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The Policy-driven Dimensions of Teacher Beliefs about Assessment

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Abstract: Despite the advancement of the conceptualisations of teacher assessment literacy, teachers' assessment practices remain relatively low due to misalignment between teachers' beliefs on assessment and principles of effective assessment practices. The current assessment reform in the Philippines has not gained significant traction despite the ongoing professional development programs focused on enhancing teacher assessment literacy. We argue that to change teachers' exam-dominated assessment practices towards a more student-centred approach, there is a need to explore teachers' beliefs in assessment. Hence, we developed a context-driven tool using both theoretical and empirical approaches that could measure this construct, and which the results could provide a stronger foundation for professional development program. Factor analyses extracted nine dimensions that describe teachers' assessment beliefs: assessment for professional learning, for motivation, for measurement, for planning, for engagement, for learning, for evaluation, for norm-referencing and for instructional accountability. Implications of findings for teacher professional development and practice are discussed.

Keywords: teacher assessment beliefs, dimensions of teacher assessment beliefs, professional development

Introduction

The strong focus of professional learning and practice on teacher assessment literacy (AL) is supported by its strong theoretical and empirical evidence (Black & Wiliam, 1999; Hattie, 2008; Popham, 2009; Wiliam, 2017). However, even with the advanced conceptualisations of this construct and the numerous professional development programs for teachers, teachers' assessment practices remain relatively low (Davison & Michell, 2014). This is a similar case found in the Philippine educational system where the current assessment reform has not gained significant traction across the country in raising teacher assessment literacy. The Department of Education (DepEd) Order No. 8, series of 2015 otherwise known as the "Policy Guidelines on Classroom Assessment for the K to 12 Basic Education Program" specifies the guides for implementing the principles and practices of effective assessment. However, despite significant efforts to shift teachers' examination-

driven practices to a more student-centred approach, focused on using assessment to effectively support students in their learning, there is little evidence to support the effectiveness of the reform.

One of the most cited and well-argued factors that hinders teachers' ability to change their practices is the failure to change their belief system (Fives & Buehl, 2016). Research into teacher beliefs in assessment shows that their alignment to the philosophy of effective practices frame and guide teachers' adoption and implementation of effective assessment practices (Looney, Cumming, van Der Kleij, & Harris, 2017). In contrast, a conflict between teachers' beliefs and principles of effective assessment will filter their practices (Bonner, 2016). Hence, it is imperative that to change teachers' assessment practices, there is a need to explore their beliefs held and find ways to align these beliefs to the aims of the assessment reform.

Researchers and educators argue that an assessment literacy program aimed at supporting teachers to enhance their assessment literacy should begin with measuring their beliefs in assessment (Brown, 2004) and develop professional programs to change these beliefs. There have been several tools developed to measure teachers' beliefs in assessment (Loc, 2016) and conception of assessment (Bonner, 2016; Brown, 2004), but these were developed for specific context. It has been clearly shown by the study of Brown, Gebril, and Michaelides (2019) on determining whether any models of teachers' beliefs in assessment can be applied to different contexts that a single global tool for measuring teachers' beliefs about assessment does not exist. This finding is consistent to the context-driven nature of assessment that cultural, political and local factors influence teachers' assessment beliefs and practices.

To effectively support the implementation of the DepEd Order No. 8, series of 2015 of the Philippine educational system, there is a need to develop a more context-driven tool to measure Philippine teachers' assessment beliefs. This is due to the fact that teachers from different contexts hold different views on assessment (Brown, Hui, Yu, & Kennedy, 2011; Dayal & Lingam, 2015). Drawing upon the principles of effective assessment indicated in the DepEd Order No. 8, series of 2015 of the Philippines, curriculum innovation and change, and effective assessment practices under the philosophical framework of assessment *for learning* (AfL), we developed a Philippine teachers' assessment beliefs tool to guide the development and implementation of a more effective assessment literacy program. Theoretical and empirical approaches were combined, using several rounds of experts' validation and an application of exploratory and confirmatory factor analyses.

Review of Literature

This review of literature examines both theoretical and empirical approaches to explore teacher assessment beliefs. We begin by arguing the critical roles of teachers' beliefs in filtering, shaping and guiding their assessment practices. Then, we argue why there is a need to develop a new tool to measure teachers' assessment beliefs despite the continuous edition of related tools. Also, a critical analysis on issues related to teacher assessment practices is presented to foreground the theoretical dimensions of Philippine teachers' assessment beliefs.

