The Classroom Assessment Scoring system (CLASS) program, which aims to evaluate the quality of teacher–children interactions, has integrated video-based learning to support assessments (Hamre et al., 2009). Hamre et al. (2009) stated that video was an invaluable resource for teachers to watch and reflect on their interactions with children. A *CLASS* video library comprised of recordings demonstrating exemplar teaching interactions supports reflective practice. Social and academic development are considered to be based on effective teacher–child interaction. Not all children in early childhood education are exposed to effective teacher–child interactions and programs such as *CLASS* are considered valuable in providing PD support to improve these classroom interactions (Hamre et al., 2009).

Despite the widespread use of video in PD, there is limited research on its efficacy in teacher learning (Borko et al., 2008). Moreover, to be an effective tool in PD programs, it is recommended that excerpts should be selected to address specific program goals which are incorporated within activities to support teachers' progress towards those goals (Borko et al., 2008). Such targeted learning goals have been explored in studies conducted by Sherin and van Es (2009), including new pedagogical techniques (e.g., problem solving), developing knowledge or learning to notice classroom interactions.

Video in Initial Teacher Education

The use of video to develop pre-service teacher' reflection through self-examination of their own teaching is considered to enhance deliberate thinking about action and improvement (Coffeytm 2014; Hatton & Smith, 1995; Welsch & Devlin, 2007). In order to evaluate teaching practices, teaching and learning need to be observed as they take place within a classroom. Recording lessons using video technology is considered an effective tool to review these practices (Welsch & Devlin, 2007). Rosaen et al. (2008) propose that studying video recordings may shift a teacher education student's focus from vague perceptions to more complex and evidence-based analysis. Additionally, when used as part of

a stimulated recall (Calderhead, 1981) episode, where a video is viewed and discussed immediately after a teaching episode, video technology provides immediate feedback and accurate data on pre-service teacher performance providing a more reliable account than memory-based reflection (Calandra et al., 2008; Wang & Hartley, 2003; Yerrick et al., 2005).

Three independent, self-video-based studies referenced by Wang and Hartley (2003) concluded that video technology assisted with attitudes and behaviours relating to teaching. However, it was noted that none of these studies assessed the influence of attitude change. Additionally, little was known about student judgment and how it differed from professional judgment and their performance (Wang & Hartley, 2003). In another study with a focus on classroom management, student-generated video activities improved motivation, understanding of content, empathy, and the construction of professional identity (Koc, 2011). However, it was suggested that the active role of pre-service teachers as actors, directors, and camera crew in video recordings, rather than passive viewers, was largely accountable for student motivation and interest (Koc, 2011). Nevertheless, participants concluded that visualisation and engaging in experimental learning by simulating classroom scenes improved their comprehension and confidence in classroom management (Koc, 2011). Students also reviewed their student peers' recordings which prompted multiple discussions with different points of view, which were considered to lead to a better understanding of classroom management. Further research, however, was recommended to investigate the influence of pre-service teachers' technology adoption (Koc, 2011).

In a study conducted by Welsch and Devlin (2007), video recording was reported to enhance student reflection in areas of technical skills and overall perception of teaching episodes. As per previous studies, the level of reflection was more accurate than in alternative analysis based on memory. Additionally, students commented that video-based reflection enhanced their thinking of what they would do differently in the lesson and promoted self-improvement. This result was consistent with findings of a similar study conducted by Calandra et al. (2008). Welsch and Devlin (2007), however, added that the study highlighted the need to introduce a clear framework for viewing videotapes, providing common ground for reviewing lessons and discussing teaching and learning. These findings were also consistent with research conducted by Rosaen et al. (2008), which reported that video-based reflection of classroom practice generated more specific comments about their teaching than writing from memory and that it diverted reflections on classroom management to a focus on instruction. Additionally, pre-service teachers were less focused on themselves and more on the children, a focus that is not often attained without several years' teaching experience (Cornish & Jenkins, 2012). The ability to slow down teaching performance facilitated detailed noticing and classroom discussion. This study nevertheless concluded that more research was required to establish how understanding of teaching practices promotes analysis, reflection and critical thinking in different subject matter contexts (Rosaen et al., 2008).

