What's the Evidence?

A Study on Teacher Quality

A White Paper based on the research funded by the New South Wales Department of Education from 2021 - 2024

Acknowledgement of Country

The authors of this White Paper acknowledge the Gadigal of the Eora Nation as the traditional custodians of the land where members of the research team were based throughout the What's the Evidence? Study. We recognise Gadigal traditions of teaching and learning as among the oldest and most sustained in the world and know them to be intimately connected to knowledge of Country, waterways and sky.

We acknowledge Elders past and present, and Aboriginal and Torres Strait Islander participants and readers of this work.

Artwork: *Yanhambabirra Burambabirra Yalbailinya' (Come, Share and Learn), 2020 by Luke Penrith for the One Sydney, Many People Strategy.*

Preface

Teacher quality matters. Teacher quality can enrich the learning experience of students no matter what their context or background. Students need support from teachers who can respond appropriately to various contexts. When teachers can provide this support and make professional judgements informed by bodies of educational knowledge, students are more likely to succeed in the complex task of learning. Teachers are highly valued as individuals, yet poorly understood as a profession and often misrepresented, despite their qualifications, and their recognised societal contribution. Without a shared understanding of what is meant by teacher quality, this situation is unlikely to change.

The What's the Evidence study commenced in 2021, taking on the challenge of establishing a world-first holistic conceptualisation of teacher quality, informed by a research evidence base. We took a stance to speak against the negativity that has been continually communicated around teacher quality. Instead we are advocating for a shared understanding and holistic conceptualisation. As a result of this work, our study has become evidence-generating. We have facilitated multiple opportunities for debate with a variety of education stakeholders on the essential components of teacher quality arising from this study.

The WtE study also aimed to devise a process to check the predictive validity of a Teaching Performance Assessment (TPA), which was approved by the Australian Institute for Teaching and School Leadership (AITSL). Currently the mandated TPAs operate in all Australian institutions of initial teacher education as defacto measurements of teaching quality without any extant measures to inform them.

Since the project started, teachers have been recognised for their commitment to maintaining social stability in times of challenge such as the Covid pandemic. Though there was a brief window of community support during the height of the pandemic, critique of teacher quality now continues in policy and in the media. The number of teachers leaving the profession is rising and the teacher shortage crisis has worsened.

These mounting factors make the work on teacher quality even more critical to continue as the need to raise the status of the profession grows. Discussions with stakeholders throughout phases of the study has helped us to inform the teacher quality construct that has emerged from the research.

We note the study took place in the complex post-Covid pandemic environment at a time when teacher shortages impacted on the capacity of schools to participate in research. We experienced significant delays caused by procedural demands and the challenge of carrying out research in a climate where access to schools was compromised. Despite these issues, the study worked through a series of methodological phases and simultaneously socialised our progress. Between 2022 and 2024 a total of 548 teachers, professional association leads, experts and initial teacher education graduates have taken part in phases of data collection. Findings have been reported through yearly presentations at conferences including the Australian Association for Research in Education, the Australian Teacher Education Association, the Higher Education Research and Development Society of Australasia, the British Educational Research Association and the American Educational Research Association across 2022-2024.

This White Paper wraps up the What's the Evidence? study by proposing four recommendations as a way of refocusing attention on teacher quality to bring about positive change for the profession. For example, we aligned the new construct with the AITSL standards to reveal conceptual gaps. This also demonstrated how the teacher quality indicators could contribute to the required revision of the Australian Professional Standards for Teachers.

Teachers are professionals who are core to the education of our children and the future of our society. The social benefit of building greater respect for our teachers is important if we are to reverse the downturn in teaching being considered as a valued career. The translational relevance of the WtE study points the way to how a focus on teacher quality could help build capacity in the profession.

From the start of our enquiry into the understandings that the profession has of teacher quality, we have gathered valuable feedback from multiple stakeholder consultations. That input has kept us agile in explaining the need for a clear definition and evidence base for teacher quality.

The continual affirmation we have received for the construct and for the processes we have undertaken is a highlight of our work. The White Paper is an evidence-informed and evidence-generating provocation designed to promote deeper understanding of teachers' work by proposing a holistic measure of teacher quality. The WtE team have written this paper as a public statement summing up our work to-date, to provide evidence of the complexity involved in being a teacher. As an important part of the paper, we also indicate the work yet to be achieved if the status of the profession is to be improved. We are keen to continue the discussion with education stakeholders in the future.

Professor Alyson Simpson
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The University of Sydney, December 2024

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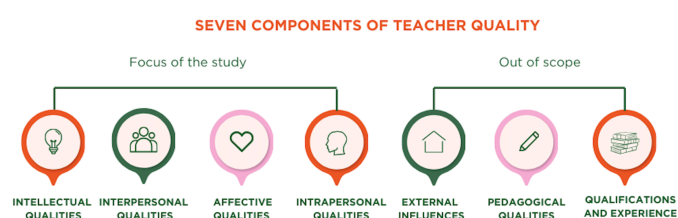University of Sydney, Camperdown NSW 2006
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Executive Summary

The What's the Evidence? Study is a collaborative project funded by the New South Wales Department of Education and run by a consortium of researchers from The University of Sydney, The University of Technology Sydney, Western Sydney University and the University of Melbourne. The project spanned a total of four years, running from its inception in 2021 through to its conclusion in 2024. This White Paper focuses on the construct of teacher quality that has been a key finding of the research.

As educators we note that the concept of 'teacher quality' is a contested space, causing concern as it is so often the topic of deficit discourse in the media. We are proposing a Teacher Quality Construct to reframe the debate through research-informed advocacy. The research team arrived at this construct using a multifaceted approach, which included literature review, empirical data analysis and consultation with cross-sectoral stakeholders in government and professional bodies, as well as teachers and school leaders in NSW, Australia. The construct represents a world-first attempt to create a list of indicators of teacher quality to represent the complex role of being a teacher.

SEVEN COMPONENTS OF TEACHER QUALITY

Focus of the study | Out of scope

INTELLECTUAL QUALITIES · INTERPERSONAL QUALITIES · AFFECTIVE QUALITIES · INTRAPERSONAL QUALITIES · EXTERNAL INFLUENCES · PEDAGOGICAL QUALITIES · QUALIFICATIONS AND EXPERIENCE

Our long term goal is to promote shared understandings of a holistic conceptualisation of teacher quality that could be relevant worldwide. The components of the Teacher Quality Construct are designed to be comprehensive, noting that a teacher's pedagogical knowledge is key, but will not be the only influence on student outcomes.

Rather, it is a combination of professional knowledges, personal attributes, and interpersonal skills which make a quality teacher.

The WtE team is confident that the recommendations and principles of the study shared in this White Paper will provoke discussion as well as inform future research approaches focusing on teacher quality, to improve the morale of the workforce and address negative public perceptions of this vital profession. The recommendations emerging from the study have been shaped in collaboration with stakeholders belonging to peak education bodies. Our research team proposes the four recommendations outlined below.

