Action Research as Evidence-based Practice: Enhancing Explicit Teaching and Learning through Critical Reflection and Collegial Peer Observation

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Abstract: In an era where teachers are increasingly being asked to demonstrate evidence of their impact, action research is identified as a practical and critically reflective research approach for enhancing explicit teaching and learning. Using a historical perspective, foundations for reflective practice and action research in educational contexts are explored. A discussion of the processes and techniques that may be employed, including how collegial peer observation is embedded to strengthen application is provided. An action research model, encapsulating the approach discussed, demonstrates its practicality for teachers to engage in critically reflective practice and provide an evidence-base for their work. As teacher-led research becomes more accessible, it is suggested that this may have positive implications for future teaching practice.

Keywords: Action research, critically reflective practice, evidence-based practice, explicit teaching and learning, teacher's professional learning, collegial peer observation

Introduction

Notions of quality teaching and learning are now underpinned by standardised processes of measurement, comparison, reporting and accountability in many Western countries (Lipman, 2010). Business driven models (Mahony & Hextall, 2000), have changed the way a number of schools are run and the expectations of teachers. Policy makers, government and education authorities, request demonstrable evidence and justification of education outcomes, resulting in accountability measures including, professional standards for teachers and learning benchmarks set through national high stakes student testing**.**

In Australia, this adoption of rigorous accountability measures in education has impacted significantly on schools, teachers and students. In 2008, following the lead of countries such as the U.S. and U.K. (Wiliam, 2010), the Education Council in Australia introduced a national annual literacy and numeracy test for students in years 3, 5, 7 and 9, the National Assessment Program - Literacy and Numeracy (NAPLAN) (Australian Curriculum, Assessment and Reporting Authority (ACARA), 2016). The National Assessment Program also tests samples of years 6 and 10 students in science literacy, civics and citizenship and communication technology (ICT) literacy on a rolling 3-year structure. Soon after the implementation of the national assessment regime, the MySchool website was established, which supports national transparency and accountability of Australia's schools, by publishing nationally-consistent school-level data (ACARA, 2010). These performance indicators changed the educational landscape for many schools as publicly available results had wider implications, such as, the allocation of school funding and resources and overall perception of

schools due to rank and comparison. Despite protest from teachers and educational experts about why such emphasis should be placed on these national standardised tests; pointing to the fact that this is an unrealistic measure due to obvious limitations and bias as not all students perform well under such conditions and that this is only one form of assessment; the tests have remained. In addition, there has been the adoption of the Australian Professional Standards for Teachers as the basis for a national approach to teacher registration and promotion (Australian Institute for Teaching and School Leadership (AITSL), 2011). These standards include sets of expectations for 4 stages of a teacher's career, graduate, proficient, highly accomplished and lead teacher. Teachers are required to demonstrate appropriate knowledge and understanding for their level of experience and provide evidence of having met the relevant standards in order to be promoted.

Accountability measures have also impacted initial teacher education courses as the Australian Teacher Education Ministerial Advisory Group (TEMAG) provided recommendations in 2014 on how courses could be improved to better prepare new teachers with the practical skills needed for the classroom. Recommendation 27 of the policy states that, "Pre-service teachers develop a Portfolio of Evidence to demonstrate their achievement of the Graduate level of the Professional Standards" (TEMAG, 2014, p. xvi). This is further supported by recommendation 28 of the policy, which requires higher education providers to work with schools, "to assist pre-service teachers to develop and collect sophisticated evidence of their teaching ability and their impact on student learning for their Portfolio of Evidence" (TEMAG, 2014, p. xvi). As a result of these recommendations, 2 consortia of Initial Teacher Education (ITE) providers were granted funds by the Australian Institute for Teaching and School Leadership to design Teacher Performance Assessments (TPA) (AITSL, 2017). Since 2018, the performance-based assessments have been implemented by Australian universities within their ITE courses and in combination with the Australian Professional Standards for Teachers to provide a multi-tiered approach to accountability for graduate teachers entering into the profession. This consistent and clear messaging about accountability measures and the requirement of evidence-based practice used to demonstrate achievement of teacher professional standards and the impact of student learning outcomes is now an embedded expectation across educational contexts.

The notions of accountability and what might constitute as an evidence-base for teacher practice are complex, multifaceted and highly contested (Crawford & Tan, 2019; Gorur & Koyama 2013; Jerrim & de Vries 2017; van Ingen, McHatton & Vomvoridi-Ivanovic 2016). This article does not attempt to problematise and philosophise the challenges and considerations associated with what may or may not constitute appropriate evidence of teacher practice or student learning. Rather, based on the current climate, this discussion acknowledges the requirement for teachers both in Australia and abroad to establish an evidence-base for their practice across diverse educational contexts. However, it has been identified that teachers have largely been left to their own devices, with little guidance about ways to develop evidence of their practice effectively and efficiently. As a result of my recent work with schools in Australia, and as an experienced teacher-led researcher myself, I have come to recognise this as a major challenge for teachers and schools. Government policy documents are littered with expectations and requirements, but provide little practical advice concerning the how, what and why. It is in this context that action research is proposed to be a practical and critically reflective research approach for understanding, developing and enhancing explicit teaching and learning. It is suggested that such a research approach can be a powerful way to build an evidence-base for teachers professional learning and assessing the impact of pedagogy on students' learning. A historical overview of both reflective practice and action research will be presented in turn to provide a foundation for the approach. This will be accompanied by an explication of the action research design principles, processes and techniques considered in this context, including how collegial peer observation is embedded

to strengthen application. The discussion will culminate in the presentation of an action research model that is proposed that teachers can use to assist in engaging with critically reflective practice and provide an evidence-base for their work.

Reflection and Critically Reflective Practice

'Reflection' or 'critical reflection' and 'reflective practice' are often used interchangeably. While these terms all involve ongoing scrutiny of practice based on identifying the assumptions that may be underlying the practice, they can be considered somewhat distinct in their theoretical principles and application. It is useful to consider the origins and premise of 'reflection' and 'critically reflective practice' in order to understand how critically reflective practice might be used as a driver for action research and collegial observation.