More advanced video-based technology, such as the *VAST* software, has been explored in pre-service teacher education to self-analyse teaching practices (Rich & Hannafin, 2009; Sherin & van Es, 2005). *VAST* imports digitised video from classrooms and the software provides a series of scaffolds to analyse teacher practice such as student thinking, teacher's role and classroom discourse. A series of questions within each subject matter prompts the student-teacher's response. Generally, the software aims to stimulate interpretation of complex classroom interactions and promote the exploration of multiple explanations for events noticed (Sherin & van Es, 2005). In a comparative study conducted with six teachers using *VAST* software and six not using *VAST*, pre-service teachers were required to reflect on classroom interactions. Findings suggested that *VAST* supported teachers in identifying significant features based on evidence and directed their focus of analyses to those areas. Ultimately, participants learnt to 'notice' classroom interactions.

Teachers not using *VAST* were less inclined to interpret classroom interactions (Sherin & van Es, 2005).

At the University of Sussex, an interactive video-based software, *In-School Teacher Education Project (InSTEP*), was evaluated in a two-year study of science trainee teachers (Marsh et al., 2010). *InSTEP* differs from *VAST* by having video cameras and broadband technology installed at the university and in participating schools. The technology supports live audio and video feed, in both directions between the classroom and the university, hence delivering real-time interactions. Discussions arising from classroom observations can be made available through the video system as required (Marsh et al., 2010). Additionally, this technology offered a four-way split screen option so at any time during a lesson, the teacher and groups of pupils can be observed simultaneously. The video cameras could also be manipulated by the university educator at any point in the lesson to redirect focus (Marsh et al., 2010).

Marsh et al. (2010) advocate that live video provides opportunities for university-based observation and discussions of real-time remote classroom practices, illustrating complex social interactions and events as they occur. The technology also illustrates interactions of trainees with classroom practitioners, tutors, peers and/or pupils. A range of different strategies for dealing with diverse classroom situations can also be demonstrated. Marsh et al. (2010) state an additional benefit of *InSTEP* is that classroom dynamics were not affected, unlike the situation that generally happens when observers are physically present in schools. It was reported that *InSTEP* provided a greater range of classroom practices and exposure to teaching practices, and promoted peer reflection and discussion with practical learning about school classrooms within a university setting. Equally, trainees developed their ability to analyse practice and use *InSTEP* as a teaching resource (Marsh et al., 2010).

A number of other video-based software programs have been made available to support pre- service teacher education, including *VideoPaper* and *Video Tracers* (Rich & Hannafin, 2009). The use of video-based software, however, requires a great investment of time and effort by teacher educators (Rich & Hannafin, 2009; Yerrick et al., 2005). Yerrick et al. (2005) argue that educators need to be familiar with students' practicum and must play a significant role in order to support designing, developing, implementing and recording lessons. Teachers must be tech-savvy and competent with the technical aspects of new digital tools, having the knowledge and skills to effectively integrate them in education and inspire student learning (Borko et al., 2009). Software programs may require teachers to learn additional skills to use technology and/or upload or edit videos (Rich & Hannafin, 2009). Furthermore, educators need to seek and obtain the video equipment by means of purchasing, borrowing, or reserving from the university technology or media departments. These requirements are considered a pathway that some teacher educators do not wish to choose (Yerrick et al., 2005).

Field experience may find pre-service teachers in a classroom where what they are expected to do may be inconsistent with what they are required to learn in their programs (Wang & Hartley, 2003). However, an authentic context is required to develop teaching skills. Video-based reflection of actual teaching practices is thought to resolve these issues and has become a popular resource for develop teaching skills (Koc, 2011; Seidel et al., 2013; Wang & Hartley, 2003; Wilkens et al., 2014). Once again, this approach is also thought to help bridge the gap between theory and practice (Seidel et al., 2013).

A study using a video-based approach to mathematical instruction concluded that pre-service teachers learnt to develop ideas on ways to solve real, situated problems (Lin, 2005). Group discussions on video cases enhanced reflection on the actions of others whilst different perspectives from peers contributed to deeper understanding. Overall, the video-cases

motivated pre-service teachers to identify problematic situations from multiple perspectives and engage students when implementing challenging mathematical tasks (Lin, 2005).

Wang and Hartley (2003) stated that video technology used to reflect on teacher practice provides opportunities to see alternative ideas and approaches in action. Three independent studies reviewed by Wang and Hartley (2003) concluded that videotapes of actual teaching practices were useful for uncovering pre-service teachers' ideas about teaching, instructional technique and developing confidence in teaching. Video also helped with developing knowledge and improving pre-service teachers' ability to identify effective practice (Wang & Hartley, 2003). Furthermore, video technology was considered to be effective in developing skills to identify children's behaviour and learning problems.