Recommendations

1. Adopt the Teacher Quality Construct as a shared concept by stakeholders

2. Design professional learning for teachers based on self-reflective critique on indicators from the Teacher Quality Construct

3. Refine the Australian Professional Standards for Teachers. at a national level informed by Teacher Quality Construct as one of the lenses the Australian Institute for Teaching and School Leadership adopted to focus on the qualities, skills, knowledge, and practices that are valued in teachers' work

4. Continue cross-sectoral collaborations that focus on teacher quality, offering peak professional bodies and teachers opportunities to interact with researchers.

We are proposing a Teacher Quality Construct to reframe the debate through research-informed advocacy.

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Introduction

The Role of the Teacher

It is widely recognised that teachers are one of the most important influences on student progress at all levels of education. The 2021 New South Wales Government Productivity Commission White Paper stated that 'evidence suggests teaching quality is the most important in-school factor governments can influence' to improve student outcomes.[1] Similarly in 2022, the UNESCO Education Summit positioned teachers as 'valued agents of change' when it comes to transforming education.[2]

The Australian *Review of the National School Reform Agreement* in 2022 stated that: 'An effective teacher – a teacher with the right personal qualities using sound teaching practices – can lift student outcomes more than any other in-school factor'.[3] This points toward a growing sense of acknowledgement from the Australian federal government that a teacher's influence in the classroom is created not just from their pedagogical knowledge, but also from a range of other factors.

The recommendations in the NSW Productivity Commission White Paper focus heavily on what teachers *know,* especially when it comes to pedagogical knowledge. Our research principles and recommendations arising from the What's the Evidence? (WtE) study support the 2021 NSW recommendations and also advocate for a broader focus. We are proposing a Teacher Quality Construct that acknowledges the full spectrum of a teacher's work in the classroom.

This includes what teachers *do* with their students on a daily basis, *how* they interact with their students, colleagues and parents, and *what* they perceive of students' needs, abilities, as well as the skills they apply in creating a positive learning environment. Our study is therefore petitioning for a change in policy language from its current bias towards 'quality teaching' to imagine a dual pairing with 'teacher quality' to fully represent the work involved in being a teacher. This aligns with UNESCO's intent to accelerate future education goals by affirming the interrelationship of teachers, teaching and the teaching profession as one of its key themes for action.[4]

We are proposing a Teacher Quality Construct that acknowledges the full spectrum of a teacher's work in the classroom

The Language of Teacher Quality

Globally, there have been renewed efforts to measure and support the 'effectiveness' of teachers. A significant amount of Government energy and resources has been applied to updating policies, which both increase the scrutiny on and shape or improve the practice of teachers. Governments are concerned by a perceived sense of educational stagnation and declines in student learning outcomes, which are reflected in international testing results and league tables.[5] International debates have also focused on the limited capacities for schools and teachers to prepare young people for the demands of a rapidly changing world.[6]

Many education systems around the world have articulated what they believe are the knowledges and skills that teachers must demonstrate. Teaching standards have been supported by research on 'effective' instruction and are used to articulate what teachers should know and be able to do.[7] These standards attempt to make clear the expectations for teachers as well as for those who support them (such as teacher educators and school leaders), striving to make assessment of teaching 'transparent and efficient'.[8]

This is important work, which the WtE study affirms. However, despite decades of research around the world on the 'effective' teacher, no set of standards to-date has yet attempted to capture the nature of teacher quality. We have proposed in this project that a change of policy language is required to think more broadly about the role of the teacher.

We suggest that teacher effectiveness could be seen as an aspect of teacher quality. By refocusing attention to include teacher quality alongside 'quality teaching' in our professional conversations, we can maximise the likelihood that attention will be given to the complete spectrum of what it means to be a teacher.

A change of policy language is required to think more broadly about the role of the teacher

The phrase 'teacher quality' is not altogether new in the NSW context, used regularly in NSW parliament since 1985. However, the term has historically been used without a clear, evidence-informed definition. The NSW Hansard reveals the term 'teacher quality' has been used 177 times in parliamentary chambers and committees. The graph on the following page highlights the proliferation of the term teacher quality over nearly 40 years (Figure 1). The most intense use of 'teacher quality' was in 2013 (30 times). Dissatisfaction with teacher quality gained momentum and during that time the Australian Institute for Teaching and School Leadership (AITSL) was established in 2010 to create a national standards framework. Interest grew in setting standards not only for teachers but also for programs of Initial Teacher Education (ITE), which eventually led to publication of the Teacher Education Ministerial Advisory Group *Issues Paper* of 2014.[9]

Figure 1. NSW Hansard Mentions of 'Teacher Quality'
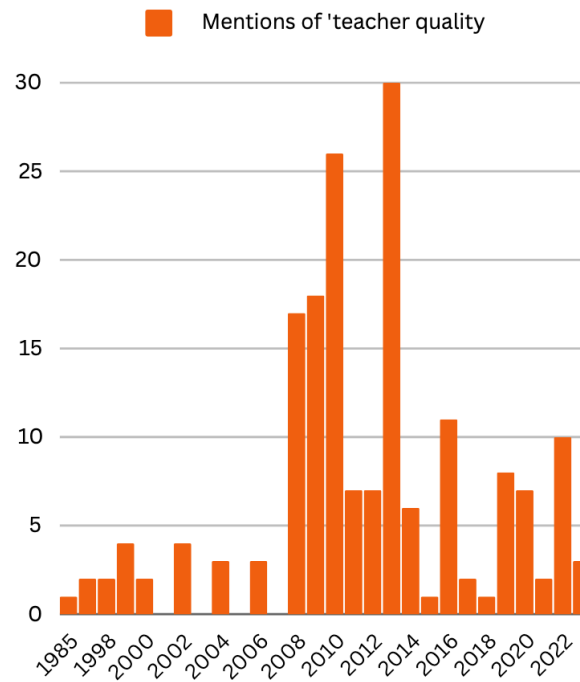
It was the introduction of the Teaching Standards Bill in 1998 that first named 'teacher quality' as an issue that needed to be fixed. The Ramsey Review conducted in the year 2000 for the NSW Government referred to 'teacher quality' on 66 occasions.[10] The Review cited school captains in a rural secondary school who wanted their teachers to 'know and understand their subject, treat each student as an individual, make learning the core of what happens in the classroom, [and] manage distractions that prevent learning'.[11] Teacher professionalism was a primary concern of the report, with direct parallels being drawn between professionalism and quality teaching. The term teacher quality continued to be used without an evidence base.[12]

Key to this period was a recognition of the difficulty in defining the work of teachers, yet an increasing emphasis on problems with teacher quality was maintained without an evidence base for claims being made. The Ramsey Review repeatedly mentioned a study conducted by Darling-Hammond in the USA, with the title 'Teacher Quality and Student Achievement'.[13] Findings from the research strongly influenced the language of NSW Parliament. In the two decades following, many comments have referred to teacher quality being the single strongest influence on student learning outcomes. Little variation in the language has been used since then yet lack of consistent understanding of the term teacher quality still exists.

