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The Validation of a Classroom Observation Instrument Based on the Construct of Teacher Adaptive Practice

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Teacher adaptability is a key disposition for teachers that has been linked to outcomes of interests to schools. The aim of this study was to examine how the broader disposition of teacher adaptability might be observable as classroom-based adaptive practices using an argument-based approach to validation. The findings from the initial phase of the validation study indicate that there is sufficient warrant to further develop a teacher observation instrument based on the construct of teacher adaptive practices. The study is of import to educational researchers and school leaders who are interested in the development and use of a valid and reliable teacher observation instrument designed for the purpose of promoting adaptive teacher practices.

■ **Keywords:** adaptive practice, classroom observation, validation

Adaptability is a key trait or disposition in the complex working environment of schools. Until recently, adaptability remained an ill-defined teacher trait that resided in the larger set of innate skills that teachers either possessed or not. Recent research, employing a validated scale, has identified links between the disposition of teacher adaptability and outcomes of interest to schools, including teachers' job satisfaction and students' academic engagement and achievement (Collie & Martin, 2016).

The foundation of this study resides in the conceptual framework proposed by Martin, Nejad, Colmar, and Liem (2012) that posits adaptability as an individual's capacity to 'constructively regulate psycho behavioral functions in response to new, changing, and/or uncertain circumstances, conditions and situations' (p. 66). Adaptability has been shown to predict positive academic and personal outcomes (Martin et al., 2012). The tripartite model of adaptability has three areas: cognitive, affective, and behavioural adaptability (Martin et al., 2012). Cognitive adaptability refers to an individual's capacity to adjust their thinking to constructively deal with change, novelty, and uncertainty. Affective adaptability refers to the modification of emotions in response to environmental change, uncertainty, and novelty. Behavioural adaptability refers to an individual's ability to problem solve and act in response to these changes in order to enhance personal and/or group outcomes. It is the possible observation of

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these actions, or adaptive practices, that is of interest to this study. We are deliberately using the term *practices* instead of *behaviours* to distinguish between teacher improvisation and the more systematic development of adaptive repertoire (Tomlinson, 2016).

The research into the general disposition of adaptability has been extended into the specific domain of teaching (Martin, Collie, Nejad, Colmar, & Liem, 2015). The Teacher Adaptability Scale has been developed, which has demonstrated strong relationships between the construct and outcomes of interest to schools, teachers, and students (Collie & Martin, 2016). This study has been designed to examine whether this relationship between teacher adaptability, classroom adaptive practice, and outcomes of interest could also be measured by a classroom observation instrument.

It is important for the purpose of this study to make a distinction between the newer construct of teacher adaptability and the older construct of adaptive expertise. There is a long-standing body of work on adaptive expertise in teaching generated through small-scale, classroom-based research (Anthony, Hunter, & Hunter, 2015; Bohle Carbonell, Stalmeijer, Könings, Segers, & van Merriënboer, 2014; Vaughn & Parsons, 2013, 2016; Vaughn, Parsons, Burrowbridge, Weesner, & Taylor, 2016; Yoon, Koehler-Yom, Anderson, Lin, & Klopfer, 2015). Therefore, while both could be considered valid theoretical constructs, the Teacher Adaptability Scale has stronger claims towards empirical validity, having been established through large-scale studies. It is also interesting to note that there have been no observation instruments developed to measure either construct, especially given the fact that the observation of teaching is a well-established measure of teacher practice (Pianta & Hamre, 2009).

In summary, the hypothesis of this study assumes that teacher adaptability is a disposition that underpins effective pedagogical responses to unpredictable and novel situations. Adaptive practice is the higher order observable practice component of this pedagogical response in classrooms. The aim of this study was to examine whether these adaptive practice behaviours can be validly represented by indicators in a teacher observation instrument.

Literature Review

The intellectual history of adaptive practice resides in the contemporary turn towards the learner in professional learning discourses. This broader focus on the learner is represented in what has been termed *assessment-centric teaching* and includes assessment for learning, formative assessment, and adaptive expertise. This review examines the key constructs of adaptive expertise, adaptability, and teacher adaptability within this broader context in order to argue for adaptive practice as a potential construct to underpin a teacher observation instrument.