Roles of Belief in Improving Practice

The roles of beliefs in teachers' assessment practices have been clearly established in

the literature since the early 90s. For example, the work of Borko and Putman (1996) highlights that teacher beliefs are the major influence in what they do. Therefore, the key to ensuring that teachers' practices are aligned to the principles of effective assessment practices is to ensure that teachers' beliefs are aligned to these principles. As such, any incoherence between teachers' beliefs with these principles will compromise their practices and their beliefs would have filtering effects to what they actually do (Bonner, 2016). In contrast, the study of Looney et al. (2017) shows that the alignment of teachers' beliefs to the principles of effective assessment practices will frame and guide teachers' adoption and implementation of effective assessment practices.

The Existing Tools for Teachers' Beliefs or Conceptions

There are several tools developed to measure teachers' beliefs in assessment. For example, a tool to measures science teachers' assessment beliefs and practices was developed by Genc (2005). In addition, the Vietnamese pre-service EFL teachers' assessment literacy developed by Loc (2016) contains items that measure teachers' beliefs in a very specific context.

Some other tools go beyond measuring teachers' beliefs in assessment. Brown (2004) use the teachers' conception of assessment as an overarching construct to describe teachers' views and interpretation of assessment. According to Brown (2004), there are four dimensions that describe teachers' conception of assessment. These are that: "assessment is for the *improvement* of teaching and learning; assessment is for making *schools accountable* for their effectiveness; assessment is for making *students accountable* for their learning; and assessment that has no purpose and is *irrelevant* or detrimental to the life and work of teachers and students." Although the work of Brown has been extensively tested in New Zealand, it appears that the tool cannot be applied for other educational systems. The results of studies using the tool in Hong Kong (Brown, Kennedy, Fok, Chan, & Yu, 2009), Egypt (Gebril & Brown, 2014), and China (Brown et al., 2011) extracted the same factor structure but the correlations amongst the dimensions are different. Contrary to New Zealand teachers' beliefs that student improvement is not highly associated with student accountability in learning, teachers from these examination-driven bureaucracies have higher beliefs that students are held accountable for their learning. Given this evidence, it can be construed that teachers from different context hold different beliefs on assessment. A single universal tool for measuring this construct is not ideal, and hence, every educational system should have their own tool to help teachers to determine their level of belief about assessment.

Issues on Teacher Assessment Practices

There are two prevailing issues associated with teacher assessment practices: (1) the various conceptualisations and interpretations of this construct; and (2) their alignment to the principles of effective assessment practices.

The various conceptualisations and interpretations of what constitute an effective assessment practices pose significant problem in defining what constitute effective assessment practices. Among the existing conceptualisations, assessment experts have long argued for teachers' ability to use student assessment data to guide and enrich student learning (e.g., Black & Wiliam, 1999; Stiggins, 2005; Hattie, 2008) as the most relevant and student-centred assessment approach. Broadly, it is represented by a philosophical framework

referred to as assessment for learning (AfL). It embodies a paradigm shift of classroom assessment from recording and evaluating student achievement to helping and encouraging student active engagement in learning through assessment (Black & Wiliam, 1999; Hattie, 2008; Hattie & Timperley, 2007; Kluger & DeNisi, 1996).

As indicated earlier, teacher assessment knowledge and skills can be characterised as a highly situated construct, which means that it must be operationally defined for a particular educational system. From a synthesis of more than 800 meta-analyses studies, Hattie (2008) commented that “the remarkable feature of the evidence is that the biggest effects on student learning occur when teachers become learners of their own teaching, and when students become their own teachers” (Hattie, 2008, p. 22). In other words, improving achievement means ensuring that students take full responsibility of their learning and they are able to self-assess and to self-monitor their progress. However, these abilities of students are not innate and need to be developed by teachers. Thus, the way to develop self-regulated students lies through the ability of the teachers to provide opportunities for students to self-assess and to self-monitor their learning progress.

The views of several authors form the theoretical background of our discussion of teacher assessment literacy. From the early 1960s, there has been a continuous stream of publications, including both books and training materials, on assessment. The focus of earlier assessment literacy was on the measurement principles, but later shifted to the assessment knowledge and skills that teachers needed in the classroom. This is evident in the views of Fullan (2002) who equates assessment literacy with teachers and principals’ capacity to use student achievement data to increase learning, and to inform policy makers on the uses and misuses of achievement data.