The importance of the teaching profession is undisputed for its contribution to society. Yet, a teacher's work is becoming increasingly difficult to define. This is especially so when we take into account the challenges to learning such as mental health and socioeconomic background that can come from non-traditional sources and have little to do with school. [14]

However, given the economic and cultural emphasis on international league tables, the imperative for teaching to be constructed as a profession focused on 'quality' is likely to increase in the years ahead. This situation calls out the urgent need for a Teacher Quality Construct that is evidence-informed, fit for the profession and supported and accepted by key stakeholders.

More recently, commentary from the 2022 Federal Productivity Commission in Australia refers to teacher quality as the cognitive and non-cognitive attributes that individual teachers possess. This is a promising sign that politicians and other stakeholders may recognise the need for more holistic and comprehensive definitions and measures of teacher quality to be created. In this context, the work of the WtE study on creating a Teacher Quality Construct is most timely and could contribute to future policy directions.

A teacher's work is becoming increasingly difficult to define

The Teacher Quality Construct: A New Framework

The Teacher Quality Construct created in the WtE study proposes a new framework to identify and measure indicators that will provide the profession with a vocabulary for recognising and enhancing teacher quality. The Teacher Quality Construct was built in response to global concerns with education standards.

In New South Wales, more broadly in Australia and in many locations round the world, we currently have a top-down framework to closely monitor teachers' work and practice in the classroom. This standards-informed method of measuring teacher success introduced through government regulation and adopted by education systems carries high accountability yet is managed with low levels of consultation with teachers.

The WtE Study was funded by the NSW Government in recognition of a vital need to establish an evidence base to inform discussions of teacher quality that is fit for use by the profession. The research proposed four primary reasons why such evidence was needed:

1. Assessment of teacher quality has been challenging for governments and school leaders. Our team believes this is partly due to the longstanding and incomplete framing of teacher 'effectiveness' focusing only on the craft of teaching rather than a broader view of a teacher's work that needs both skills and personal attributes.

2. There has been poor retention in the profession due to reduced professional status with a teacher attrition crisis now being experienced around the world.[15]

3. Both teachers and ITE programs have been historically undervalued while also subject to ongoing intense scrutiny.

4. More understanding is needed of the complexity of the role of the teacher

A key output of the WtE study has been a Teacher Quality Construct which includes four interrelated components with 30 indicators (Figure 2).

These indicators were discovered through a mixed-methods approach, including a scoping review of over 1000 articles of academic literature and a Delphi consultation process used to confirm the opinions of expert stakeholders, school leaders and teachers. The construct represents teacher qualities as:
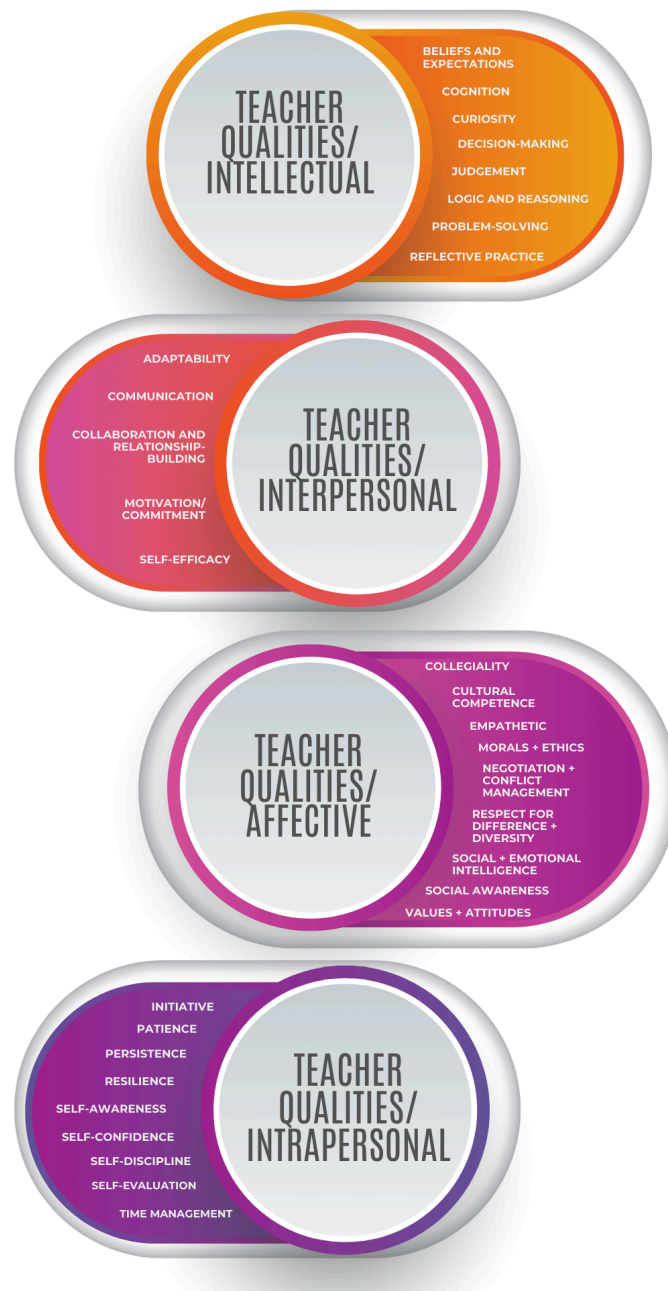
1. **Intellectual:** a teacher's cognitive processing abilities and professional mindset
2. **Interpersonal:** how teachers communicate and interact with others, understand alternative views in the community, but particularly with students
3. **Affective:** a teacher's capacity to be relatable or empathetic towards others
4. **Intrapersonal:** a teacher's ability to take personal responsibility for professional conduct.[16]

Other aspects critical in consideration of the ways in which student outcomes can be improved were also recorded in the literature review. These included topics such as content knowledge, teaching effectiveness, assessment strategies and pedagogical qualities, qualifications and experience as well as the external factors that impact teaching. As professional standards mandate achievement in many of these areas already, the WtE study chose to focus on the indicators from the four components that do not systematically appear in professional discourse.
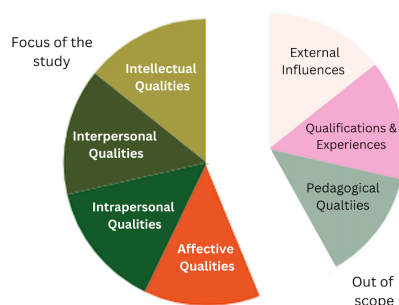
We recommend that future considerations of what it means to be a teacher should acknowledge the full spectrum of a teacher's work in the classroom. In the next part of the paper, we introduce our project compact followed by six key principles that have informed our WtE study.