Teacher adaptive practice may be conceptualised as part of a broader contemporary turn towards the learner in teacher professional learning. This turn can be seen in Hattie's seminal paper on the difference between experienced and expert teachers where he concluded 'that the three most important dimensions that effectively separated expert from experienced teachers were Challenge, Deep Representation, and Monitoring and Feedback' (Hattie, 2003, p. 5). Hattie's identification of monitoring and feedback echoed the findings of Black and Wiliam (1998) on the importance of formative assessment for learning. Both studies are representative of a research focus into what DiRanna et al. (2008) termed *assessment-centric teaching*.

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Assessment-centric teaching involves monitoring the impact of the teacher's behaviours on the learner. This is different from focusing solely on the actions of the teacher (teacher-centred) or the students (student-centred). It is also different from the historical pejorative expression of 'teaching to the test', as assessment-centric teaching implies continuous ongoing assessment rather than one-off summative assessment at the end of a teaching sequence.

Assessment-centric teaching is embodied in the plethora of teacher performance standards, including the latest iteration of the U.S. Interstate New Teacher Assessment Support Consortium model that describes the progressive focus of the teacher moving from 'delivery of instruction to the impact of practice on serving learner needs' (Council of Chief State School Officers, 2013, p. 13). Vaughn and Parsons (2013) depict this as how 'responsiveness provides a bridge to meet student interests, concerns and the specific instructional situation at hand' (p. 82). This evolution to a focus on the impact of teacher practices is critical for student learning in education systems, but there is no consensus in the literature on how this might be achieved. This situation provides justification for the focus in this study on the validation of an adaptive practice observation instrument that could measure a teacher's instructional responsiveness to their students.

There is a view in some education systems that finite resources should be expended on selecting teachers for training and employment based on their inherent disposition towards assessment-centric teaching through the use of situated judgment tests (Klassen, Durksen, Rowett, & Patterson, 2014). Another view is that a teacher's ability to adapt their instruction based on students' learning needs can be identified as a discrete practice and, therefore, is amenable to professional learning interventions. This view is represented by the literature on adaptive expertise (Anthony et al., 2015; Bohle Carbonell et al., 2014; Vaughn & Parsons, 2013, 2016; Vaughn et al., 2016; Yoon et al., 2015).

Adaptive expertise can be understood as a variation of routine expertise. Routine expertise is 'the ability to perform flawless in familiar situations' (Hatano & Inagaki, 1986, p. 262). Adaptive expertise is evident when individuals are faced with unfamiliar situations. In these situations, people with adaptive expertise can overcome the novelty and quickly regain a high level of performance, thanks to a knowledge representation that allows for flexibility (Schwartz, Bransford, & Sears, 2005). This flexibility is grounded in a foundation of practical wisdom: 'individuals with adaptive expertise possess the knowledge of why and under which conditions certain methods have to be used or new methods have to be devised' (Bohle Carbonell et al., 2014, p. 15). This definition of adaptive expertise is very close to Marzano's (2007) claim that: 'Individual classroom teachers must determine which strategies to employ with the right students at the right time' (p. 5). In this sense, adaptive expertise involves improvisation on the part of a teacher who has sufficient pedagogical repertoire. Aspects of this pedagogical repertoire have been mapped out in the adaptive expertise literature.

The adaptive expertise research program has identified particular pedagogical practices that are associated with adaptive expertise. Two of the most frequently published authors in this genre are Margaret Vaughn and Seth Parsons, who have developed a coding schema for qualitative data relating to teacher adaptations and the reasons teachers give for making these adaptations (Vaughn et al., 2016). The distinction between the adaptive behaviours and the teachers' reflection or reasons for their

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adaptions is interesting for this study as it alludes to both the focus and purpose of adaptive expertise.

Their coding schema has seven codes for teacher adaptations and nine reasons teachers commonly offer for making these adaptations. The seven adaptations are: (1) introduces new content; (2) inserts a new activity; (3) omits a planned activity, (4) provides a resource or example; (5) models a skill or inserts a mini lesson; (6) suggests a different perspective to students; and (7) pulls a small group, conducts an individual conference, or changes grouping structure (Vaughn et al., 2016, p. 261). It is not relevant to list the nine reasons given for the purposes of this review. Instead, it is enough to note their earlier definition of teacher adaptations as 'distinct moments in classroom instruction that require innovation as teachers respond to and build upon students' inquiries, ideas, and interests' (Vaughn & Parson, 2013, p. 81).