Apart from this, Webb (2002) Mandinach and Gummer (2016) highlight the importance of using assessment data to improve teaching and effectiveness of the educational programs to help students’ learn. Over time, these professional and technical emphases have evolved to include a more holistic view of the concept of assessment literacy. Stiggins (2005) describes the characteristics of assessment literate teachers as teachers who “know the difference between sound and unsound assessment; they are not intimidated by the sometimes mysterious and always daunting technical world of assessment” (p. 240). These teachers are confident in their capacity to undertake the necessary preparation and planning. They determine the object of their assessment, the purpose of doing it, the best way to assess the construct of interest, the best way to generate exemplary performance of students, the misrepresentation of assessment, and the negative effects of inaccurate assessment. This view of Stiggins is consistent with the view of Popham (2011) that teacher assessment literacy involves teachers’ “understanding of the fundamental assessment concepts and procedures deemed likely to influence educational decisions” (p. 265). Popham’s emphasis is on teacher ability to use assessment to inform decisions related to student learning and effective teaching, which is becoming the focus of recent educational reforms (Alonzo, Leverett, & Obsioma, 2021).

Following this period, the emphases of assessment literacy have broadened to include critical views of testing and its social consequences (McNamara & Roever, 2006) and the social roles of assessment (Inbar-Lourie, 2008), including the roles of teachers in providing assessment information to stakeholders (Taylor, 2009). Also, assessment literacy is no longer confined to teachers but there is now a growing emphasis on the assessment literacy of other stakeholders (Davison, 2013). This trend has been shaped by pressures at the system level where the effectiveness of teacher assessment practices is constrained by the external pressures due to the inconsistencies of understanding and expectations of other stakeholders. This call for stakeholder assessment literacy was first evident in Popham’s (2009) view that

assessment literacy is directly linked to the responsibilities of people, which means that different stakeholders have different assessment literacy needs. Teacher assessment literacy is a critical factor for addressing the assessment needs of, and building the assessment literacy of, stakeholders (Taylor, 2009).

In recent years, there has been a strong emphasis on teacher data literacy (Mandinach & Gummer, 2013, 2016) which requires teachers to use both classroom assessment data and high-stake external examination results to support individual students in their learning. This requires teachers' ability to use summative assessment for formative purposes (Black, 2015, 2017). The focus is no longer on the types of assessment that teachers need to use but more on the purpose of using a range of assessment activities. Black (2017) explored the relationship of FA and SA by framing both within an overarching, model of pedagogy. In addition, there is also a strong emphasis on ensuring trustworthiness of assessment and assessment decisions to make trustworthy assessment decisions aimed to increase student outcomes (Alonzo, 2016).

Taking into account all the issues discussed so far, teacher who are assessment literate translates assessment principles and knowledge into practice to ensure student learning. These principles and knowledge are manifested by teachers' skills in using assessment and analysing assessment information to make important decisions in their learning and teaching context. There are six general clusters of knowledge and skills that comprise assessment literacy. First is the ability of the teachers to develop and use a wide range of assessment strategies to gather robust assessment data (Stiggins, 2005). Second is the ability of the teacher to reflect on the assessment data – both student achievement and student characteristics – and use this information to develop lesson plans and implement instruction. Webb (2002) offers a definition of assessment literacy that encompasses this ability of the teachers "as the knowledge of means for assessing what students know and can do, how to interpret the results from these assessments, and how to apply these results to improve student learning and program effectiveness" (p. 1). Third are the skills of the teachers to actively engage students in the assessment, learning, and teaching activities. Fourth is the teacher's use of assessment to enhance and sustain student motivation. As argued by McMillan (2003) teachers need to assess students' motivation to better understand them and to make contextualised assessment decisions. The teacher needs to know if the assessment task is enhancing students' engagement in learning and if the students are exerting effort in trying to accomplish the task. Fifth is the ability of the teachers to reflect on their practices and assessment data to identify their professional needs both in assessment knowledge and in curriculum-content knowledge (Timperley, 2011) and engage in a professional learning, which is an important environmental condition for effective implementation of assessment (Loughland & Alonzo, 2019). Sixth is the ability of the teachers to establish strong partnerships with stakeholders by providing them their assessment information needs. Clear understanding of the principles of AfL will help make the implementation of AfL be more effective. For example, policy makers can review assessment policies to ensure that external factors are helping teachers make assessment information more relevant (McMillan, 2003).

Theoretical Dimensions of Philippine Teachers' Assessment Beliefs

Building on from the conceptualisations above of teacher assessment practices and cross-checking with the DepEd Order No. 8, series of 2015, Philippine teachers' beliefs in assessment has the following theoretical dimensions.

First, teachers see assessment for measuring student learning. This is the most common perception on assessment. Teachers design and implement assessment to measure

individual students' learning (Stiggins & Chappuis, 2005) and use the results for various purposes. It has been clearly argued that the other functions of assessment are dependent on the outcomes of assessment (Black, Harrison, Lee, Marshall, & Wiliam, 2003). Hence, teachers' beliefs in using assessment to measure student outcomes are critical to ensure other functions of assessment.