Figure 2. A diagrammatic overview of the Teacher Quality Construct developed as a result of the WtE project

TEACHER QUALITIES/ INTELLECTUAL
- BELIEFS AND EXPECTATIONS
- COGNITION
- CURIOSITY
- DECISION-MAKING
- JUDGEMENT
- LOGIC AND REASONING
- PROBLEM-SOLVING
- REFLECTIVE PRACTICE

TEACHER QUALITIES/ INTERPERSONAL
- ADAPTABILITY
- COMMUNICATION
- COLLABORATION AND RELATIONSHIP-BUILDING
- MOTIVATION/ COMMITMENT
- SELF-EFFICACY

TEACHER QUALITIES/ AFFECTIVE
- COLLEGIALITY
- CULTURAL COMPETENCE
- EMPATHETIC
- MORALS + ETHICS
- NEGOTIATION + CONFLICT MANAGEMENT
- RESPECT FOR DIFFERENCE + DIVERSITY
- SOCIAL + EMOTIONAL INTELLIGENCE
- SOCIAL AWARENESS
- VALUES + ATTITUDES

TEACHER QUALITIES/ INTRAPERSONAL
- INITIATIVE
- PATIENCE
- PERSISTENCE
- RESILIENCE
- SELF-AWARENESS
- SELF-CONFIDENCE
- SELF-DISCIPLINE
- SELF-EVALUATION
- TIME MANAGEMENT

The What's the Evidence? Compact

The WtE team has been operating through shared understandings, which were established as a compact at the start of the study. We believe teachers' work is a complex undertaking based on professional judgements informed by bodies of educational knowledge. As a team, we value teachers as key contributors to the formation of a just society.

We are committed to supporting the complex work of teachers through research informed advocacy. We recognise that teachers contribute to the public good in challenging circumstances by supporting the learning needs of all students. As educators we note that the concept of 'teacher quality' is a contested space. We take a stance against the negativity continually promoted about teacher quality and to promote shared understandings of a holistic conceptualisation.

Our goal has been to identify and measure indicators of teacher quality that will provide the profession with a vocabulary for recognising and enhancing teacher quality. We believe that the examination of evidence informed qualities will support a positive reframing of the broader discourse around teacher quality. We also believe shared agreement on the principles will contribute to the continuation of this important work.

Six Key Principles of the WtE Study

Our study has been defined by six key principles which have shaped our approach to research.

1. **Evidence-informed:** we have undertaken an earnest endeavour to identify what the profession values about teacher quality.
2. **Collaborative:** we strengthened existing partnerships and built deliberate and inclusive partnerships with stakeholders across sectors of government and professional bodies to include the voice of the profession.
3. **Advocacy-driven:** we looked to improve the status of the profession by addressing negative portrayals of teachers in the public sphere.
4. **Transparent:** we socialised research-informed evidence about teacher quality through multiple stakeholder meetings, conference presentations and publications.
5. **Reflexive:** we adopted a view of teachers and their career trajectories that envisages new ways for designing professional support for teachers which both recognises and builds capacity in teacher quality.
6. **Connected:** we sought to build on our work in the WtE study to influence future government policy by conceptualising a more holistic and complex view of teacher quality that relates to how the professional career trajectory is influenced by entry requirements for initial teacher education, teaching standards and accreditation

Principle 1
Evidence-informed

Identifying What the Profession Values about Teacher Quality

What counts as teacher quality? In 2005, the NSW Institute of Teachers was established with a mandate for 'developing and promoting professional standards for teachers'.[17] However, the Institute was not the teachers' self-regulatory organisation proposed originally in the Ramsey Review, but a government 'statutory body representing the Crown'.[18] These standards were to be used as a benchmark for accrediting teachers and measuring, identifying and rewarding their achievements.[19]

Since 2010, national standards and measures of accountability for teachers have been developed to improve student outcomes. The current education policies at national and state (NSW) levels create a *policyscape*, which determines who holds the political power and identifies the multiple actors involved in implementation.[20] This is a complex nexus of politicians, policy makers, regulatory bodies, school system leaders and school leaders, all of whom represent a top-down, standards-based framework designed to inform and monitor teachers' work and practice in the classroom. However, the inherent value of existing standards is disputed as they do not measure or represent all that should be valued in teachers' work.

Scholarly research on teacher standards continues to present contrasting views of the contribution standards make to the professionalism of teaching.[21]

Some studies claim that teaching standards are 'clinical and detached' and 'oversimplify' the work of teaching,[22] while critique has also been raised about 'reductionist' approaches, which emphasise 'technical and instrumental approaches to teaching'.[23]

However, other studies in favour of teaching standards argue that they provide a 'reference point' for teachers to analyse their practice beyond their individual context.[24] Some say standards help teachers to 'articulate a vision' and provide a definition for the public of teacher professionalism. [25] Advocates say that standards can help to make teaching and assessment of teaching more 'transparent, predictable and efficient'.[26] These debates demonstrate interest in ensuring that standards fit for purpose for the profession would be of use to the profession.

Thus far discussions of the Teacher Quality Construct have provided a useful stimulus for a review of the Teacher Standards. In the future, it could serve as one of several lenses through which the Standards could be read. That is, where current standards focus on the skills, knowledge, and practices teachers need, the construct proposes other qualities that could be considered for addition into the Standards.

Although standards are expected to shape important generic as well as specific teacher practices, current standards tend to reduce the complexity of teachers' work to justify a focus on teaching and teaching practices. A lack of support for the development of teacher qualities has led in many cases to teacher burnout, as the interpersonal labour of teaching takes a toll on teachers' emotional capacity.[27]

There is also debate about whether standards can achieve the quality for which they were designed and introduced, with a danger of them becoming 'entrenched and institutionalised in policy texts and discourses'.[28] This brings into sharp relief the paradox for both pre-service and in-service teachers, namely that school-students need 'passionate, innovative, flexible, context-responsive teachers capable of functioning as creative knowledge producers', who can also 'satisfy the demands of a political and policy climate that favours consistency, effectiveness and accountability'.[29]

The WtE study is contributing to the debate about teacher standards by providing an evidence-informed Teacher Quality Construct that has taken into account scholarship as well as what the profession values. To undertake an earnest endeavour to identify what the profession values about teacher quality, which supports student learning, the WtE study was run over four years as complex, mixed-methods research.

The study engaged teachers, educational leaders and researchers as participants. In 2021, the first phase of project commenced with the proposition of a new construct for teacher quality informed by indicators collected from grey literature. We then conducted a scoping review of academic literature to establish a scholarly, research-informed evidence base for the Teacher Quality Construct. Through the second phase in 2022, our researchers tested the construct for use with early career teachers (5 years since graduation), adopting a modified Delphi process involving online surveys and focus group discussions with stakeholders. Different test theories (Rasch Theory and Classical Test Theory) provided evidence to support the proposition that the Teacher Quality Construct could be represented by four components: intellectual, interpersonal, affective and intrapersonal. The evidence resulting from our project has implications for future education policy reform and practice at State and National level.

The WtE study is contributing to the debate about teacher standards by providing an evidence-informed Teacher Quality Construct

Principle 2
Collaborative

Strengthening Existing Partnerships in Research

How do we frame good collaboration? The literature on collaboration emphasises the human element of teaching due to the importance of relationship building between teachers, students, parents and the community.[30] Teaching is viewed as an inherently social and relational profession and requires teachers to possess dispositions that support their capacity to effectively communicate with others.[31] The same can be said of research that sets out to build partnerships across sectors to bring disparate groups together who have different engagements with the teaching profession.