It is interesting to note that the 2016 special issue of *Theory and Practice* refers to adaptive teachers and adaptive teaching rather than adaptive expertise. This article is less concerned with the shift in terminology than it is with the validity of these terms as constructs; that is, do they lead to outcomes of interests to schools, teachers and students? The only validation argument made by Vaughn and Parsons (2016) was that 'our research team has examined teacher adaptations for nearly a decade to document how and why they adapted their instruction' (pp. 260–261). There is no mention of a measured correlation between the coded items and other measurable outcome of interest.

The American Educational Research Association (AERA) Test Standards (1999) endorse an integrated argument approach to validation that recognises a range of validation evidence. Although this range is broad, it is difficult to locate any of this validation evidence in the literature for adaptive expertise. Instead, this review now turns to an examination of the construct of teacher adaptability for evidence of validation. This construct is the teacher domain-specific variant of the broader construct of adaptability (Liem & Martin, 2015; Martin, 2012; Martin et al., 2012; Martin, Nejad, Colmar, Liem, & Collie, 2015). A self-report teacher adaptability scale has been developed (Martin, Collie et al., 2015).

There is emerging validation evidence of correlation to outcomes of interest for the Teacher Adaptability Scale. Collie and Martin (2016) collected data using the Teacher Adaptability Scale in a self-report survey of over 100 teachers from various Australian schools. They also obtained achievement test scores from over 1,700 students taught by these teachers. Four key findings were revealed in the study: (1) teachers who perceived the school principal as more supportive tended to report greater adaptability wellbeing and work commitment; (2) teachers who reported greater adaptability tended to experience greater wellbeing at work and greater work commitment; (3) teachers with greater adaptability and therefore higher levels of wellbeing tended to have students who achieved higher test results; and (4) a teacher's age, gender, and years of teaching experience did not seem to affect their adaptability (Collie & Martin, 2016).

The correlation evidence of the Teacher Adaptability Scale warrants investigation into the validation of a classroom observation instrument developed from the three behavioural items of the scale. These items are:

- I am able to seek out new information, helpful people, or useful resources to effectively deal with new situations.

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- In uncertain situations, I am able to develop new ways of going about things (e.g., a different way of asking questions or finding information) to help me through.
- To assist me in a new situation, I am able to change the way I do things if necessary (Martin, Collie et al., 2015).

These three items are not precise enough for a classroom observation instrument. Hence, the development of classroom indicators is the focus of the validation arguments presented in this article. To distinguish this classroom observation instrument from the Teacher Adaptability Scale, we adopted the title of 'adaptive practice' for our nascent instrument. The research question for this study was:

What is the validity of the indicators in a classroom observation instrument based on the construct of adaptive practice?

Methodology

This study adopted an integrated argument approach to the initial validation of classroom observation indicators of teacher adaptive practices. The initial validation phase involved the examination of possible indicators within the existing literature, expert group consultation, and classroom observations.

The AERA (1999) have officially adopted a unitary definition of validation that refers to types of validation evidence in their test standards. These types of validation evidence relate to the test content, the response processes, the internal structure, the relationship to other variables, and the intended and unintended consequences of the test (AERA, 1999). This unitary definition requires an integrated argument approach to validity that focuses more on what inferences can be made from an instrument rather than providing warrants for claims that the instrument has construct, content or other types of validity. This conception of validity draws attention to the quality of the evidence produced: 'a few lines of solid evidence regarding a particular proposition are better than numerous lines of evidence of questionable quality' (AERA, 1999, p. 11). This study looked to the literature, classroom observations, and both teacher and academic experts for validation evidence of the content of the Teacher Adaptive Practice Scale.

Method

This study confidently acknowledges the lack of a linear process of defined steps. Instead, it was a continuous process of drafting, testing, consulting, and rewriting, reflective of Zumbo's (2009) analogy of the process of validation as being like rebuilding a ship at sea. The ship, or the research process in our case, has to stay afloat and keep going while the necessary repairs or adjustments are made. Therefore, the data collection and analysis occurred concurrently as the indicators were continuously tested and subsequently refined as a result of the examination of each source of validation evidence.