Second, teachers view assessment as a tool for motivating students. The role of assessment in improving student engagement is supported by a range of evidence. It has been argued that the use and misuse of assessment could either promote or compromise student motivation (Dweck, 2007), and ultimately influence students' learning (Bevitt, 2015).

Third, teachers believe that assessment can be used to engage students in their learning. Student engagement and motivation are related concepts (Martin & Dowson, 2009) but teachers' use of assessment to engage students in their learning could be the precursor for enhancing student motivation. These beliefs of teachers are related to how they provide opportunities for students to take accountability for their learning and for their active participation in all assessment activities (Bird & Yucel, 2015; Walker, 2015). Students' voice in assessment is a critical factor for the success of any assessment strategy being implemented by teachers (Tong & Adamson, 2015).

Fourth, teachers perceive that assessment can be used as learning activities. These beliefs of teachers lend strong support to the constructivist view of assessment where student learning is constructed while they are engaging in assessment tasks that take the nature of learning tasks (Keppel & Carless, 2006). Teachers beliefs related to this, will guide their ability in planning learning and teaching activities to consider how to properly embed assessment in their teaching (Marshall & Drummond, 2006). The engagement of students in various assessment tasks as learning tasks, which requires them to utilise a range of cognitive processes beyond recalling and recognising information will increase knowledge building and skills development (Howells, Fitzallen, & Adams, 2016; Mayer, 2002).

Fifth, teachers believe that assessment can be a guide for planning learning and teaching activities. These beliefs highlight the pedagogical use of assessment and assessment data. Teachers need to hold a strong view that student assessment data are important input for teachers' instructional design and planning (Moss, 2003). These data include students' interests (Mandinach & Gummer, 2016), prior knowledge and experience (Kalyuga, Chandler, & Sweller, 2001). Certainly, planning of classroom activities requires a high level of teacher understanding of student learning characteristics, levels and maturity of student learning. As asserted by Hattie (2003), expert teachers take into account the unique context of each classroom and all other factors that affect student learning and use them in planning learning and teaching. As teachers understand more about the complexities of the classroom climate, they can set higher expectations for learning, proven to enhance achievement (Hattie, 2008).

Sixth, teachers perceive that assessment is for evaluation of student outcomes. These teachers' beliefs are leaning towards one of the functions of assessment in a high-stake educational system. It is somewhat related to teachers' beliefs of assessment for measurement, but these are specific in the use of assessment to determine who pass the course, for ranking purposes and to pass judgment on students' overall performance (Stiggins, 2005).

Seventh, teachers view that assessment functions for norm-referencing. This is another aspect of a high-stake educational system. Comparison is made amongst students to establish their relative placement against the overall cohort (Biggs, 1999). This addresses the concerns of the schools to determine high performing students who will receive academic awards at the end of the year (Stiggins, Arter, Chappuis, & Chappuis, 2007).

Eighth, teachers view that assessment results can be used as a basis for their professional learning. The ability of the teachers to reflect on their needs based on student assessment information and their assessment experience is highlighted in the literature (Timperley, 2011; Timperley & Alton-Lee, 2008), in their teacher inquiry and knowledge-building cycle. They stress that after collecting information about the current level of students' learning and the knowledge and skills needed by students to achieve their learning outcomes, teachers need to identify what knowledge and skills they need to have to assist students in their learning.

Ninth, teachers believe that assessment results can be used for teaching performance evaluation. This set of beliefs is highlighted in the work of Brown (2004) which emphasises the use of assessment as a tool for making schools accountable. If these teachers' beliefs are aligned for school improvement, it will have a positive impact to student outcomes.

Method

We used a two-stage approach in developing the tool to measure teachers' beliefs in assessment aligned to the DepEd Order No. 8, series of 2015 and underpinned by the philosophical framework of A_fL. In the first stage, we used the theoretical approach (Bryman, 2016) and engaged 10 teachers, 3 principals and two education supervisors in focus groups to explore their perceptions in relation to the purposes and functions of assessment. The tool underwent a series of validation with five teachers and two assessment experts. They were asked to review the items including its content and language use and their feedback was used to revise the tool. This step ensures the content validity of the tool that it covers a range of teachers' beliefs about assessment.