In our context, we had support from the NSW Department of Education (DoE) Strategic Research Fund to establish a collaboration between several universities and various representatives of government education systems. Thus, the collaborative stance adopted by the WtE study aligns our work with the 2019 Alice Springs (Mparntwe) Education Declaration, which encourages the education community, including universities, to work together.[32]

The National Health and Medical Research Council advises that collaborative research can pose challenges due to the need to accommodate varied methodologies and practices that exist across institutions and organisational structures, and differing research cultures.[33] However, the challenges should not be seen as a barrier, but as elements to be managed.

The WtE study experienced several challenges, which arose due to governance requirements, yet the commitment of all parties enabled us to resolve most issues.

Since the WtE study was addressing teacher quality, it was a common concern for stakeholders including AITSL, the NSW Education Standards Authority (NESA), the NSW Department of Education, Catholic Schools NSW, Australian Independent Schools NSW, the NSW Teachers Federation, First Nations educators and others. We invited collaboration from multiple government and non-government entities at national and State level. The extent of involvement has varied for each participating group over time. As a whole, the collaborations improved the pace of the progression that we would otherwise have made if working on the study without their input.

In the early days of the study, the willingness of stakeholders to attend meetings demonstrated the keen interest that professional bodies had in helping to shape the Teacher Quality Construct. We adopted a modified Delphi process involving consultation with an expert panel of stakeholders along with extensive feedback processes with school leaders and teachers. We chose this method as it is considered to be an unbiased process for gathering opinions in order to reach a consensus on an issue where there is limited evidence for a solution.[34] It allowed us to collect a range of informed judgements on the issue of teacher quality that we felt had been largely unexplored to date.

We also looked to confirm the relevance of our Teacher Quality Construct with teachers and school leaders. At the end of the process the stakeholders endorsed our indicators of teacher quality as being relevant for the teaching profession. Now, as a result of our collaboration, the construct represents a conceptualisation of teacher quality that is 'richly complex, holds high expectations of early career teachers and signals the need for ongoing support for them if they are to remain and thrive in the profession'. [35] Four years later, the same group of stakeholders was represented at our final research meeting in November 2024.

Willingness of industry leaders to attend meetings demonstrated the keen interest that professional bodies had in helping to shape the Teacher Quality Construct

We have been able to gain consistent and relevant commitment to researching this challenging topic within the profession and the disparate groups with which it interacts. We acknowledge the complex post-Covid pandemic environment in which the study took place and the impact of teacher shortages on the capacity of schools to participate in research.

Unfortunately, these pressures contributed to low recruitment rates and significant approval delays that led to constrained timeframes. We also note that the Aboriginal researcher who joined the team for the first year of the study did so in addition to her existing commitments and did not have capacity to continue.

It is anticipated that an Aboriginal and/or Torres Strait Islander researchers will be invited to join the project to provide expert advice about culturally responsive research design, methods and data analysis.[36] Additionally, an Aboriginal and Torres Strait Islander advisory group will be established to guide the project ensuring that findings are relevant to Aboriginal and Torres Strait Islander stakeholders. During the time of this project, the peak Aboriginal community organisation that the team would have consulted with was experiencing leadership transitions that reduced opportunity to collaborate.

Despite these challenges the existence of a trusted network of collaborators at the end of the study cannot be underestimated. The inclusive partnerships we have established with stakeholders across sectors of government and professional bodies sets the groundwork for future investigations into shared challenges.

Principle 3
Advocacy-Driven

Improving the status of the teaching profession

How can we better advocate for teachers? Too often the public perception of the teaching profession has been tied simply to student outcomes and economic productivity, rather than focusing on their wellbeing and acknowledging the important role that they play in our society. In the WtE study, we have set out to conduct advocacy-driven research that would petition for teacher's professional standing. Meredith Rogers Cherland and Helen Harper state that advocacy research is 'scholarship for transformation, and a more compassionate and equitable world'.[37] Robert Bogden and Sari K. Biklen also use the term 'advocacy research' interchangeably with 'action research' to describe research conducted with the aim of benefiting a particular interest group, often involving collaboration with communities and stakeholders in the process.[38] In the case of teacher quality, the WtE study has set out to advocate for teachers' professional standing and question the assumptions that are often drawn about them in public discourse.

The WtE study was funded at a time when the state of NSW was recognising a growing attrition crisis with its teaching workforce. Still an ongoing and rising problem, our teachers have expressed difficulties with over-capacity workloads and external pressures leading to burnout. In addition to this, our politicians and media regularly add an extra layer of pressure to our most essential workers in the education system.

The most recent update from the NSW Government about education policy was in August 2024. The reforms are directed toward public schooling and focused primarily on attracting and retaining 'more high-quality teachers'.[39] The word 'more' signifies an increase in respect that the current NSW Government are trying to give teachers.

Additionally, the NSW Education Standards Authority (NESA) website has a 'What We Do' page, which states 'We work with the NSW community to drive improvements in student achievement. We set syllabuses, assessments, teaching and school standards for all schools in NSW'.[40] In this wording, it is important to note that the teacher is not present, but merely implied in the act of teaching.

Our Teacher Quality Construct shows that advocacy for the teaching profession needs to include petitioning for greater recognition of the complexity of teaching. This is recognised in much research in education but has not yet reached broad public understanding.[41] The Teacher Quality Construct demonstrates that teachers need to have an extensive 'kit' of skills, personal attributes, and the capacity to learn from experience. They also need to apply these to the daily challenges of teaching each student, being cognisant of their individual needs, within a curriculum and its associated assessment requirements, and framed within an education system. Their teaching consequently needs to be tailored, inclusive, challenging, flexible, and responsive.

Another way that the WtE study has been advocating for teachers is by evaluating the Teaching Performance Assessment (TPA) which is designed to assess the quality of teachers at the point of graduation from a teaching qualification. During the early phases of the WtE study, a group of teacher educators and PhD researchers from two universities involved in a national TPA model, the Assessment for Graduate Teaching (AfGT), set out with the dual aim to investigate the predictive validity of the assessment, and redress the negative view of teachers by politicians, policymakers, the media, and the general public.

Advocacy for the teaching profession needs to include petitioning for greater recognition of the complexity of teaching

The result has been a push within the WtE study to recognise the holistic nature of teaching and for this to be reflected in the TPA and accreditation processes. The Teacher Quality Construct that has resulted from the study is an important first step in recognising the full spectrum of the work of teaching. Publicising the four components and 30 indicators as belonging with the term 'teacher quality' will hopefully begin a process for more widespread recognition of the full spectrum of teaching as a profession.

Principle 4
Transparent

## Socialising Research-Informed Evidence about Teacher Quality

What does socialisation look like? Socialisation refers to the transmission of knowledge and practice in research.[41] The aim of socialisation for the What's the Evidence study is to share research-informed evidence about the Teacher Quality Construct with key stakeholders and those most affected by educational studies.

There are international models, which bear consideration for sharing research from the WtE study. First is the *Evidence for ESSA* website hosted by John Hopkins University in the USA.

The site is designed by the Centre for Research and Reform in Education in collaboration with a technical work group and stakeholder advisory group to share research funded by the Anne E. Casey Foundation.[42] The website provides evidence-informed programs for students with details at the top of each page about the number of studies that have been conducted to build the evidence for that activity (Figure 3).