The writing process of indicators for the adaptive practice observation instrument commenced with the three behavioural items from the Teacher Adaptability Scale (Martin, Collie et al., 2015). The process began with these items because they describe adaptability behaviours that could be observed in contrast to the cognitive and affective items in that scale. The last two items were more relevant when applied to the context of a teacher conducting a lesson alone in a classroom. These items are: (1) In uncertain situations that arise in the classroom, I am able to develop new ways of going about

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things (e.g., a different way of doing something or finding information) to help me through; and (2) To assist me in a new situation that arises in the classroom, I am able to change the way I do things if necessary (Martin, Collie et al., 2015). The co-authors constructed a preliminary list of 14 indicators (see Appendix A), beginning from the foundation of these two items, based on their own extensive experience in the area of classroom observation.

These initial 14 indicators were tested in the classroom to see if they were teaching behaviours that could be observed. Seventeen classroom lesson observations were conducted of teachers who were rated as expert by their principal. School principals are well placed in selecting teachers they believe represent quality teaching in their schools.

Three focus groups of expert teachers were conducted. There were eight teachers in the first group and four in the second and third groups. The first consult was conducted with a break-out group of teachers at a micro-hack conference designed for the purpose of giving feedback on educational innovations. The second and third groups were held at schools at the end of the day with the expert teachers who had been the subject of classroom observations.

Two consultations were also held with academic experts in this area. The first of these consultations was part of a colloquium on teacher adaptability and the second was with Professor Andrew Martin, the head of the Educational Psychology Research group that created the Teacher Adaptability Scale (Martin, Collie et al., 2015). The result of the continuous method of data collection and analysis was a Teacher Adaptive Practice Scale of 15 indicators (see Appendix B).

Results

The results presented in this article are the report of the process of generating validation evidence for the Teacher Adaptive Practice Scale. The integrated validation evidence for this was sourced from the teacher observations, teacher and academic expert groups, and the relevant literature. The data from these sources informed the continuous item writing and rewriting process.

The initial 17 classroom observations provided useful validation evidence on the draft adaptive practice scale. The first validation argument we made was that some of our initial indicators (learning intentions and success criteria, multiple modalities) were designed by the teacher before the lesson rather than being an adaptive practice in the lesson. In the interest of clarity, these items were pared from the list in the first round. The second validation argument constructed from this first round of observations related to the overall purpose of the scale. We decided to distinguish and disregard adaptive practices that occurred for the purpose of instructional and managerial efficiency in favour of those adaptive practices that promoted student thinking. This distinction is evident in the modification of indicator 5 in the original scale, flexible pacing (Appendix A), being linked to student learning in the next draft as item 12, 'the teacher demonstrates flexible pacing of lesson in response to student learning needs' (Appendix B).

In the three teacher focus groups the participants were asked their considered professional opinion on whether our draft indicators constituted adaptive practices that lead to creative and critical thinking on the part of the students. In one of these focus groups, a teacher summarised the indicators as: 'It's when the teacher follows the

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student and not the script.' Other comments related to school contexts where adaptive practices might be enabled, such as in team teaching of integrated cross-curricular units. There was also commentary on adaptive practices being a developmental milestone not available to early career teachers. These comments alerted us to two key aspects that resulted in a focus on indicators of teacher practices and a commitment to developing an observation instrument applicable to all teacher regardless of their experience. This decision was supported by Hattie's (2003) synthesis of the research evidence that found no correlation between teacher experience and teacher expertise.

Feedback gathered from the consultations with our academic colleagues reminded us of the importance of consistency in language use with the indicators. This consistency is important when the instrument is intended for use by multiple raters. The feedback was added to the data gathered from the initial 17 observations and three teacher focus group consultations, to create the 15 indicators in Appendix B. These indicators were then compared to the current research evidence on effective teaching. This process provided some extrapolation evidence that our indicators represented what the literature regarded as being quality teaching practices that lead to improved student outcomes.

The draft indicators for adaptive practice were reviewed in the literature in accordance with the 'extrapolation inference' (Bell et al., 2012, p. 8) to see if these indicators concur with existing conceptions of teacher quality. There were two sources of existing conceptions of teacher quality reviewed. The first was a classroom practice continuum created by a recognised expert in the field of classroom observations (Australian Institute for Teaching and School Leadership, 2014b). The second was Hattie's (2012) extensive meta-analyses on the in-class factors that contribute to learning.