Reflection is considered as a process or activity that is fundamental to the development of practices (Dewey, 1933, 1938; Loughran, 1996). Socrates' exemplified the notion of reflection as 'the examined life', a way of approaching and understanding one's life through ethical and compassionate engagement with the world and its moral dilemmas (Nussbaum, 1997). Retaining connotations associated with cognition, thinking processes and contemplative self-examination, 'reflection' is regarded as a metaphor for representing a process of learning from experience and predominantly associated with acts of cognition that are linked to asking questions about learning that focus on 'how' rather than learning 'about' or 'what' (see Arlin, 1990; Csikszentmihalyi & Sawyers, 1995; Dewey,1933; Goodman, 1984; Loughran, 1996). Dewey (1933) defined reflective thinking as a number of phases that considered not only a sequence of ideas, but a consequence that would result in an outcome and in turn, an evolving sequence of new ideas would emerge. This has had a profound impact on the way teachers can approach their professional learning. Drawing on both the work of Dewey (1933) and Goodman (1984), Loughran (1996) considers reflection as an approach to thinking that is both deliberate and purposeful that stem primarily from ways of responding to problem situations, particularly in teaching and learning. In educational contexts this idea has been extended and popularised by the notion of the 'reflective practitioner'.

Schön extended on Dewey's (1933) principles of reflection through observing how practitioners think in action and distinctly developed the professional artistry of the 'reflective practitioner'. This was embedded within Schön's (1983) 'epistemology of practice' model, which consisted of two forms of reflective thinking: reflection-in-action and reflection-on-action. The first acknowledges the tacit process of thinking that accompanies the act of 'doing', which constantly evolve so that learning takes place as a result of interaction and modification of ongoing practice. While it is recognised that much of this thinking remains unconscious and tacit (Greenwood, 1993), reflection-in-action can include addressing unanticipated problem situations that require reframing the problem or improvisation so that the experience can be viewed through a different lens or perspective (Gibbs, 1988; Loughran, 1996). Contrastingly, reflection-on-action is described as deliberately and systematically thinking back over one's actions (Munby & Russell, 1990) and in the educational context, it is viewed as teachers' thoughtful consideration and retrospective analysis of their performance to construct knowledge from experience. Schön's epistemology of practice model was timely and well received within teacher education and research, particularly for its reaction against an instrumental notion of teaching, the teacher as technician implementing the knowledge of others in practice (Schön, 1983; 1987). The thinking processes of the reflective practitioner remain an essential element of developing teachers' professional learning, shared knowledge and the understanding of practice that

should be fostered at all levels of the teaching profession.

The literature on reflection presents a strong problem finding and solving thread as a means of learning from experience either in the moment or retrospectively. In this context, cognitive psychologists place particular emphasis on 'critical thinking', defining reflective practice as developing a critical stance or viewpoint towards one's own practice or that of their peers (Johnston & Badley, 1996; Klein, 2008; Moon, 1999). Critical theorists have extended Schön's two reflective thinking processes with the addition of 'reflection about action' providing teachers with a lens to reflect on the social, economic and political purposes and conditions of teaching and learning, as well as the classroom, school and other educational contexts (Beauchamp, 2014; Zeichner, 1993; Zeichner & Liston, 1996). However, its primary purpose is the explication and articulation of teachers' meaning construction while engaging with teaching and learning across diverse contexts.

There appears to be two primary ways to engage with 'critical reflection'. The first proposes to impact change on ingrained or fundamental assumptions through the process of examination or unearthing of new knowledge and perspectives (Mezirow, 1991). The second involves reviewing practice with the intent of detecting hegemonic assumptions that result in better awareness of "submerged and unacknowledged power dynamics that infuse all practice settings" (Brookfield, 1998, p. 197). Both these approaches to critical reflection concern the ability to be transformative, leading to a fundamental change in practice (Cranton, 1996; Williams, 2001). Shulman and Shulman (2004) propose that critical reflection is a core element of learning and that reflection is in turn the key to teacher learning and development.

The term 'reflection' is applied widely and is recognised as a fundamental element of engaging with 'reflective practice', to understand and improve professional practice. The distinction between 'reflection' and 'critical reflection' is also described by many researchers (Fook, 1999; Fook & Askeland 2006; Moon, 1999), however, critical reflection appears predominantly in the education field (Beauchamp, 2014; Brookfield, 1995, 1998; Cranton, 1996; Loughran, 2002; Mezirow, 1991). Part of the complexity in defining exactly what reflective practice and critical reflection may be is due to its application across diverse discipline areas and the resulting conceptual development of these ideas from vastly different fields from both research and practice traditions. However, the terms 'reflection' and 'critically reflective practice' are not mutually exclusive, but as explained, can be based on similar assumptions and processes of thinking. These ideas continue to form the basis of much of the contemporary thinking about the nature of reflection, critical reflection and the development of effective reflective practitioners in the teaching profession. Critically reflective practice in this context involves making decisions that are deliberate and explicitly articulating the dynamic interplay between thinking and action. Shulman (1987) terms this 'the wisdom of teaching', so that teachers may become thoughtful and learn from their work.

The Role of Critically Reflective Practice in Teachers' Professional Development and its Relationship with Action Research

'Reflection' and 'critically reflective practice' are considered central to the professional development of teachers as teaching and learning involve complex processes that occur in diverse multidimensional environments and contexts. There is a general assumption that there is not necessarily one right approach to teaching and learning (Crawford, 2019a; Loughran, 1996; Tripp, 2011). Evaluating teaching through deliberation, articulation and reconstructing past understandings, experiences and practices can lead to improvement (Glasswell & Ryan, 2017; Loughran, 1996; Newman, 2018) and avoid perpetuating ineffective practice (Argyris & Schön, 1976). Critically reflective practice provides a means from which to challenge personal assumptions and values about teaching

and the theories that are used to drive the approaches employed. In this respect, its relationship to 'action research' becomes even more pronounced as being a critically reflective practitioner is considered essential to the professional development and growth of teachers who are regarded as inquirers engaging in both self-study and collaborative research within or outside of their educational contexts, schools and classrooms.