Wang & Hartley, 2003, however, suggest pre-service teachers' prior conceptions and experiences often influence their observations and interpretation. Additionally, limited data are available on how these prior conceptions influence classroom teaching practices and if the observational and interpretational skills learnt by video can be applied in the classroom. Wang and Hartley (2003) concluded that further research was required to assess what pre-service teachers believe to be exemplary teaching and to assess how pre-service teachers examine teaching from multiple perspectives and representations. These recommendations emphasise the crucial role of the teacher educator in guiding analysis and reflection.

Video-based software, *Video Interactions for Teaching and Learning* (*VITAL*), was evaluated at the University of Columbia to enhance pre-service teacher education (Rich & Hannafin, 2009). The video-based program aimed to facilitate training student-teachers on how to observe children closely and interpret their behaviour. Similar to *VAST*, the program enables creation of video segments. *VITAL*, however, differs from *VAST* as it encourages thinking through essay writing based on events recorded rather than a scaffolded analysis with guided prompts. *VITAL* was reported by pre-service teachers to help connect theory with their own teaching practice (Rich & Hannafin, 2009).

Wang and Hartley (2003), however, state that more qualitative studies designed to understand the complex process of pre-service teachers' thinking, and its change in the video technology environment, are required. Additionally, long-term studies that monitor pre-service teachers to determine if lasting change occurred are also warranted. This finding is consistent with that of Sherin and van Es (2005) who state there is a lack of data evaluating the correlation of a teacher's ability to notice video classroom interactions and interactions during actual teaching instruction.

Implementation of Video Technology

Rich and Hannafin (2009) advise that video technology requires a framework to guide interpretation of classroom interactions. Seidel et al. (2013) advocate that video is not effective in itself and must be embedded in appropriate instructional context with clear objectives in mind. To link theory with practice, clear rules pertaining to basic knowledge of effective principles of teaching and learning are considered fundamental. Integrating rules and video is largely based on learning objectives and can be implemented in two ways; the illustration of rules, which are used in the context of schools and classrooms (*rules–example*), or the demonstration of action from which rules are derived (*example–rules*). Seidel et al. (2013) went on to investigate the two approaches as they related to pre-service teachers' knowledge. Their findings suggested that the *rule–example* model promoted and fostered factual knowledge and pre-service teachers were more capable of applying their knowledge to assess videotaped classroom situations. The *example–rule*, however, promoted the use of knowledge to identify challenges in planning a lesson (Seidel et al., 2013). This investigation

highlighted that more research, based on the impact of video-based instructional approaches, on pre-service teachers' adoption of knowledge, is required to facilitate informed decisions on the effective use of integrating video.

Summary of the Literature

The benefits of video-based learning as a supportive educational tool and for providing a permanent record of classroom interactions that can be viewed multiple times without the demands or distractions of daily classroom practice are evidenced in the literature reviewed. Video-based technology appears to provide an authentic but virtual learning environment to support classroom reflections, professional development and self-assessment. Analysis of videos of other teachers' classroom practice has been noted to reduce anxieties and foster confidence in pre-service teaching practice.

Although video technology provides an alternative and often novel learning experience, this technology may also create challenges such as establishing effective ways to integrate technology in teacher education to foster effective learning. Importantly, more research appears necessary to establish effective practices. Rich and Hannafin (2009) state that video and reflection tend to be strong on ideas, however, evidence of impact is lacking. Peer-reviewed journal articles which examine the effects of video tools on teacher practice or student learning are limited. Nevertheless, research iterates that video should not be regarded as effective in itself and must be integrated with clear objectives (Ball, 2000; Borko et al., 2006). Furthermore, no singular approach to teacher education is considered to exist and video-based tools must not be accepted as a stand alone or in isolation (Borko et al., 2006; Seidel et al., 2013; van Es, 2009;).

Video-based technology may actually create further challenges for teacher educators. More time is required to learn the technology and seek appropriate equipment. Teacher educators need to be tech-savvy and develop ongoing knowledge to keep up with advances in relevant technology. Further investment of time may not be favoured by those educators who are comfortable with more routine and traditional approaches (Rich & Hannafin, 2009). Additionally, ethical issues are considered a risk associated with implementing video-based learning. Clear standards to safeguard identity, data and define the purpose of accessing data also need to be established (Rich & Hannafin, 2009).