In the second stage, the tool was pilot tested with 38 teachers. Results of the pilot test using the general partial credit analysis of the Rasch model using Conquest software showed that the tool has a high Cronbach's alpha (0.96), discrimination indexes range from 0.45 to 0.72, all mean fit square value is close to 1 and within the confidence interval and there was no evidence of category disordering. These results initially suggested that the tool has good psychometric properties. To establish the empirical support for the construct, we sent out an email to recruit teachers across the country and 568 participated in the survey (142 males; 408 from public schools; 356 high school). The inclusion criteria for participation include at least 1 year of teaching experience and employed full-time. Participant consents were sought prior to administering the survey.

We randomly split the sample to comprise two data sets: one for exploratory factor analysis (EFA) and one for confirmatory factor analysis (CFA). We used the maximum likelihood with direct oblimin rotation for EFA using SPSSv24. Initial screening of the data was performed to check for factorability. We checked the item correlations, Kaiser-Meyer-Olkin of sampling adequacy, Bartlett's test for sphericity. In the actual EFA, we checked the results for eigenvalues, scree plot, cross loadings and we included only items with factor loadings greater than 0.30. The CFA was conducted using the Mplus Software v7 (Muthén & Muthén, 1998-2012). We used the conventional threshold values of good fit (Kline, 2010; Marsh et al., 2009; Tabachnick & Fidell, 2007) of the following indexes: root mean square error of approximation (RMSEA) = $\leq .08$, comparative fit index (CFI) = $\geq .90$, Tucker-Lewis index (TLI) = $\geq .90$ and weighted root mean square residual (WRMR) = ≤ 1.0 . Missing data was imputed using the Mplus default Full Information Maximum Likelihood (FIML) estimation.

Results

In this section, we present the empirical evidence for the dimensions of teacher beliefs in assessment in the Philippine context. Both the results of EFA and CFA are presented to provide bases for choosing the most parsimonious model for the construct.

Factorability and EFA Results

There was no outlier observed in two subsets of the data. Analysis of the factorability of the items showed positive correlations among items ranging from 0.15 to 0.71. In addition, the Kaiser-Meyer-Olkin measure of sampling adequacy is 0.74 and the Bartlett's test of sphericity was significant ($\chi^2(284) = 7701.24$; $df = 1326$; $p < .0001$). Further, the communalities range between 0.80 to 0.98, which are all above 0.30. All these indexes support the factorability of the 52 items of the tool. The first round of EFA analysis extracted 11 factors that explained 79.01% of the variances observed. Further EFA analysis was done, by subsequently deleting non-loading and cross loading items, produced nine factors, which explained 65.34% of the variance observed. In the final EFA, only 34 items were retained with factor loadings from 0.35 to 0.98. The scree plot analysis supports this 9-factor model. This 9-factor model of teachers' beliefs in assessment was further tested using the other subset of the data through CFA.

CFA Results

Results of the CFA showed that the data fit the 9-factor model with chi-square and degrees of freedom ratio equal to 1.45, which adheres to Kline (2005) arguments that a 3:1 proportion indicates a good fit. In addition, the RMSEA value (0.03) below 0.05. The CFI (0.96), TLI (0.98), and WRMR (0.96) were higher than 0.90, indicating a good model fit (Kline, 2010; Tabachnick & Fidell, 2007). The standardised factor loadings range from 0.70 to 0.95 as shown in table 1. Although the fit indexes are all satisfactory and the factor loadings are acceptable, some of the factors are highly correlated particularly Factors 1, 4 and 9, ranging from $r = 0.58$ to 0.78 and Factors 2, 3, 5, 6, 7 and 8, ranging from $r = 0.49$ to 0.81.

To address the high correlations of the nine factors, we explored the existence of second-order factors and fitted factors 1, 4 and 9 together into a second order factor and Factors 2, 3, 5, 6, 7 and 8 into another second-order factor. Results showed that the fit indexes are slightly lower compared to the first order CFA above, but they are all fitting reasonably well. The chi-square and degrees of freedom ratio equal to 2.01, RMSEA=.03, CFI=0.95, TLI=0.96, and WRMR=0.96. The standardised loadings of the primary factors onto the second order factors were all substantial, ranging from 0.78 to 0.92. The factor correlations have reduced significantly ranging only from 0.19 to 0.32.

We named the second-order factor comprised of Factors 1, 4 and 9 as *G₁ assessment for teacher development* while the second-order factor comprised of Factors 2, 3, 5, 6, 7 and 8 we named it as *G₂ assessment for student learning*. The correlations between these two-order factors is .18. Figure 1 shows the second-order factor structure with standardised loadings.