Driven by the Aristotelian concept of praxis, Grundy's (1995) participatory action research sought to understand how external societal influences may underpin individual practices. Central to this work is the concept of 'criticality', the turning points that provide insight as to where the boundaries of knowledge and understanding begin and end, and the degree of their permeability on developing practice. Critical praxis for educators is intended to "move beyond the constraints of formal teaching, knowledge and curriculum and instead encourages communities, teachers and students to work together in producing new understandings and practices" (Arnold, et al., 2012, p. 281). Grundy (1987) advocated the need for deliberate and deep reflection that required of practitioners that they make their understandings of their work explicit, which required an examination of how those understandings emerged and were shaped by the conditions and contexts of their work. Accountability and standardisation continue to dictate the culture of positivism, which in turn exerts a profound impact on the nature of educational research. If teachers are to be researchers, provide evidence-based practice and create knowledge about teaching, then they need to develop critical perspectives and understanding of the ontology of positivism (Kincheloe, 2012; Kress, 2011; Smyth, 1989). "Only then will teachers understand positivistic research and be empowered to act in opposition to the policy implications which come from it" (Kincheloe, 2012, p. 79). This paradigm shift in the role of the teacher being one that implements existing theory in practice to generating knowledge of practice is consistent with contemporary expectations of the profession. It not only ensures that teaching and learning is progressive, innovative and responsive to the needs and requirements of society, but also that teachers can provide evidence for what they do, how and why. Factors that influence the extent to which this may occur can be attributed to teacher experience and career stage, the effects of organisational and cultural contexts that may impact on opportunities for professional growth, and because teachers may have varying ways to evaluate practice through reflection, if at all (Crawford, 2019b). Crawford's (2019b) study that explored teachers' implementation of high impact teaching strategies exemplified the importance of establishing a consistent and rigorous approach for engaging with critically reflective practice. The principles and techniques that are embedded within action research, provide both the systematic rigour and flexibility necessary to develop an evidence-base for practice in a range of diverse and complex education contexts and settings such as that in the study mentioned.

Lewin first coined the term 'action research' in his 1946 paper, *Action Research and Minority Problems* where he described it as: "comparative research on the conditions and effects of various forms of social action and research leading to social action" (p. 35). He suggested a spiral of steps, where each cycle included planning, action and fact-finding to investigate the result of an action. While Lewin's social change efforts made him the pioneer of action research, in education, some trace the conceptual roots back to the progressive views of Dewey in the 1920s (Mertler, 2009; Pelton, 2010). It was not until Stenhouse's (1975) notion of the 'teacher-as-researcher' that 'action research' and 'critical reflection' became interrelated. The primary aim of action research in educational contexts is to change and improve that which is being investigated (Ali, 2020; Atkin, 1993; Carr & Kemmis, 1986; Elliott, 1991; Hendricks, 2009). The reflective inquiry processes embedded within action research are framed and interpreted by the epistemology of the action research model being used that are intended to result in teachers becoming more effective and empowered practitioners. While action research has a long tradition in education, the contemporary

discourse around evidence-based practice has instigated a resurgence about the value of such an approach for developing critically reflective practitioners (McTaggart, et al., 2017). Providing educators with a way to understand, interpret and analyse the complex and multifaceted issues presented in a localised or context-specific environment that uses a systematic and rigorous research frame, may allow for the findings to be applied to a wider context or other educational settings. This provides opportunities for such research to be replicated and potentially make a greater contribution to the development of the profession. Compared to other research methodologies, action research is based on the premise that local conditions vary widely and that the solutions to such complex educational problems cannot be found in generalised facts that take no account of local conditions, hence the issue with standardised measures. There is a misconception that action research is associated primarily with qualitative methods, which may be a result of the commonly-held view that "action-oriented work cannot be scientific (precisely because it involves action) and the additional assumption (erroneous in our view) that quantitative research must be more scientific than qualitative research" (Greenwood and Levin, 1998, pp. 6-7). Action research can use qualitative, quantitative and mixed methods. In fact, studies indicate that mixed methods in education research has increased in the recent past, including within action research, due to its flexibility, rigour and as it provides a range of data to demonstrate evidence for practice (Ali, 2020; Crawford, 2019b; Crawford & Tan, 2019). Being a reflective practitioner is an essential part of teaching and the development of teachers professional learning. Action research can be used to demonstrate evidence-based practice through exploring the techniques, strategies, behaviours and attitudes of professional actions and decisions of teachers (Crawford, 2019b; Pelton, 2010). The next two sections detail the mechanics of how action research has been used in the studies referred to and how its application has been strengthened in practice to embed an important collegial peer observation component, which is distinct from previous action research models.

The Mechanics of Action Research in Context

Action research provides a means to not only develop evidence-based practice, but also to formally or informally determine the impact of pedagogy on student learning, develop curriculum and program initiatives and respond to education policy and school reform. Challenging and questioning one's own practice is an expectation of the professional work of a teacher and an embedded part of the wider systemic culture of the school or education context. Many effective teachers will engage in a form of reflection as tool for self-assessment and evaluation. However, reflection in action research is a deliberate process and a key component of the methodology. It is characterised by a cyclical approach that is planned, systematic, iterative and critical, alternating between action and reflection, continuously refining methods and interpretations based on understandings developed in earlier cycles (Mertler, 2009; Crawford, 2019b). While the focus of action research may be about one's own practice, it has the potential to significantly improve education outcomes holistically by incorporating change in a collaborative capacity with the common goal of improving practice. Educators have direct access to the research findings in order to implement immediate change as a result of engaging in systematic critical reflection. The research is situated in a localised context and focused on an identified local issue, acknowledging the importance of unique educational contexts, which may not always be resolved by findings that are generalisable. Finally, the research is conducted by and for the educator as well as the learners and the findings result in an action or change implemented by the educator that is justifiable, credible and authentic (Crawford, 2019b; Kennedy-Clark, et al., 2018; Mills, 2003).

While the basis of the recommendations in this paper are derived from Crawford's work across Australian schools, one particular study is drawn on (2019b). This study was particularly significant because the aim of the project was to develop teachers understanding and implementation of high impact teaching strategies (HITS). This was a new government initiative, part of the Framework for Improved Student Outcomes (FISO). The focus was to work with schools to increase teachers' professional efficacy in the explicit teaching and learning of these HITS, but also to develop teachers' research capacity to investigate the impact of their practice on their students' learning. Teachers had been left to their own devices trying to decipher how to transition from the government's previous Curiosity and Powerful Learning model to FISO and then somehow demonstrate evidence of their practice. The schools involved were considered high performing, regardless of demographics and had teachers and leadership teams committed to developing pedagogy and sharing professional knowledge. These schools became 'model schools' for demonstrating practice to other schools in the districts and regions partaking in professional development opportunities through the wider school network.

Hendricks (2009) describes four primary action research approaches, which can be summarised as follows:

- Collaborative action research: Share expertise and foster dialogue among multiple stakeholders, which may include school and university personnel or teachers and school administrators.
- Critical action research: Evaluate social issues where the results are then used to drive social change. This normally involves a wide collaboration including university researchers, school administrators, teachers and community members.
- Classroom action research: Improve classroom/tutorial practice or in the wider school/university context to change theory and practice. This involves teacher/s in their classroom/tutorial, examining issues and problems to find innovative solutions.
- Participatory action research: Explore practices within social structures, to challenge power differences and unproductive ways of working that lead to transformational changes of theory and practice. This involves the collaboration of stakeholders in a social process.