[The university] Initial Teacher Education Courses and Practicum Placements

[The university], School of Education (SOE), provides a number of pathways to qualify as a primary or secondary school teacher. In 2017, undergraduate qualification as a primary school teacher was available through the Bachelor of Education (Early Childhood and Primary), Bachelor of Education (K–6 Teaching) and combined degree Bachelor of Education (Primary)/Bachelor of Disability Studies. Undergraduate qualification as a secondary school teacher was available through the Bachelor of Education, with appropriate discipline study in Secondary Arts, Mathematics, Music, Science or Information Technology. Postgraduate qualification to teach was available through the Master of Teaching (Primary) or Master of Teaching (Secondary). The Bachelor of Education (K–12) was available to qualify to teach in both primary and secondary school, while the Bachelor of Education (Early Childhood and Primary) qualified graduates to teach at both early childhood and primary levels. Note that as of 2017, early childhood teachers were not subject to the AITSL

graduate teacher standards and practicum experiences in early childhood settings have not been included in the following analysis.

The number of practicum placements required is dependent upon the course and the year of enrolment, with changes in course rules modifying the unit codes attached to placements in a number of programs in recent years. As an illustration, Table 1 shows the practicum placements for primary/secondary school required in each course under rules applicable in 2017.

Course	Placement 1	Placement 2	Placement 3	Placement 4	Placement 5
M Teach (Secondary)	XXXX540 (10 days)	XXXX550 (20 days)	AAAA560 (30 days)		
M Teach (Primary)	XXXX540 (10 days)	XXXX550 (20 days)	AAAA560 (30 days)		
B Ed (Secondary)	ZZZZ101 (20 days)	AAAA302 (20 days)	YYYY324 (20 days)	BBBB302 (20 days)	
B Ed (Primary)	ZZZZ101 (20 days)	AAAA219 (20 days)	YYYY324 (20 days)	BBBB302 (20 days)	
B Ed (Early Childhood and Primary)	ZZZZ101 (20 days)	AAAA301 (20 days)	YYYY323 (15 days)	BBBB302 (20 days)	YYYY323 (25 days)
B Special Ed (Primary)/Bachelor of Disability Studies	ZZZZ101 (20 days)	AAAA302 (20 days)	YYYY352 (20 days)	BBBB302 (20 days)	

Table 1: 2017 Course Rules, Practicum Placement Requirements

As can be seen in Table 1, the first practicum placement in 2017 can be done in one of two units, depending on the program of study the student is enrolled in. Commencing in 2016, the ODS was included in the unit XXXX540 in the graduate-entry programs, while the traditional in-school observation placement was maintained for ZZZZ101 in undergraduate programs. Thus, for the second practicum placement, a student completing the unit XXXX550 completed the ODS in the pre-requisite unit XXXX540, while students completing the units AAAA302, AAAA219, AAAA301 and AAAA302 completed the traditional in-school placement in the pre-requisite unit ZZZZ101. The requirements for the in-school practicum associated with ZZZZ101 are summarised in Table 2.

Week	Practicum Requirements
Week 1	Classroom immersion, small-group and team teaching, assisted planning and teaching a full session on Day Five (guidance from the supervising teacher)
Week 2	Working towards teaching 2 lessons each day (with assistance from supervising teacher)
Week 3	Exploring a range of teaching strategies with clear learning goals, and assisted planning for teaching of up to 10 hours in the week
Week 4	Planning for and teaching no less than 10 hours per week and transitioning students between sessions.

Table 2: Weekly Guide — PrEx1 20 days at a glance

The ODS in XXXX540 requires teacher education students to view a series of videos of real classroom situations where different educational contexts are presented. The students then use both qualitative and quantitative observation scaffolds to report their observations. Reflection based upon a comparison of these observations with the academic literature was also required. Collaboration with peers in the unit and with the unit coordinator are required as a part of the reflection process. Each video has specific foci and may involve issues relating to classroom behaviour management and/or a specific aspect of effective teaching and learning. The videos were produced in conjunction with a number of local primary and secondary schools. Because the length of the placement is mandated by the accreditation

approval, measures were put in place to ensure a weekly commitment equivalent to spending a day in school. Engagement with the content by the teacher education students to establish they have completed the required time commitment is measured using Moodle analytics and through the completion of compulsory weekly assessment tasks.