Figure 3. Example Data Sharing for a Class Exercise on the *Evidence for ESSA* Website
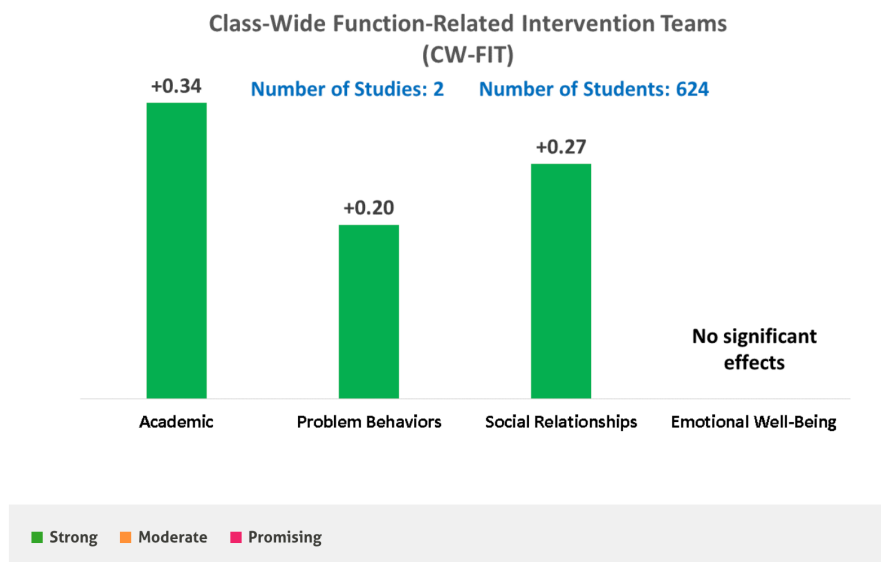
The WtE study has a website that is currently a simple landing page outlining the goals and strategies of the project (Figure 4). Interested parties can click through on the site to read about the three main phases of the research and download the Teacher Quality Construct as a word document. Though this provides a useful introduction to the study, there is potential for future iterations of the site to contain an online tool for teachers and school leaders to use in professional development and reflexive practice.

The WtE Study was funded by the NSW Government in recognition of the importance of gathering evidence on teacher quality to benefit both the Department of Education as well as school leaders and teachers. It is therefore important that the findings of this study be shared in non-traditional avenues to maximise the benefit of the research within the NSW education system. As noted by Stephen Ross and Jennifer Morrison, it can be a daunting task to prepare and disseminate research related to teaching when there is continually updating evidence requiring considerable resources to evaluate and share with the public.[43]

Our approach to socialising the WtE study focused on keeping all stakeholders informed throughout the project. This process involved regular communications, online and face to face meetings, social media posts, and a dedicated website. The website was set up as a primary touch-point for both our participants and anyone interested in the research.[44] Due to limited capacity of teachers to participate in the initial stages of the study, we sought ethics approval in the final stage to recruit participants via social media. Our social media posts have had a high number of traffic, particularly on LinkedIn with over 560 views in a month. Throughout the study, our engagement with stakeholders during panel discussions has also been a key means of sharing the research.

Though the engagement has been encouraging, it is difficult to measure the impact of this outreach, and we are looking to develop future methods of engagement that advocate for the standing of teachers in more concrete ways.

Figure 4. The What's the Evidence? Website hosted by the University of Sydney

What's the Evidence?

Our initial research project on Teacher Quality

Evidence-based research is crucial as it provides a foundation of reliable and objective information, enabling informed decision-making, improving outcomes, and ensuring the most effective allocation of resources.

Professional standards for teachers that focus on *teaching* were created in Australia over ten years ago with an aim to improve learner outcomes. Our *What's the Evidence* study shows the need for a refocus of the educational research and policy agenda to build support for *teacher* quality to address both the high attrition rate of early career teachers and to aid capacity building for experienced teachers.

Developing a robust construct of teacher quality was essential for clarity and consistency when identifying and measuring indicators of teacher quality.

The 'What's the Evidence' project has been running since 2020 with funding from the NSW Department of Education over three key phases:

Teacher Quality

Find out more

→

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Principle 5
Reflexive

Capacity-building in View of Teachers and their Career Trajectories

How do we encourage ongoing critical self-reflection? A person who believes that their abilities and skills can be developed and improved over time is more likely to engage in reflexive practice.[45] Research suggests that a teacher's growth mindset could improve not only their own personal performance, career success and well-being, but also have an impact on the students they teach.[46] This body of work recommends incorporation of capacity-building principles into professional development for classroom teachers and others in the system.

In the NSW context, professional learning (PL) for teachers is designed to be part of an 'integrated system of support that is developmentally focused, building the capabilities of all staff to ensure a highly skilled and professional workforce across NSW public schools'.[47] Inclusion of the word 'developmentally' suggests a strong alignment with capacity building approaches. The NSW policy document on PL for teachers states that 'highly effective professional learning, aligned to system, school and individual priorities' supports its vision for NSW public education to be Australia's best education system and one of the finest in the world.[48] Documentation from NESA demonstrates a whole-of-system approach to professional learning as it includes principals, executive and teachers in performance management and development policy.

The NSW DoE also emphasises a 'cycle of continuous professional learning' through a dual focus on teachers and 'deepening teaching practice', though its main aim is to achieve 'ongoing growth in student learning'.[49]

Policy analysis reveals the intention of the NSW government to support teachers in their PL as an ongoing process.[50] The WtE study was similarly designed on the premise that the work involved in becoming a teacher who demonstrates valued qualities is a continuum of connected learning that commences in ITE and continues through teachers' professional engagement in the classroom. [51] However, a point of difference in the WtE study is an emphasis on recognising and supporting the broad spectrum of qualities that are part of being a teacher.

The WtE study has built a body of evidence about indicators of teacher quality to enable teachers and researchers to more effectively tailor their PL. For example, as part of the research process, the team has already trialled approaches to involving teachers and school executives in dialogue about teacher quality indicators. The interactive workshops have been well received with reports from principals suggesting discussions about the WtE Teacher Quality Construct provided their staff with new opportunities to reflect on their professional development in meaningful ways. Of interest was the finding that the ranking of indicators of teacher quality in order of importance sometimes varied according to the stages teachers were at in their careers and/or their teaching context. This aligns with the importance of allowing for a growth mindset as part of designs for recognising and building capacity in teacher quality across career trajectories that acknowledges the situated practice of teaching.[52]

A point of difference in the WtE study is an emphasis on recognising and supporting the broad spectrum of qualities that are part of being a teacher

Considering influences on the start of a teacher's career trajectory, the current use of TPAs as a capstone measure of the performance of graduating teachers in Australia act not only as a gateway to employment as a teacher but also serve as a bridge between initial teacher education and independent professional practice. Yet while TPAs may have construct and content validity, they currently operate as a nationally mandated practice without evidence existing of their predictive validity.