Classroom action research and participatory action research were identified in the abovementioned study as highly valuable approaches to build an evidence-base for teacher practice and as a tool for critical reflection. The benefits of using such approaches in education have been identified by Crawford (2019a) as means to provide opportunities for teachers and pre-service teachers to:

- Develop knowledge directly related to practice and focusing on improving practice, such as, establishing links between the impact of pedagogy on student learning outcomes.
- Engage with systematic critical reflection and informed decision making.
- Foster openness to new ideas and encourage creativity, critical thinking and innovation.
- Encourage collaboration and the development of teaching teams or professional learning communities/partnerships.
- Encourage rethinking about how teachers and students' work is assessed and evaluated.
- Challenge rhetoric and policy about what should and should not be considered appropriate data for improving teacher practice and respond to educational issues in unique and localised contexts.
- Provide rich sources of qualitative and quantitative data that can be used for policy, curriculum and pedagogical development.
- Justify with authority the purpose for decisions made and methods used.

- Raise the status of the teaching profession through increasing understanding and mutual respect among educators, policymakers, students and the community about the rigorous processes involved in teachers work.

There is a compelling argument to be made for the value of using classroom and or participatory action research as a tool for critical reflection and to build an evidence-base in teacher practice.

Action research is a non-linear and systematic process, involving stages that are strategically repeated as a response to research findings. Four different action research designs have been summarised in the following table to distinguish the number of processes or stages in one cycle and what this might entail:

Stages	Description of process (Johnson, 2012)	Description of process (Alber, 2011)	Description of process (Pelton, 2010)	Description of process (Stringer, 2008)
1	problem identification	choosing a topic	issue identification	look (systematically gathering information)
2	literature review	literature review	data collection	think (analyse information and reflect)
3	planning for data collection	implementation plan	action planning	act (devise solutions and implement)
4	data collection and analysis	data analysis and display	plan activation	-
5	creating an action plan	discussing findings	outcome assessment	-
6	putting the plan into action	-	-	-
7	evaluating data	-	-	-
8	sharing the findings	-	-	-

Table 1: Four action research designs

While action research designs may differ (see Table 1), the processes encompassed in a cycle appear to have common elements, for example, they all indicate formulating and implementing a plan on a specified issue or problem. It is these common elements coupled with the ideas of Hendricks' (2009) approaches that were used to provide the foundation for Crawford's 2016 action research model, considered an effective tool to engage with critically reflective practice. The question of what is different to previous action research designs is detailed in the following section, including an extension of the 2016 model that incorporates a key peer observation element found to be critical when demonstrating and developing explicit teaching and learning.

Action Research Model with Embedded Collegial Peer Observation

After working extensively in diverse educational contexts and with a range of educators at all stages of their career, the author understood the importance of developing effective techniques and processes for critical reflection and the direct impact that the application of these skills and knowledge can have on practice and wider education outcomes. As a teacher-led researcher and researcher practitioner, the author has always valued evidence-based practice and strongly held the view that this can raise the status of the profession and awareness of the critical work of educators. However, it has been difficult to continually see government driven industry mandates and expectations applied with little regard to the resources and guidance teachers may require or the impact that this will have on teachers work and initial teacher education courses. These professional experiences, issues and factors as well as the common mechanical elements found in previous action research designs (Table 1) have all contributed to the development of the model illustrated in Figure 1.

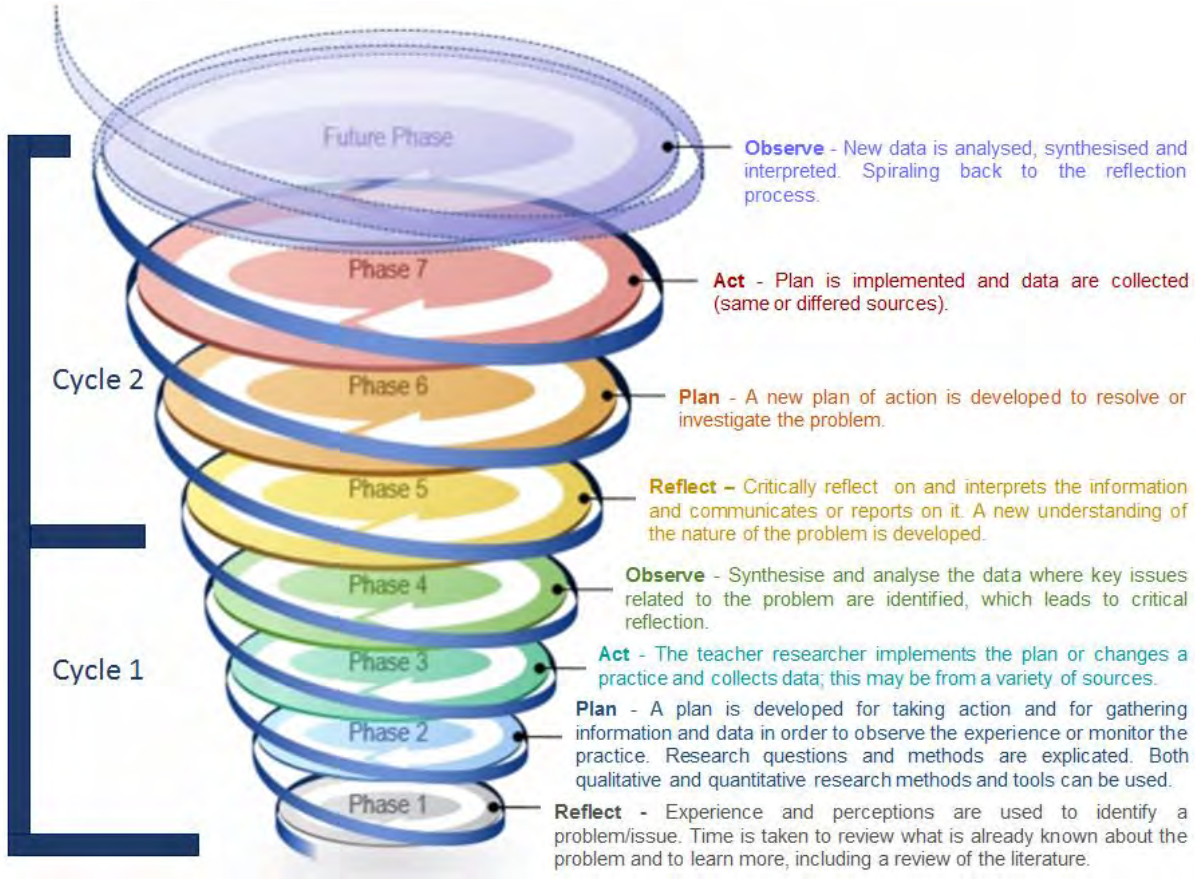

Figure 1. Crawford's 2016 'Action research design principles' (cited in Crawford, 2019b).