	Loading	error
Factor 1 Assessment is for Professional Learning		
qpl assessment results can identify my professional learning needs	0.95	0.03
qaa assessment results can determine the appropriateness of my practices	0.85	0.05
qip assessment results can identify what I need to improve in my practices	0.72	0.04
Factor 2 Assessment is for Motivation		
qte assessment is a tool to engage students in their learning	0.73	0.02
qms assessment motivates students to learn better	0.71	0.02
qlt assessment tasks can be used as learning tasks	0.74	0.04
qli assessment makes learning more interesting	0.70	0.04
Factor 3 Assessment is for Measurement		
qlu assessment determines my students' level of understanding	0.90	0.07
qln assessment enables me to identify the learning needs of my students	0.88	0.03
qlo assessment determines if students have achieved the learning outcomes	0.79	0.05
qlp assessment helps me to monitor individual students' learning progress	0.74	0.05
qia assessment is a tool for improving class activities	0.70	0.03
qil assessment is an integral part of learning and teaching	0.71	0.02
Factor 4 Assessment is for Planning		
qla assessment guides me in planning learning and teaching activities	0.93	0.05
qtn assessment is a tool to determine what should be taught next	0.88	0.04
qsu assessment helps me to decide what strategies to use	0.87	0.06
qai assessment can be used it to determine the most appropriate intervention	0.70	0.06
Factor 5 Assessment is for Engagement		
qal students need to set their goals to achieve the learning outcomes	0.83	0.03
qip students need to contribute to the learning and teaching activities	0.81	0.04
qac Students need to contribute to the design of assessment	0.70	0.03
Factor 6 Assessment is for Learning		
qha assessment holds students' attention to learn	0.92	0.05
qip assessment enhances student motivation to further improve their learning	0.91	0.04
qam assessment makes students to aim more	0.71	0.07
qlg assessment enables students to establish their personal learning goals	0.70	0.07
qsl assessment is a tool to determine what should be done at each stage of learning	0.71	0.06
Factor 7 Assessment is for Evaluation		
qps assessment is a way to determine who pass the subjects	0.92	0.04
qsl assessment results can be used to determine student ranks	0.80	0.03
qjp assessment is used to judge students' performance	0.76	0.04
Factor 8 Assessment is for Norm-Referencing		
qal student marks is used to categorize students based on ability level	0.79	0.05
qcs assessment results can be used to compare students' performance	0.76	0.05
qrs assessment can be used rank students	0.71	0.05
Factor 9 Assessment is for Instructional Accountability		
qot assessment is a way to determine the outcome of learning and teaching	0.70	0.03
qet assessment results can be used to evaluate the effectiveness of my teaching	0.72	0.03
qep assessment can be used to evaluate the effectiveness of educational programs	0.73	0.06

Table 1. Standardised factor loadings and standard error of the 9-factor model of teacher beliefs in assessment derived from CFA (N=284)