To address this challenge the last phase of the WtE study has focused on devising a process that can measure the predictive validity of the TPA. Further work is needed to develop measures for indicators that the profession values. These need to correlate with the Teacher Quality Construct and support future professional development.

Principle 6
Connected

Building Partnerships that are Deliberate and Inclusive

In the planning phase of the WtE study we developed short-term, medium-term and long-term goals for the research. Now as the study comes to an end, we reflect on the potential of what has been achieved to influence future government policy.

First, the WtE study has been successful in creating an evidence-informed list of indicators of teacher quality suitable for adoption pre- and post-graduation. By identifying essential areas of professional development for teachers in the early/first five years of employment in the context of whole school improvement the results in the form of the Teacher Quality Construct have the potential to inform much needed support for early career teachers to enable them to thrive in the profession. The information could also be widely adopted as entry requirements for ITE as a means of communicating qualities that are necessary for the career of teaching. The results will support the NSW DoE's focus on improving the education outcomes for students by ensuring public understanding of a holistic and more complex view of what it means to be a teacher.

Second, the exploration of possible processes to affirm the predictive validity of TPA offers critical support to improve their credibility and lead to a more transparent approach to future TPA design. This work could help develop community confidence in public education and of employing bodies in standards of graduates as it would provide evidence that early career teachers are becoming teachers who are qualified to teach and demonstrate indicators of teacher quality.

Since 2018, the National Program Standards have required all ITE providers to include a valid and reliable TPA as part of their program design. Given the use of TPA across Australia uptake and expansion of the body of evidence resulting from our project has implications for regulatory bodies and future education policy reform and practice at State and National level.

Third, the study has the potential to contribute to education policy reform by influencing collaborative revision of the Australian Professional Standards for Teachers (APSTs) with a focus on the Graduate stage. The APSTs are significant in the building and development of a teaching workforce. Best practice requires the 'standards' to be continuously evaluated regarding their fitness for purpose in a constantly evolving profession. Examination of the relationship between the indicators from our Teacher Quality Construct and the current Graduate Teaching Standards as part of the WtE study has highlighted an emphasis on the act of teaching, which reduces necessary acknowledgement of the teacher who undertakes the work. A more holistic conceptualisation of the work that teachers do would respond to the recommendations of the 2022 UNESCO report that to accelerate progress on achieving international education goals teachers, teaching and the teaching profession need greater attention.[53]

What Comes Next?

The WtE research project represents a comprehensive exploration of teacher quality through using international educational research and the voices of NSW educators. The Teacher Quality Construct recognises teachers' adaptability, communication skills, and professionalism for fostering effective education. Moving forward, we aim to establish a broader, holistic understanding of teacher quality. This will come from analysing the intersection of national system with policy mandates and Australian education stakeholders. It is an important step to build upon the current Teacher Quality Construct to ensure that it has national representation.

If a holistic understanding of teacher quality becomes established, and Australian educator stakeholders have reported essential indicators of teacher quality, a validation framework for measures of these essential indicators of teacher quality will need to be created.

The validation framework establishes a means to review the rigour and robust nature of measures of teacher quality. It is likely that valid and robust measures of some indicators of teacher quality may exist, but there may be measures for others that do not exist. If this is the case, new measures of indicators of teacher quality will need to be systematically designed and validated.

Our aim is for the resultant measures of teacher quality to be used as a self-reflective professional learning tool for all teachers. Future research will also need to determine the most appropriate platform to house the validated teacher quality measures to ensure that the measures are fit for purpose, and are accessible and feasible for teachers to use.

We aim to establish a broader, holistic understanding of teacher quality by analysing the intersection of national system and policy mandates and Australian education stakeholders

Recommendations

Our end goal is to enable the teaching profession and researchers to more effectively tailor the professional learning of teachers to suit the demands of the role and to enhance the teacher qualities valued by stakeholders. The adoption of the construct and the creation of new measures will add to the tools teachers can use to act as reflexive professionals.

We have formulated the below recommendations to maximise the ongoing benefit of the WtE study:

1. **Adopt** the Teacher Quality Construct as a shared concept by stakeholders
2. **Design** professional learning for teachers based on self-reflective critique on indicators from the Teacher Quality Construct
3. **Refine** the Australian Professional Standards for Teachers. at a national level informed by Teacher Quality Construct as one of the lenses the Australian Institute for Teaching and School Leadership adopted to focus on the qualities, skills, knowledge, and practices that are valued in teachers' work
4. **Continue** cross-sectoral collaborations that focus on teacher quality, offering peak professional bodies and teachers opportunities to interact with researchers.

Abbreviations

AfGT	Assessment for Graduate Teaching
AITSL	Australian Institute for Teaching and School Leadership
APST	Australian Professional Standards for Teachers
NSW DoE	New South Wales Department of Education
ITE	Teacher education programs and teacher educators responsible for educating future teachers
NESA	New South Wales Education Standards Authority
NHMRC	National Health and Medical Research Council
PL	Professional Learning
TPA	Teaching Performance Assessment
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WtE	What's the Evidence? Study

Endnotes

[1] NSW Treasury, *NSW Productivity Commission White Paper 2021: Re-booting the Economy*, 17.

[2] United Nations, *Report on the 2022 Education Summit Convened by the UN Secretary-General*. January 2023, 1.

[3] Australian Government Productivity Commission. *Review of the National School Reform Agreement*. December 2022, 165.

[4] United Nations, *Report on the 2022 Education Summit*.

[5] NSW Treasury, *NSW Productivity Commission White Paper 2021*, 49-52.

[6] Flores, M. A. 'Teachers' Work and Lives'. In C. Day (ed.), *The Routledge International Handbook of Teacher and School Development*. New York: Routledge, 2011, 94-107; 'Teacher Education Curriculum'. In J. Loughran & M. L. Hamilton (eds.), *International Handbook of Teacher Education*. Springer, 2016, 187-230.

[7] Darling-Hammond, L., 'Teacher Quality and Student Achievement: A Review of State Policy Evidence'. *Education Policy Analysis Archives*. 2000 8.1, 1-44.

[8] Clarke, M., & Moore, A. 'Professional Standards, Teacher Identities and an Ethics of Singularity'. *Cambridge Journal of Education*, 2013 43.4, 487–500.

[9] Teacher Education Ministerial Advisory Group. *Issues Paper*. 2014. https://www.education.gov.au/data-and-research-schooling/resources/teacher-education-ministerial-advisory-group-issues-paper

[10] Ramsey, G., *Quality Matters: Revitalising Teaching: Critical Times, Critical Choices*. Report of the Review of Teacher Education, NSW. November 2000.

[11] Ramsey, *Quality Matters,* 12.

[12] Bloomfield, D. *A New Discourse for Teacher Professionalism: Ramsey, Standards and Accountability* [Paper presentation]. Adelaide: Australian Association for Research in Education (AARE) Annual Conference, 2006. https://www.aare.edu.au/data/publications/2006/blo06777.pdf

[13] Darling-Hammond, L. 'Teacher Quality and Student Achievement'.

[14] Ramsey, *Quality Matters*, 33.