The action research design principles in Figure 1 are represented by a spiral with two cycles encompassing 8 phases or stages. There are 4 phases in each cycle with the process starting from Phase 1 Reflect. For this to be considered action research, a teacher should have at least two cycles intended in their design (Pelton, 2010; Stringer, 2008;) and why the second cycle is represented by the continuation of the numbering sequence at Phase 5 rather than a return to Phase 1. The reflections and actions implemented as a result of the findings in the first cycle will inform the next and if more than two cycles are required, then the knowledge and understandings developed in previous cycles will determine the focus of further reflection and action. In Phase 1 a problem or issue is identified that ignites the development

of a plan, which is then implemented and acted upon. This includes the identification of what data might be useful to collect, which can be in the form of qualitative, quantitative or mixed methods. Some examples may include, but are not limited to, field notes (e.g. descriptions of people, places, activities), lesson plans, classroom layouts, student work samples, journals, observations, surveys, interviews, focus groups, student results and learning outcomes data, etc. The data collected are synthesised, analysed and interpreted. In the study mentioned, the overall issue concerned ways to investigate the implementation and effectiveness of HITS on student learning. Data collection involved lesson plans, student work samples, student surveys, teacher journals and classroom observations. Teachers analysed the data using content and thematic analysis techniques, which were demonstrated to them. The strategies and techniques used for analysis are dependent on the research methods used and in turn will mirror the practices associated with those. Findings are shared and disseminated, which then leads to the beginning of the next cycle, which will be reflective of a new understanding of the nature of the problem or issue, including the generation of new knowledge and theory about practice. Figure 1 highlights the systematic and iterative nature of each cycle, which builds on previous knowledge, insights and understandings. Figure 2 provides a detailed set of steps and processes that should be considered in the first cycle, which encompass the first 4 phases before a return to the identified issue or problem in Phase 5.

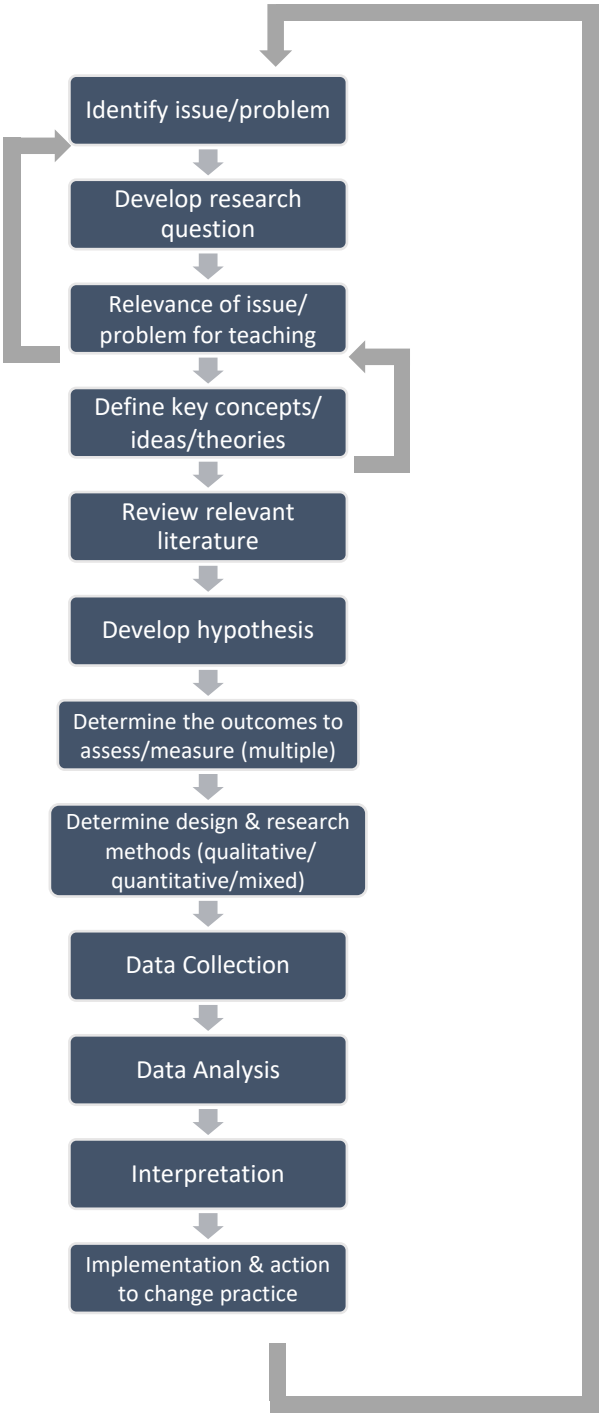

Figure 2. Detailed set of steps in the first action research cycle.

Figures 1 and 2 illustrate layered elements of the action research model proposed in Figure 3, which has been tested in a range of school and educational contexts across a number of years. The overall outcomes and level of engagement with the critically reflective processes required may differ as a result of teaching experience, education context, willingness to conduct research and school culture. However, it has been found that the design principles and processes are highly effective in improving practice, responding to contemporary education issues and making research accessible to teachers and pre-service teachers regardless of their career stage (Crawford, 2019b). This is based on the positive outcomes of recent projects and feedback that indicated that teachers predominantly valued using action research to develop critically reflective practice, perceiving it as a practical way

to provide authentic evidence and justification of what they do, how and why (Crawford, 2019b; 2020). These ideas are further supported by the findings of Kennedy-Clark et al. (2018) who highlighted the importance of addressing pre-service data literacy and suggest action research as a way to develop teacher research skills and authentic professional knowledge.