Methodology

At the conclusion of each in-school practicum placement, a single report is completed by the teacher education student's mentor teacher/s. For 2017 practicum reports, mentor teachers reported against each graduate standard descriptor (see https://www.aitsl.edu.au/teach/standards), with the provision for a single comment to be made against each of the seven standards. The practicum experiences analysed for this report were graded on a four-point scale, N – Not Developed, P – Partially Developed, D – Developed and E – Exceeds Expectations at this Stage, and were scored for analysis from 0 (Not Developed) to 3 (Exceeds Expectations). Reports were available as PDF documents and all data entry was done manually into Excel and then imported into SPSS for analysis. The final dataset comprised 342 placement reports, with 162 students completing the ODS. To facilitate analysis of performance against the standards as a whole, a summative mean index score for each standard was calculated by adding together the result on each of the standard descriptors and dividing by the number of standard descriptors. Reports where a standard descriptor was not graded by the mentor teacher were not included in this analysis.

The summative mean index scores for each standard were analysed using an independent samples *t*-test. This parametric test was considered appropriate for use as it has been demonstrated to be robust for violations of normality (Edgell & Noon, 1984). Analysis of performance against a single descriptor was done using a Mann-Whitney *U*-test due to the ordinal level of measurement of the data.

The analysis of the practicum data was guided by the following research question: *What differences exist in relation to the preparedness of initial teacher education students at [the university] to meet the AITSL graduate teacher standards on their second practicum placement based upon whether they had previously completed the ODS or an in-school placement?*

Summary of Responses Against Standards

An independent samples *t*-test was conducted for each mean standard result using participation in the ODS as the control variable. The results are summarised in Table 3.

	Online DEM School			In-school Placement					
Standard	*N*	$\bar{X}$	SD	*N*	$\bar{X}$	SD	*t*	*df*	*p*
1	136	2.020	0.548	162	2.047	0.469	0.471	296	0.638
2	148	2.176	0.485	163	2.145	0.445	0.578	309	0.564
3	142	2.177	0.511	165	2.156	0.441	0.355	281	0.723
4	161	2.200	0.521	176	2.202	0.477	0.065	335	0.948
5	150	2.001	0.536	170	1.960	0.501	0.712	318	0.477
6	156	2.271	0.517	175	2.219	0.476	0.958	329	0.339
7	143	2.229	0.493	168	2.180	0.444	0.921	309	0.358

Table 3: Independent samples *t*-test for mentor teacher gradings on mean standard scores based on completion of online demonstration school

The analysis indicates there were no significant differences between the practicum placement results for students on their second placement based upon whether they had completed the ODS or an in-school placement for their first placement. It should be noted that, for standards 2, 3, 5, 6 and 7, the mean result for students who completed the ODS is higher. Mann-Whitney *U*-tests were conducted to compare mentor gradings at the standard descriptor level to determine if there were any significant differences in specific areas within the standards. Table 4 summarises the analysis.

Descriptor	Online DEM School		In-school Observation				
	N	Mean Rank	*N*	Mean Rank	*U*	*Z*	*p*
Standard 1							
1.1	162	166.1	179	175.4	13,708.5	-1.029	0.304
1.2	162	176.1	180	167.4	13,840	-0.974	0.330
1.3	158	166.4	175	167.5	13,733	-0.122	0.903
1.4	143	148.7	167	161.3	10,966.5	-1.432	0.152
1.5	162	168.2	180	147.5	14,045	-0.648	0.517
1.6	148	154.1	172	166.1	11,773.5	-1.343	0.179
Standard 2							
2.1	162	179.1	180	164.7	13,351	-1.557	0.120
2.2	162	179.6	180	164.2	13,266	-1.631	0.103
2.3	161	175.0	179	166.4	13,679	-0.973	0.330
2.4	**150**	**148.7**	**165**	**166.5**	**10,977**	**-2.058**	**0.040**
2.5	162	171.8	179	170.3	14,375	-0.161	0.872
2.6	161	173.2	179	168.1	13,975.5	-0.554	0.580
Standard 3							
3.1	162	181.0	180	162.9	13,039	-1.918	0.055
3.2	162	170.9	180	172.1	14,479.5	-0.124	0.902
3.3	162	173.7	180	169.5	14,228	-0.446	0.655
3.4	162	176.0	180	167.4	13,846	-0.913	0.361
3.5	162	168.3	180	174.4	14,061	-0.640	0.522
3.6	156	175.2	179	161.7	12,833.5	-1.450	0.147
3.7	143	149.5	166	159.7	11,084	-1.179	0.239
Standard 4							
4.1	162	174.8	180	168.6	14,053.5	-0.660	0.510
4.2	162	168.0	180	174.6	14,016	-0.695	0.487
4.3	161	164.5	178	175.0	13,441	-1.085	0.278
4.4	161	170.6	179	170.4	14,399	-0.014	0.989
4.5	162	176.2	179	166.3	13,661.5	-1.068	0.286
Standard 5							
5.1	161	174.9	180	167.5	13,865.5	-0.826	0.409
5.2	161	177.0	180	165.6	13,523	-1.229	0.219
5.3	157	169.4	177	165.9	13,602	-0.394	0.693
5.4	155	165.4	177	167.4	13,551	-0.223	0.824
5.5	151	164.4	173	160.9	12,776	-0.391	0.695
Standard 6							
6.1	160	172.5	176	164.9	13,446	-0.864	0.388
6.2	159	169.3	177	167.8	13,953	-0.153	0.878
6.3	162	177.3	179	165.3	13,485	-1.268	0.205
6.4	158	173.0	177	163.6	13,198	-1.018	0.309
Standard 7							
7.1	160	170.8	178	168.4	14,039.5	-0.257	0.797
7.2	158	174.8	176	161.0	12,756	-1.535	0.125
7.3	148	156.3	169	161.3	12,112.5	-0.575	0.565
7.4	149	169.5	174	155.6	11,843.5	-1.573	0.116