The classroom practice continuum (CPC) developed by Professor Patrick Griffin for the Australian Institute of Teaching and School Leadership (2014b) is a six-level continuum that is not a pedagogical model but 'is built on and explicitly privileges the evidence base about those practices that have a high impact on student learning and achievement' (Australian Institute for Teaching and School Leadership, 2014a, par. 14). This synthesis of observable behaviours of effective teaching draws heavily from the criteria for expert teaching developed from a validity study of the certification system of the National Board for Professional Teaching Standards in the United States' (Smith, Baker, Hattie, & Bond, 2008) research studies. These criteria were initially developed from Hattie's paper on expert and experienced teachers (2003), so there is a common starting point, with both sources of research evidence used in the collection of validation evidence for the Teacher Adaptive Practice Scale.

The commonalities between the two sources extend beyond their genesis. They were both chosen for this study because they are syntheses that draw upon many other research studies. Hattie's meta-analysis was based on 800,000 individual studies (2012) while the CPC was built upon the evidence base of the National Board evaluation in the United States (Smith et al., 2008), the more recent work on learning progressions for teachers by the Council of Chief State School Officers (2013) and credible learning theory based upon the work of Rasch, Glaser, Vygotsky, and Bruner (as cited in Australian Institute for Teaching and School Leadership, 2014b).

All of the adaptive practice indicators describe teacher behaviours that occur in response to an on-the-spot assessment of student learning. In Hattie's work, this is termed *feedback*, with an overall effect size of 0.73 (Hattie, 2012, p. 173). However,

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this is not feedback in the commonly understood direction of teacher to student but the reverse:

> *When teachers seek, or at least are open to, feedback from students as to what students know, what they understand, where they make errors, when they have misconceptions, when they are not engaged — then teaching and learning can be synchronized and powerful. (Hattie, 2012, p. 173)*

Specifically, indicators 1–6 and 12–15 seem to embody the required shift from teacher delivery of content to the monitoring of student learning suggested by Hattie's practice of feedback (see Appendix C). As acknowledged in the literature review in this article, the focus on the formative assessment of student learning is a broader turn in classroom practice research that is also reflected in the work of Marzano (2003, 2007), William and colleagues (Black & Wiliam, 1998; Leahy, Lyon, Thompson, & Wiliam, 2005; Wiliam, 2011, 2014) and the assessment for learning project (Hume & Coll, 2009; Klenowski, 2009; Mansell, James, & The Assessment Reform Group, 2009; Moss & Brookhart, 2010).

The classroom practice continuum (CPC; Australian Institute for Teaching and School Leadership, 2014b) provided some validation evidence that our adaptive practice indicators constitute what the research evidence regard as effective teacher practices. The adaptive practice indicators in Appendix B correspond with descriptors that are clustered at the higher end of the CPC continuum. Indicator 3 of our scale is taken directly from level 6 of the CPC while indicator 2 is a close match to another sentence from level 6 (see Appendix C). Indicators 1, 4, 5, 6, 7, 8, 12 and 13 in our scale are linked to descriptors in levels 4–6 of the CPC (see Appendix C).

Indicators 9–11 in our nascent Teacher Adaptive Practice Scale could not be directly linked to Hattie's work or the CPC, but their identification in our classroom observations and focus groups warrant their inclusion in the scale at this stage. Further rigorous validation of the instrument will occur in the next phase of this study, which will test these items again.

Discussion

This study was designed for the purpose of ascertaining the validity of the indicators in a classroom observation instrument based on the construct of adaptive practice. The evidence gathered from the expert group consultation, classroom observations, and a review of the relevant literature suggests that there is sufficient validation evidence to proceed with further testing of the Teacher Adaptive Practice Scale. There were also two key issues that emerged from this initial process of validation, centring on the subject of the observation, the developmental question.

The initial design of the teacher adaptive practice classroom observation instrument was based on two items from the Teacher Adaptability Scale (Martin, Collie et al., 2015). These items were:

1. In uncertain situations, I am able to develop new ways of going about things to help me through; and
2. To assist me in a new situation, I am able to change the way I do things if necessary.

We argued that these items were too broad to be used verbatim in a classroom observation item. Instead, the focus was on creating indicators that conveyed the intent of these two items, of how adaptable teachers are adept at changing tack in

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lessons in response to changes in student learning behaviours. The verbs used in the indicators reflect this dynamism: modifies (3), prompts (3), demonstrates (2), uses (2), provides (2), creates (1), links (1) and negotiates (1). We argue that this is validation evidence that the adaptive practice indicators represent the construct of teacher adaptability.