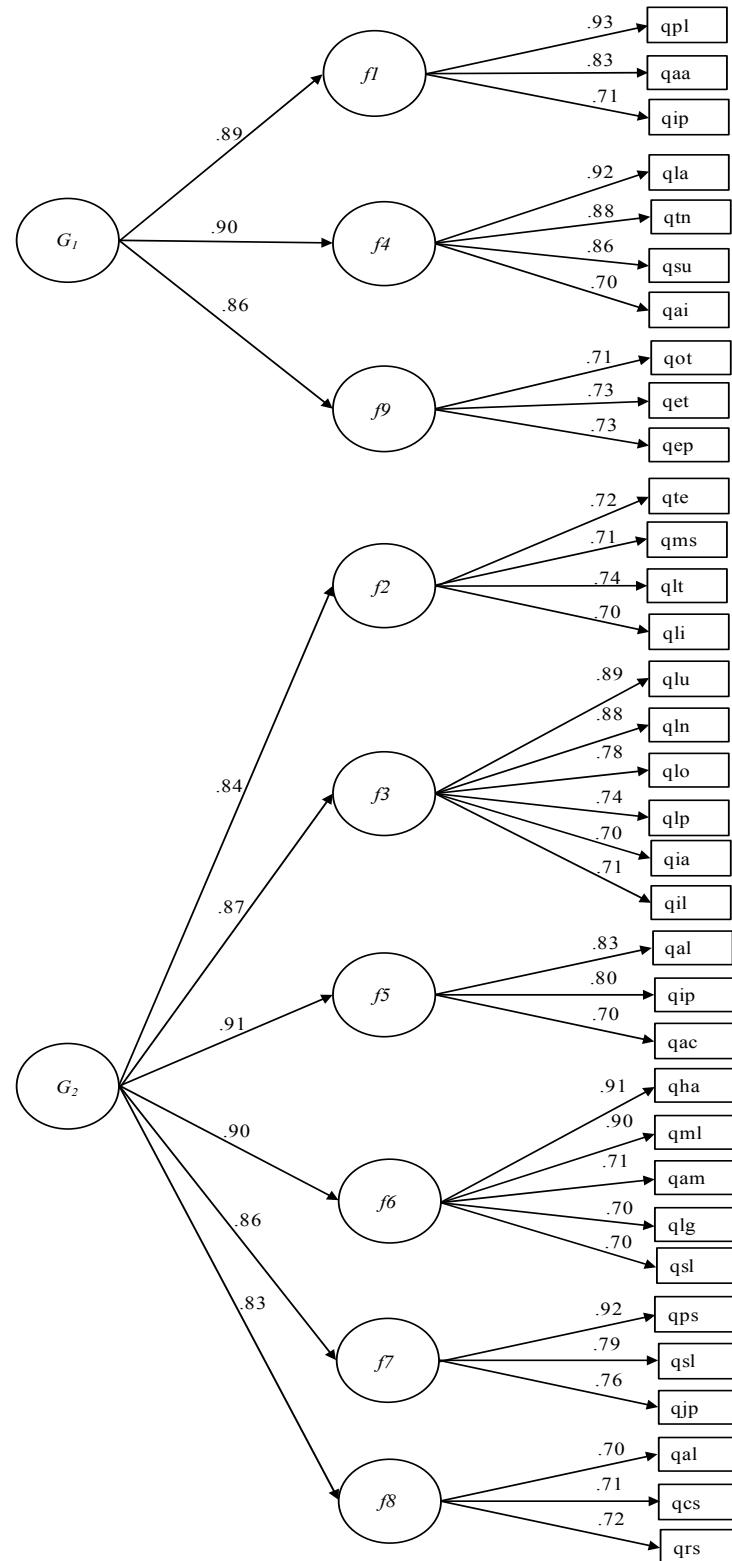


Figure 1. The 9-factor model with second-order general factors of teacher assessment beliefs with the standardised factor loadings of variables to their corresponding factor; G_1 assessment for teacher development and G_2 assessment for student learning.

The convergent validity of the 9-factor model was examined. From Figure 1, the factors loadings of the items are substantially high, which means that each variable is highly correlated with its corresponding factor. In addition, the low correlations amongst the nine factors support the discriminant validity of the model. From the results, we named the nine factors and computed their reliability indices using split-halves.

- Factor 1—*assessment for professional learning*. This is the belief of the teachers on the use of assessment to guide their engagement in professional development (Cronbach's $\alpha = 0.89$).
- Factor 2—*assessment for motivation*. This is the belief of the teachers on the use of assessment to enhance and sustain student motivation (Cronbach's $\alpha = 0.90$).
- Factor 3—*assessment for measurement*. This is the belief of the teachers on the use of assessment to measure student outcomes (Cronbach's $\alpha = 0.93$).
- Factor 4—*assessment for planning*. This is the belief of the teachers on the use of assessment to guide their lesson planning (Cronbach's $\alpha = 0.94$).
- Factor 5—*assessment for engagement*. This is the belief of the teachers on the use of assessment to enhance student engagement in learning, teaching and assessment activities (Cronbach's $\alpha = 0.92$).
- Factor 6—*assessment for learning*. This is the belief of the teachers on the use of assessment to guide students in their learning (Cronbach's $\alpha = 0.95$).
- Factor 7—*assessment for evaluation*. This is the belief of the teachers on the use of assessment to pass on judgment to students' learning and development (Cronbach's $\alpha = 0.88$).
- Factor 8—*assessment for norm-referencing*. This is the belief of the teachers on the use of assessment to compare students standing in the class against their peers (Cronbach's $\alpha = 0.93$).
- Factor 9—*assessment for instructional accountability*. This is the belief of the teachers on the use of assessment for accountability (Cronbach's $\alpha = 0.92$).

Discussion and Conclusions

The aim of this paper was to develop a context-driven tool to measure teachers' beliefs in assessment. We provided theoretical support and empirical evidence for the tool and for the conceptualisation of the construct. Findings of our study have contributed to our understanding of the dimensionality of the construct within the context of Philippine educational system. We discuss how this conceptualisation lends support to the previous studies and our contributions to understanding this construct. In this section we discussed the implications of the findings for teacher professional development, practice and further studies.