Table 4: Mann-Whitney U-tests for standard descriptor grading on second practicum placement based on completion of the online demonstration school

The analysis indicates that only standard descriptor 2.4, Demonstrate broad knowledge of, understanding of and respect for Aboriginal and Torres Strait Islander

histories, cultures and languages, demonstrates a statistically significant difference, with students who had completed the ODS being graded at a significantly lower level. The difference in grading for standard descriptor 3.1, Set learning goals that provide achievable challenges for students of varying abilities and characteristics, is close to statistical significance, with students who have completed the ODS being graded higher. Further research would be required to investigate the reasons for these differences.

Concluding Discussion

The literature review supported the use of video as a means of providing an authentic, virtual mode of professional development for initial education students. The implementation of the use of the ODS reflects the views of Seidel et al. (2013), in that video use should be embedded within the instructional context of an academic unit (in this case, XXXX540) and include instruction on how the video is to be used within a framework of quality instruction.

The analysis of the data available for the second practicum placements for the 2017 academic year indicated that completion of the ODS in XXXX540 produced students who were as classroom ready for their second practicum placement as those who completed the traditional in-school placement in ZZZZ101. It should be noted that the ODS is considered the equivalent of only 10 days of in-school observation but is producing comparable outcomes to a 20-day in-school placement building to a small teaching load by the end. While there are limitations on this study due to students who completed the ODS all being enrolled in graduate-entry courses, this lack of difference in teacher preparedness does appear to positively answer the question posed by Wang and Hartley (2003) in relation to whether the interpretational skills learnt by video can be applied in the classroom. It also supports the findings of Lin (2005), that video-based instruction allows teachers to develop ideas on ways to solve real, situated problems.

The importance of this finding must be considered within the context applicable at [the university] for initial teacher education. Firstly, many of the students in initial teacher education programs, irrespective of their course enrolment, are mature age and have substantial commitments in terms of employment and family. The capacity to complete the first practicum placement through the ODS provides great flexibility and allows engagement at times that suit the student, rather than having to complete 20 days of full-time in-school placement. It also means that the university does not have to organise and fund well over 300 or more in-school placements each year. The lack of any significant difference across all but one of the AITSL standard descriptors (standard descriptor 2.4) indicates that the ODS is providing opportunities to develop the capacity of students across all standards.

There appear two opportunities available to increase the impact of the ODS in initial teacher education programs. When the ODS was implemented in 2016, it was introduced into XXXX540 only. In 2018, it has been introduced as the first practicum placement in several programs and is now completed in the units XXXX104, XXXX106 and XXXX540. These units are coordinated and delivered by different staff members using different pedagogical approaches. This situation will allow for future research to investigate which pedagogical approaches provide the optimum outcomes for the ODS and for implementing in all courses the findings of such research.

A second opportunity exists to use the ODS, perhaps with the inclusion of additional resources, to support students who have not met the proficiency requirements of a practicum placement. Where a mentor teacher grades a student as not meeting the standards expected in a practicum placement, the student could be supported in their development by using the ODS prior to their being allowed to complete a subsequent placement.

The comparison of mentor teacher assessments for students completing and not completing the ODS is encouraging. While considerable investment in time and resources is needed to film and edit the videos, design appropriate learning tasks for each video, and monitor student compliance in terms of engaging with the videos and related assessment tasks, the effort seems to be warranted in terms of several factors (e.g., cost savings as mentioned above). Primarily, however, the effort seems to be warranted in terms of suitable preparation of teacher education students for their first in-school placement .

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