Another source of validation evidence was the review of what has been described in the literature as an assessment-centric approach to teaching (DiRanna et al., 2008). We argued that the separate literatures on assessment for learning, feedback, and formative assessment could be grouped under the umbrella term of assessment-centric teaching. This instructional paradigm is represented by the INTASC (2013) progression from a teacher's focus on delivery of instruction to the impact of their practice upon learners. Three of the indicators (1, 4, 14) in the nascent teacher adaptive practice scale specifically reference formative assessment:

1. The teacher modifies learning goals in response to formative assessment.
4. The teachers uses formative assessment to differentiate their responses to individual students.
14. The teacher creates groups of students based upon formative assessment.

A further three indicators (2, 3, 12) imply the act of formative assessment:

2. The teacher modifies their instructions during the lesson to increase learning opportunities.
3. The teacher negotiates assessments with students, ensuring these are aligned with learning goals.
12. The teacher demonstrated flexible pacing of lesson in response to student learning needs.

These direct and indirect links of six of the indicators in the assessment-centric literature provides validation evidence that the content they represent is regarded as substantive and important in the peer-reviewed literature.

The validation evidence generated from the focus group consultations suggests that the Teacher Adaptive Practice Scale is measuring teacher behaviours that were valued by our sample of the teaching profession. We cite a quote from one of our focus group members, 'it's where the teacher follows the students and not the script', as representative of the understanding from our expert teachers that we were trying to measure something of value. The teacher groups also highlighted two key issues that we needed to address.

The first key issue concerned the subject of the observation instrument. The focus groups generated data that related to the collective origins of adaptive practices in team-teaching. The argument we heard was that the context of team-teaching created an adaptive practice context that promoted adaptive behaviours in teachers. This focus on the classroom environment is one part, alongside the student and teacher, of what is known as the instructional core by the instructional rounds methodology of professional learning (City, Elmore, Fiarman, & Teitel, 2011). Other classroom observation instruments, such as the Class-S in the United States (Pianta, Hamre, & Mintz, 2012) and the quality teacher model in Australia (NSW Department of Education and Training, 2003), choose to focus primarily on the teacher. We decided our focus needed to be on the teacher, as we wished to measure teacher adaptive practices that occurred in anticipation of or in response to student learning needs.

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The second issue in the initial phase of validation was the developmental question. A theme across the focus groups was the notion that teacher adaptive practices are a developmental milestone rather than something that teachers can practise from the beginning of their careers. This argument is beguiling, as it fits with the commonsense understanding that learning progresses from the simple — in the case of teachers, this is lesson preparation and classroom management — to the more complex skills such as adaptive responses to student learning. The counterpoint to the developmental progression argument are studies such as Hattie's (2003) article on the difference between expert and experienced being in their skillset rather than their longevity in the classroom. The implication is that some teachers may never progress from their mastery of the basic teaching skills unless prompted by appropriate professional strategies that aim to build the more complex skills from the outset of their career.

Conclusion

This study undertook an argument approach to the validation of a classroom observation instrument based on the construct of adaptive teacher practices. The evidence for the arguments was gathered from the extant literature, from classroom observations of teachers, as well as focus groups of expert teachers and education researchers. The evidence gathered thus far warrants further validation of the construct with outcome measures of interest.

The process of validation involved significant modification of the draft indicators that we began with. This modification was a non-linear process analogised to fixing a ship at sea that occurred while we tested the draft Teacher Adaptive Practice Scale in classroom observations and focus groups while continuously going back to the literature on what we called assessment-centric teaching.

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Conflicts of Interest

None.

Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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Appendix A

Initial Adaptive Practice Scale

1. Learning Intentions and Success Criteria evident
2. Dynamic Grouping
3. Many conceptual representations used as required

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4. Act upon data gathered during concept review tasks set for students
5. Flexible pacing
6. Seeking student feedback
7. Filling unexpected gaps
8. Literacy/Numeracy scaffolds used as required
9. Negotiate post-lesson activities
10. Provide more content depth as required
11. Negotiate assessment tasks
12. Adjust learning instructions throughout
13. Choice of learning activity based upon agreed learning goals
14. Content added at student suggestion