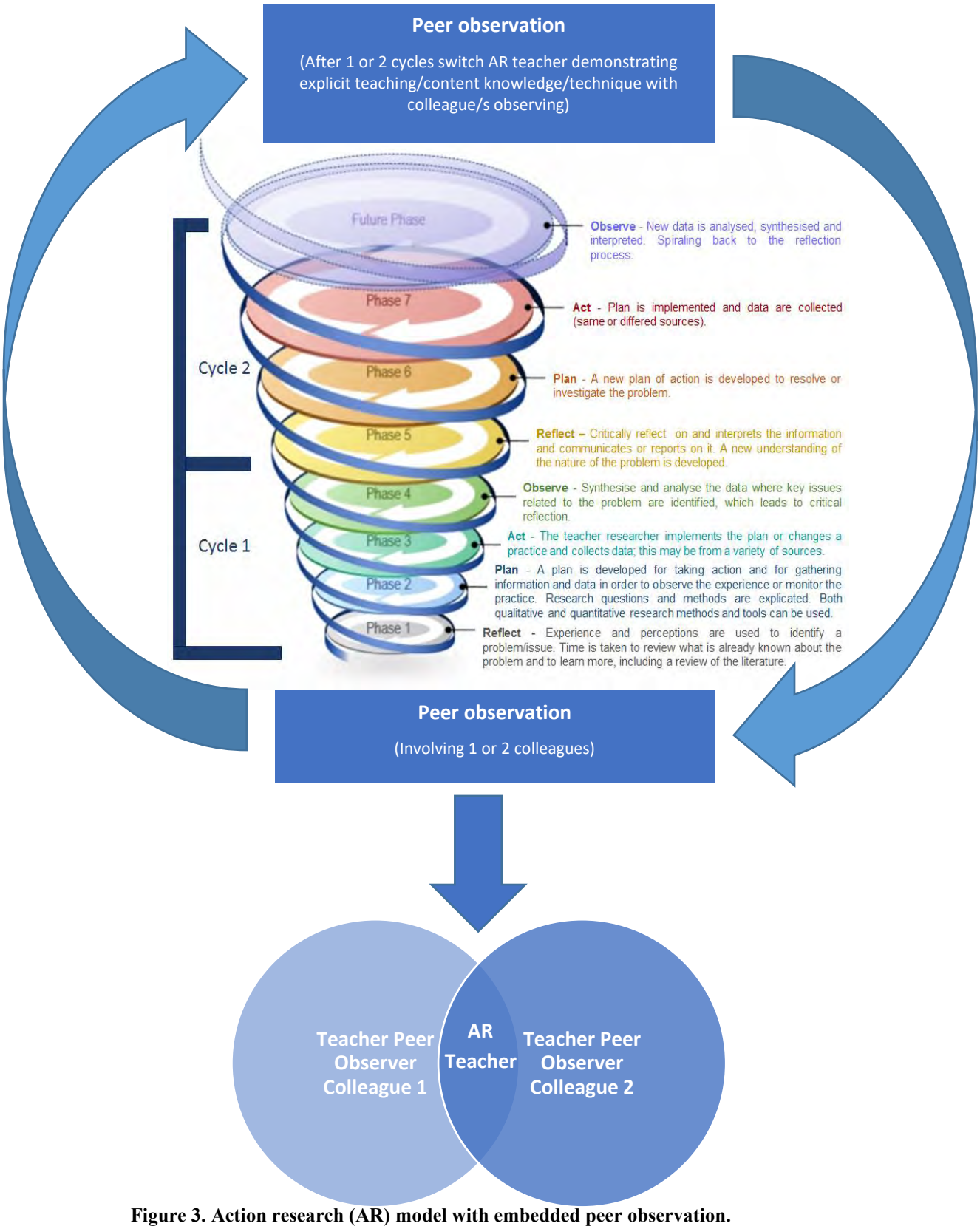

Figure 3. Action research (AR) model with embedded peer observation.

In a particular case study school (Crawford, 2019b), the task was not only to work with the teachers to develop critically reflective practice using action research, but find ways in which explicit teaching and learning can be demonstrated, replicated and modified based on new understandings and learnings. After working with the school for one term (10 weeks), and teachers had managed to work through two cycles of the action research model, the collegial peer observation was introduced. This was embedded as an overlay to the action research model presented in Figure 1. This entailed the action research teacher to be observed teaching their class by one or two colleagues and in turn engaging in the demonstration of practice. In the case study, the action research teacher was explicitly teaching a high impact teaching strategy regarding creative and critical thinking, the development of student metacognitive thinking processes. Time to discuss this peer observation should be provided either directly after class or as close to this time as possible. In this discussion the action research teacher should be given an opportunity to talk about what they did, how and why from their perspective. Reference to the lesson plan with detailed links to the lesson sequence and curriculum is important to aid in this analytical and constructive discussion, including a consideration of any modification to the practice demonstrated. The action research teacher should then observe their peer delivering the same lesson or where they engage with the same high impact teaching strategy. Table 2 illustrates an outline of the observation protocol and the reflective questions prompts.

Professional learning intention	Using the higher impact teaching strategies the teacher will identify an area of focus for the peer observation process. Teachers working collaboratively will formulate strategies to implement and improve their practice and document evidence of this.	
Primary focus and agreed evidence:	Critical and Creative thinking curriculum – metacognition	
Secondary focus and agreed evidence:	Chosen Higher impact teaching strategy (HITS)	
	Teacher	**Peer Observer**
Pre Lesson	Meet with your colleague/s.	Make sure you have the observation sheet (Appendix A) and HITS information and related curriculum relevant to the teachers chosen focus.
	Discuss your selected HITS and the aspect you wish to focus on during the observation process.	Ensure you and your colleague are clear on what the focus will be and what you will be observing.
	Negotiate how long you wish your observer to be in the room.	Ensure you have a copy of the lesson plan and sequence, with appropriate links to curriculum.
	Plan your lesson with your area of focus in mind.	
During Lesson	Teach your lesson.	The role of the observer is to record observations based only on what you have seen and heard that pertains to the previously determined focus (A camera lens with a predetermined focus).
		This process is based on descriptive observations and feedback not evaluative observations.
		Observer may stay for the entire lesson or leave according to prior arrangements.
		The observer should not interact with the students.
Post Lesson	Teacher reflects on lesson, making notes in preparation for feedback session.	Share your recorded observations. Do you have any questions to clarify with the teacher after the observation?
	Reflective questions prompts relating to the chosen HITS: 1.How do you feel the lesson went? 2.What aspects of the lesson were you pleased with? Why? 3.What aspects of the lesson concerned you? Why? 4.If you were to repeat this lesson, what would you do differently?	Allow your colleague to share their reflections on the lesson. Think about: 1.What could you take from this lesson and apply to your own class? 2.What would you do differently to enhance learning for your own students? 3.How will you adapt your teaching based on this observation?
	During discussion with your colleague/s develop some strategies that you intend to implement with your class in the coming weeks. Document these.	Collaboratively identify strategies that can be implemented in the coming weeks.