[15] McLure, Felicity I.; Aldridge, Jill M. 'A Systematic Literature Review of Barriers and Supports Initiating Educational Change at the System Level'. In *School Leadership and Management*. 2022 4.2, 402-431.

[16] Brandenburg, R., Larsen, E., Simpson, A., Sallis, R., Tran, D. '"I Left the Teaching Profession … and This is What I am Doing Now": A National Study of Teacher Attrition'. *Australian Educational Researcher*. 2024 51, 2381–2400.

[17] White, R., and Simpson, A., (eds.). *What's the Evidence?: An Investigation into Teacher Quality*. Routledge 2025.

[18] Brandenburg, R., Larsen, E., Simpson, A., Sallis, R., Tran, D., '"I left the teaching profession"'.

[19] NSW Parliament. Standing Committee on Social Issues. 2005, ix.

[20] NSW Government. Institute of Teachers Act 2004 No. 65. s.6.
https://legislation.nsw.gov.au/view/whole/html/2006-06-20/act-2004-065

[21] NSW Parliament.Standing Committee on Social Issues.

[22] Ball, S. J. 'The Teacher's Soul and the Terrors of Performativity'. *Journal of Education Policy*. 2003 18.2, 215-228.

[23] Comber, B., & Nixon, H. 'Teachers' Work and Pedagogy in an Era of Accountability'. *Discourse*. 2009 30, 4.

[24] Buchanan, R. 'Teacher Identity and Agency in an Era of Accountability'. *Teachers and Teaching*. 2015 21.6, 700-719; Cochran-Smith, M. *Policy, Practice and Politics in Teacher Education: Editorials From the Journal of Teacher Education*. Corwin Press, 2006.

[25] Yinger & Hendricks-Lee, 'The Language of Standards and Teacher Education Reform'. *Educational Policy*. 2000 41.1, 94-106; Mockler, N. 'The Slippery Slope to Efficiency? An Australian Perspective on School/University Partnerships for Teacher Professional Learning. *Cambridge Journal of Education*. 2013 43.3, 38; Clarke, M. & Moore, A. 'Professional Standards, Teacher Identities and an Ethics of Singularity'. *Cambridge Journal of Education*. 2013 43.4, 475.

[26] Connell, R. 'Good Teachers on Dangerous Ground: Towards a New View of Teacher Quality and Professionalism. *Critical Studies in Education*. 2009 50.3, 213-229.

[27] Tuinamuana, K. 'Teacher Professional Standards, Accountability, and Ideology: Alternative Discourses'. *Australian Journal of Teacher Education*. 36.12, 72.

[28] Bloomfield, *A New Discourse for Teacher Professionalism*, 78.

[29] Ingvarson, L. *Teacher Education Accreditation: A Review of National and International Trends and Practices*. Canberra: Teaching Australia, 2006, 1006.

[30] Ingvarson, *Teacher Education Accreditation,* 1025; Connell, 'Good Teachers on Dangerous Ground, 220.

[31] Clarke, & Moore. 'Professional Standards, 3.

[32] Alzobiani, I. 'The Qualities of Effective Teachers as Perceived by Saudi EFL Students and Teachers. *English Language Teaching*. 2020 13.2, 32-4.

[33] Junker, A., Donker, M., & Mainhard, T. 'Potential classroom stressors of teachers: An audiovisual and physiological approach'. *Learning and Instruction*. 2021 75, 101495.

[34] Australian Governments Education Council, 2019. https://www.education.gov.au/alice-springs-mparntwe-education-declaration

[35] Australian Government, *Collaborative research: A guide supporting the Australian Code for the Responsible Conduct of Research*. Canberra: National Health and Medical Research Council, 2020.

[36] An example of this kind of analysis can be seen in the work currently being done at the University of South Australia, 'Toward an Australian Culturally Responsive Pedagogy'. You can read more on their website at https://unisa.edu.au/research/research-in-educational-and-social-inclusion/our-research/research-projects/toward-an-australian-culturally-responsive-pedagogy/

[37] Richardson, J., Mangin, D., Kastner, M., & Raina, P. (2018). 'Protocol for a Delphi consensus exercise to identify a core set of criteria for selecting health related outcome measures (HROM) to be used in primary health care'. *BMC Family Practice*, *19,* p. 9.

[38] NSW, *Parliamentary Debates,* Legislative Council, 2023, 11:32pm (Mark Latham). https://www.parliament.nsw.gov.au/Hansard/Pages/HansardResult.aspx#/docid/HANSARD-1323879322-103536

[39] NSW Government. (2024b). *Our plan for NSW public education*. https://education.nsw.gov.au/about-us/strategies-and-reports/plan-for-nsw-public-education

[40] Rogers Cherland, M. and Harper, H., "Introduction: Advocacy, Research, and Education" in Rogers Cherland , M., and Harper, Hl. (eds)., *Advocacy Research in Literacy Education* (New York: Routledge, 2007)

[41] Robert Bogdan, R., and Biklen, S.K, *Qualitative Research for Education: an introduction to theory and methods* (Boston: Allyn and Bacon, 1982).

[42] New South Wales Education Standards Authority Website. https://nsw.gov.au/NESA

[43] Landri speaks about the 'complex vision of education as situated work'. Mahon, Kemmis, Francisco and Lloyd, refer to The Education Complex, whilst Nicole Mockler celebrates the 'Glorious complexity of educational practice'. Cochran-Smith emphasises 'the complexity and contextual variability of teaching'.

[44] Grundmann, M., 'Education and Socialization'. In Hollstein, B., Greshoff, R., , Schimank, U. & Weiß, A. *Soziologie - Sociology in the German-Speaking World, Special Issue Soziologische Revue.* De Gruyter, 2020, 53-66.

[45] Centre for Research and Reform in Education. 'Evidence for ESSA' Website. John Hopkins University, 2024. https://www.evidenceforessa.org/

[46] Ross, S.M and Morrison, J.R, "Achieving Better Educational Practices Through Research Evidence: A Critical Analysis and Case Illustration of Benefits and Challenges" in *ECNU Review of Education* 4 (1).

[47] What's the Evidence? Study. 'What's the Evidence?' Website. University of Sydney, 2024. https://www.sydney.edu.au/arts/our-research/research-projects/teacher-quality/whats-the-evidence.html

[48] Sousa, B. J., & Clark, A. M. 'Growth Mindsets in Academics and Academia: A Review of Influence and Interventions. *Journal of Higher Education Policy and Management.* 2024 19.1, 1–19.

[49] Sousa, B. J., & Clark, A. M. 'Growth Mindsets in Academics and Academia'.

[50] NSW Government, *Professional Learning for teachers and school staff.* Policy Document. https://education.nsw.gov.au/policy-library/policies/pd-2016-0468-06

[51] Shulman, L. 'PCK its Genesis and Exodus'. In A. Berry, P. Friedrichsen, & J. Loughran (Eds.), *RE-examining Pedagogical Content Knowledge in Science Education.* London and New York: Routledge, 2015, 3-13.

[52] Day, C. *Teachers' Worlds and Work: Understanding Complexity, Building Quality*. Routledge, 2017.

[53] United Nations, *Report on the 2022 Education Summit*.