Appendix B

Adaptive Practice Scale

1. The teacher modifies learning goals in response to formative assessment.
2. The teacher modifies their instructions during the lesson to increase learning opportunities.
3. The teacher negotiates assessments with students, ensuring these are aligned with learning goals.
4. The teacher uses formative assessment to differentiate their responses to individual students.
5. The teacher prompts students to discover key concepts through responsive open ended questions.
6. The teacher prompts students to express their thinking and used this as a springboard for learning activities.
7. The teacher uses a thinking routine to prompt deeper exploration of concepts or skills.
8. The teacher prompts students to demonstrate open-mindedness and tolerance of imaginative solutions to problems.
9. The teacher provides a synthesis of class generated ideas.
10. The teacher links, when appropriate, lesson concepts to larger disciplinary ideas.
11. The teacher provided imaginative suggestions to increase learning opportunities.
12. The teacher demonstrates flexible pacing of lesson in response to student learning needs.
13. The teacher demonstrates responsive use of literacy/numeracy interventions.
14. The teacher creates groups of students based upon formative assessment.
15. The teacher modifies homework in response to lesson progress.

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Appendix C

Adaptive Practice Indicators Mapped to Hattie (2012) and Australian Institute for Teaching and School Leadership Classroom Practice Continuum (2014b)

	Indicator	Reference
1	The teacher modifies learning goals in response to formative assessment.	CPC6: 'The teacher supports students to use evidence, including prior learning experiences, in personalising and revising their learning goals and aligning them with the curriculum standards' (AITSL, 2014b, p. 96). Goals 0.56 effect size (Hattie, 2012 p.298); Feedback 0.73 effect size (Hattie, 2012 p. 173).
2	The teacher modifies their instructions during the lesson to increase learning opportunities.	CPC6: 'They spontaneously adjust their instructions during the lesson to increase learning opportunities and improve students' understanding' (AITSL, 2014b, p. 96). Feedback 0.73 (Hattie, 2012 p. 173).
3	The teacher negotiate assessment strategies with students, ensuring these are aligned with learning goals.	CPC6: 'They negotiate assessment strategies with students, ensuring these are aligned with learning goals' (AITSL, 2014b, p. 96). Feedback 0.73 (Hattie, 2012 p. 173).
4	The teacher uses formative assessment to differentiate their responses to individual students.	CPC6: 'The teacher uses cues to differentiate between their responses to individual students throughout the learning time' (AITSL, 2014b, p. 96). Feedback 0.73 (Hattie, 2012 p. 173).
5	The teacher prompted students to discover key concepts through responsive open ended questions.	CPC4: 'They encourage students to justify and provide reasons for their responses to questions' (AITSL, 2014b, p. 96). Significant scepticism from Hattie on purpose of teacher questioning when they already know the answer (Hattie, 2012 p. 182)
6	The teacher prompted students to express their thinking and used this as a springboard for learning activities.	CPC6: 'The teacher supports the students to generate their own questions that lead to further inquiry' (AITSL, 2014b, p. 96). Feedback 0.73 (Hattie, 2012 p. 173)
7	The teacher uses a thinking routine to prompt deeper exploration of concepts or skills.	CPC4: 'They use conversation topics that generate thinking and they encourage students to justify and provide reasons for their responses to questions' (AITSL, 2014b, p. 94).
8	The teacher prompted students to demonstrate open-mindedness and tolerance of imaginative solutions to problems.	CPC5: 'They give students time to grapple independently with the demanding aspects of open-ended tasks' (AITSL, 2014b, p. 95).
9	The teacher provided a synthesis of class generated ideas.	
10	The teacher links, when appropriate, lesson concepts to larger disciplinary ideas.	

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	Indicator	Reference
11	The teacher provided imaginative suggestions to increase learning opportunities.	
12	The teacher demonstrated flexible pacing of lesson in response to student learning needs.	CPC4: 'The teacher prompts, listens actively, monitors and adjusts instruction and assessment tasks based on feedback from students' (AITSL, 2014b, p. 94). Feedback 0.76 (Hattie, 2012 p. 173).
13	The teacher demonstrated responsive use of literacy/numeracy interventions.	CPC4: 'The teacher focuses practice on specific skills and processes, including literacy and numeracy, in response to student needs' (AITSL, 2014b, p. 94). Feedback 0.76 (Hattie, 2012 p. 173).
14	The teacher creates groups of students based upon formative assessment.	Feedback 0.76 (Hattie, 2012 p. 173).
15	The teacher modifies homework in response to lesson progress.	Feedback 0.76 (Hattie, 2012 p. 173).

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