Table 2 Observation protocol outline and reflective question prompts

The development of this model was significant for this school setting as it was intended to be used as both a mentoring tool as well as a way to encourage a community of practice for pedagogical development and critical reflection of self and others. This is comparatively different to the designed based research process emanating from the engineering science traditions commonly found in action designed research, which focus on the intervention stage of the cycle, often as part of a co-created industry-based project (Mullarkey & Hevner, 2019), The model posed in Figure 3 does not just focus on the high impact teaching strategy or intervention, but the collegial development of critically reflective practice as a way to build capacity and professional learning. Previous studies suggest that peer observation can be used effectively to promote reflective learning for professional development, whereby teachers become proactive in their learning from each other through collegiality and dialogue based on authentic and real-world issues (Bell & Mladenovic, 2015; Sandt, 2012). While there are studies in the past that indicate using an action research approach to investigate peer observation (e.g. Sandt, 2012; Tezcan-Unal, 2018), the design principles are not explicated. Further, they do not consider peer observation embedded within

action research, therefore the model developed in Figure 3 is an extension of some of this work and the 2016 model (Figure 1). The cast study school referred to have adopted this model as a way for teachers to engage in professional learning and provide an evidence-base for their practice.

Ethical Considerations and Practical Challenges of Conducting Action Research

Objectivity and rigour of the methodology in action research are critical points for consideration as credibility, reliability, trustworthiness and validity are a times prematurely discredited and scrutinised on the basis that the researchers are educators directly involved (McNiff & Whitehead, 2000). All research traditions require the acknowledgement of researcher bias and ways to mitigate this. Like other methodologies, this can be overcome in action research by the production of objective evidence (Greenwood & Levin, 1998; McNiff & Whitehead, 2000) through the systematic and rigorous approach applied to methodology as described in Figure 1. Objective data is achievable by having multiple sources of data collection and can be balanced with more subjective forms of data (Sagor, 2000, 2004). The use of multiple data sources to make informed decisions about practice is now an expectation of teachers work and action research is consistent with this requirement (Crawford, 2019b). The production of objective data must consider issues of credibility, reliability, dependability, neutrality and confirmability. Revealing any potential bias and or discrepant data are an important part of the critically reflective process, which leads to the implementation of changing practice. If action is to be viewed as credible, the planned action must build knowledge and understandings towards solving the problem or issue identified (Mills, 2003). Credibility relies on the researcher's ability to consider the complexities of particular settings and to identify patterns not easily explained. Although the findings about changed practice may contribute and apply to wider professional contexts, generalisability is not the aim of action research, and data is not collected to validate existing practices. Rather, it is about making improvements to develop educational practice that is context-specific and accounts for localised conditions.

The nature of action research is more open ended and may change in focus depending on the issue or problem being investigated. While this develops the processes involved with critically reflective practice, it does present some unique challenges associated with conducting the research itself. For example, there is very little distance between the researcher and the subjects, which in many cases includes a teacher and their students. Teacher-led researchers are "insiders responsible to...students whose learning [they] document" (Zeni, 1998, p.10). The peer observation element in the study described helps to mitigate this. It can also be technically argued that although in cases of classroom and participatory action research that students are naturally living through the teacher researcher's instruction, informed consent should be applied where appropriate (Sagor, 2000). Pseudonyms should be used for research participants and all data should be anonymised. Where possible and depending on the issue being investigated, research tools and data that would be considered as going beyond what would ordinarily be developed or collected in the classroom context, such as a survey, should be administered by a person not involved with the class directly. If using observational data, it can be useful to have colleagues conduct the classroom and teaching observations with opportunities to debrief following a lesson or activity. This provides an additional dimension to the critically reflective process and establishes opportunities to develop practice collaboratively (Crawford, 2019b; Pine, 2009), consistent with the model presented in Figure 3. Despite the challenges, the principles applied to ethics in action research require the same consideration, rigour and systematic approach as found in other research methodologies. If action research occurs within the

higher education context or is conducted in a school or education context in collaboration with a tertiary institution, this is subject to governing ethics protocols. This requires an application for the project to be submitted to the university ethics committee and for researchers to thoroughly consider all aspects of their project as well as ethical considerations prior to commencing. The principal, regional director or another body in charge of the school may need to be provided with an application for approval to do the project, but this will be dependent on each individual circumstance (Hendricks, 2009). Consent forms and explanatory statements detailing project aims, time commitment, procedures, data collection (type, frequency and how it is intended to be used), expected outcomes and ethical considerations, may need to used. This will be dependent on whether the findings from the research will be disseminated in a public forum, for example, a publication, a presentation at a school event or a conference paper (Mertler, 2009: Hendricks, 2009).

Engaging with critical reflection through action research provides a set of clear processes that supports beginning teachers with how to embed professional learning in their work and experienced teachers with ways to pursue ongoing professional development (Kane & Chimwayange, 2014). Despite the value of using action research to improve practice, teacher-led researchers and researcher practitioners should be aware of some important challenges that need to be factored in to their research. Although action research is commonly used in small-scale studies, it does require time and commitment to work through the considerations of each phase of the cycle and carefully handle data in order to use the findings to inform practice and provide an evidence-based for decision making. Time management is an important consideration, which can impact on the potential research scope, quality of the data and overall project (Fraser, 2007). The teacher-led researcher is completing this work on top of their normal teaching and administrative workload. Therefore, the planning stage is imperative to ensure projects are structured efficiently and in turn work commitments can be balanced appropriately (Drucker, 1994; Clift et al., 1988). This is particularly important when collegial peer observation is embedded in action research. Crawford (2019b) used the model in Figure 3 as a way for teachers to demonstrate and develop explicit teaching and learning, requiring observing teachers to organise time for teaching relief. A commitment from the school about such professional learning will be required so that it is implemented and engaged with effectively as part of whole school teacher practice.

For pre-service teachers in particular, teaching is perceived as something you ‘do’, but do not necessarily reflect or think about in the moment or retrospectively (Wideen, Mayer-Smith & Moon, 1998). Given the important role of critical reflection in understanding, developing and enhancing explicit teaching and learning, it is suggested that action research can be used as a practical way to build these important skills and knowledge, which have become an expected part of teachers’ ongoing professional learning and development. However, action research requires considerable thought and a broad-based understanding of the project focus or aim. Formulating the reason why data collection is required can support the implementation process and analysis of data (Lam, 2016). Finding time to engage with reading literature on the topic being investigated and writing can be challenging, but schools can assist by investing time in the teacher and the project (Lambirth & Cabral, 2017). This is particularly important given that demonstration of evidence based-practice is an expectation of teachers work. Therefore, action research should not detract from normal teaching work, but rather be embedded within it, in turn avoiding teachers having to prioritise their teaching over research (Elliott, 1991). As Loughran indicates, “the busyness of teaching creates an environment in which the ‘doing of teaching’ becomes paramount in order to manage their (ever increasing) expectations; especially in relation to improved student learning and the Standards regimes of education and accreditation boards” (2019, p. 532). Given the continuously increasing demands of teachers and educators, action research has been

identified as an effective and efficient way to develop a portfolio of evidence to demonstrate informed decision making and practice development (Crawford, 2019b). Further, embedding a collegial peer observation element can encourage a community of practice that raises ethical standards and data objectivity.

Concluding Thoughts and Implications for Practice

Recently, educational systems across Western countries have seen a significant shift in focus towards a business driven approach. This is having a profound impact on schools, teachers and students who are now subject to an array of accountability measures designed to drive change, inform policy, allocate funding and resource provisions and assess what constitutes quality in education. Concurrently, in Australia the Professional Standards for Teachers (AITSL, 2011), the TEMAG (2014) recommendations and TPA (AITSL, 2017) require educators to regularly and efficiently implement methods in their teaching and educational contexts that will demonstrate an evidence-base for achieving or exceeding standards, benchmarks for employment commitments and targets for promotional opportunities. If considering implications for practice beyond the increasing list of competency checkboxes, there is an imperative for teachers to reflect on their work and to evaluate their impact on their students.

The declaration of the growing crisis in the education profession was sparked by an increased questioning of professional authority and infallibility. The shift to manage professional practice through measurable systems of accountability has been responded to with an acknowledgement that there is an increasing need for reflective practice (Gould, 1996; Schön, 1983) and given the complex and multidimensional nature of education that this could be a more effective and authentic way to demonstrate evidence of practice (Crawford, 2019a). While it could be argued that processes involved in reflection could be regarded as antithetical to the more quantifiable and technocratic systems of managerialism. It is suggested that critical reflective practice can be seen as part of the same imperative, making professional practice more accountable through a systematic and ongoing scrutiny of the principles upon which it is based. Schön's (1983, 1987) 'epistemology of practice' model was discussed as the reflective practice theories were found to support why reflection is central to the professional work of teachers and educators. Through a systematic process of reflection teachers are able to develop an awareness of their impact in the classroom and document moments of illumination and action to demonstrate changed and improved practice. An evidence-base which supports notions of continuous professional development through systematic reflection can be combined with other forms of data gathering to broaden and deepen a teacher's portfolio of evidence.

The role of critical reflection and its relationship to action research was established through Stenhouse's (1975) notion of the teacher-as-researcher. Hendrick's (2009) classroom and participatory action research approaches have been identified in particular, as a practical tool for critical reflection and a way for teachers to approach problem resolutions about their practice and educational issues. The complexities of action research have been deconstructed and consider the benefits, challenges and ethical issues. It has been established through a number of research projects and feedback from teachers that action research resonates well with the overall reflective requirements of impactful teacher practice and ensures credibility and reliability when questioning pedagogy. Evidence-based practice can have positive implications for teachers and educators in raising the status of the profession and in developing a voice of authority about complex educational issues. Action research is highly recommended to teachers at all career stages and as part of an ongoing professional learning and development program to be included and embedded as part of teachers work. Teacher-led

research provides opportunities to challenges one's ideas and the theories that underpin these, to develop new knowledge, question understandings and contribute to a wider perspective on educational issues pertaining not only to individual classes, but whole school communities and the profession. In the contemporary educational climate, the action research model (Figure 1) and extended collegial peer observation (Figure 3) model proposed can facilitate critical reflection in a systematic, rigorous and authentic way, providing a practical and accessible approach for educators to assess, measure and provide evidence of practice. Exemplar key improvements in teaching and learning from the case studies mentioned (Crawford, 2019a; 2020) using the action research model (Figure 3) include: Increased teacher efficacy, knowledge and understanding of the high impact teaching strategies leading to improved change in pedagogy; collegial peer observation contributing to team building and a collaborative school culture; increased efficacy in the skills and knowledge to build evidence-based practice; enhanced student learning environment; and increased development of student metacognitive thinking processes.

The opportunities for teachers and educators to consider the impact of their work in a systematic and critically reflective way and explore more deeply what they do, how and why is imperative. However, it is only with the appropriate support and resources that teachers will be able to engage appropriately with this work. If this is possible, it will have positive implications for future teaching practice and the development of the profession as teacher-led research becomes more accessible.

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Appendix A

Peer Observation Sheet		
Observation Details		
Date:	**Time:**	**Location:**
Teacher Observed:	**Teacher Observing:**	
Class/Year Level:	**Learning Focus (subject of lesson):**	
Practice Improvement Goal		
The Peer Observation focus		
Primary focus and agreed evidence (Critical and Creative thinking curriculum – metacognition		
Secondary focus and agreed evidence (Chosen Theory of Action)		
Capturing your observations:		
Learning Intentions Narrative & Pace: - Learning Intentions visible /verbally introduced Y / N - How many students engaged in discussion about intentions? - Did students state or write the intentions in their own words? Y / N - Was there a narrative for the lesson? Y / N - Were the learning intentions referred to during the lesson? Y / N - How many teacher questions related back to the learning intentions?	**Higher Order Questioning** - Students are encouraged to respond to questions with analysis and explanation. Y / N - Questioning strategies that require students to think carefully about their responses are evident? Y / N - Strategies to ensure students demonstrate thinking skills are used Y / N - Majority of questions used are high order questions Y / N - Student responses and student questions directly influence the lesson's pace and direction. Y / N - Questions are used to focus attention on the learning intention and the lesson narrative. Y / N	**Implement Cooperative Groups** - cooperative group work is used to enable students to talk through their current thinking. Y / N - group activities are planned so that students work together to improve learning Y / N - context for learning supports diverse learning abilities within the activity Y / N - students know why and how working in a group can help them develop more sophisticated responses Y / N - Students are oriented in the learning narrative and know what the problem is that they are trying to solve. Y / N
Sight observation(s): What did you see the teacher the students doing in relation to the agreed focus area?		
Sound Observation(s): What did you hear the teacher and students saying in relation to the agreed focus area?		
Evidence: Graphic organisers, Question Stems, collaborative group strategies, etc.		