The Dimensions of Teacher Assessment Beliefs

Our study has extracted nine dimensions of teachers' beliefs in assessment. Some of these dimensions are consistent with the previous studies. For example, the dimension on perceptions of teachers of assessment for learning purposes, for planning, instructional accountability, for measurement lend strong support from the dimension on assessment for improvement of student learning, improvement of teaching, school accountability, and assessment as a valid measure respectively as described by Brown (2004). One notable

difference is the absence of dimension related to the perception of teachers of assessment as irrelevant, which was well-established in the work of Brown (2004). This has not emerged in the focus group, as the main emphasis of the theoretical approach in this study was to account teachers' beliefs that are aligned to the DepEd Order No. 8, series of 2015. Although teachers, principals and higher authorities acknowledged that teachers may hold beliefs in assessment that are not aligned to the principles of effective assessment practices, it has been made explicit that beliefs that are not related to the ones stated in the tool should necessarily be addressed accordingly.

One significant contribution of our study is the explicit inclusion of dimensions of teacher beliefs on assessment to enhance and sustain student engagement and motivation. The inclusion of these dimensions highlighted the long-argued role of assessment in improving student engagement and motivation (Bevitt, 2015; Dweck, 2007). In addition, a dimension on teachers' belief that assessment results can be used to identify teachers' professional learning needs is included. This function of assessment has been widely researched by Timperley and Alton-Lee (2008), Timperley, Wilson, Barrar, and Fung (2008) and Timperley (2011). Furthermore, there are three dimensions that relate to the high-stake functions of assessment. These include teachers' beliefs of assessment for measurement, for evaluation of student performance, and for norm-referencing. Although these dimensions are often critiqued due to their high tendency to be misused and may cause backwash effects to student learning (Biggs, 1998; Brookhart, 2003), teachers' beliefs in assessment related to these dimensions are critical to the context of the DepEd Order No. 8, series of 2015 of the Philippines. As the educational system is high-stake driven, these dimensions will address the needs of the system for accountability. However, there must be some mechanisms to establish so that teachers' beliefs on assessment should not rest heavily towards these dimensions.

The Second-Order Factors

The existence of second order factors on teacher beliefs is highlighted in the study of Brown (2004). The primary factors on teacher beliefs in assessment is to describe student learning, teaching and validity are loading significantly to a second-order factor named as *improvement*. Similarly, primary factors on teacher beliefs in assessment as bad, ignore and inaccurate are loading significantly to a second-order factor named as *irrelevance*. In our study, two second order factors have emerged. First, Factors 1 (for professional learning), 4 (for planning) and 9 (instructional accountability) load to a higher-order factor we referred to as *G₁ assessment for teacher development*. This second-order factor is comprised of teachers' beliefs related to the functions of assessment for the improvement of their practices. Second, Factors 2 (for motivation), 3 (for measurement), 5 (for engagement), 6 (for learning), 7 (for evaluation) and 8 (for norm-referencing) load to a higher-order factor we referred to as *G₂ assessment for student learning*. This second-order factor relates to teachers' beliefs in assessment that influence student learning. In a broader sense, the second-order factors categorise teachers' beliefs: for the improvement of their practices and for the improvement of student learning.

Implications of Findings

The alignment between the theoretical framework of teachers' belief in assessment; and its empirical support for its psychometric properties and dimensionality support the utilisation of measuring teachers' assessment belief. With the presence of the tool, it might be

a strategic move to conduct a mass assessment of all teachers to explore the beliefs they held in assessment. This is a key step in ensuring that assessment reform in the Philippines would start by accounting for teachers' beliefs and aligning these beliefs to effective assessment practices.

In terms of building a common assessment language in the Philippines, the nine dimensions of teacher assessment belief give a more comprehensive way of theorising this construct. Establishing these dimensions contributes to the field of educational assessment, particularly in advancing the discourse around teacher professional development in assessment. With the presence of these dimensions, the discussion on teacher assessment practices in the Philippines can be repurposed using the theoretically and empirically-driven framework to align teachers' beliefs in assessment.

Although the tool and the dimensions have strong theoretical support, there is still a need to establish their validity evidence. Future studies are needed to establish the use of the tool for changing teachers' beliefs and the consequences of these changes in teachers' beliefs and ultimately its impact to student learning. We need evidence to support that the tool could potentially guide teachers' beliefs in assessment to shape their assessment practices that are aligned to the DepEd Order No. 8, series of 2015 and strongly underpinned by the philosophical framework of assessment for learning.

Furthermore, although we do not intend to develop a universal tool for all teachers across different contexts, it would be worthwhile to explore the measurement invariance of the tool. Testing the tool in another context would highlight teachers' assessment beliefs that are context-dependent and those that are universal. This is a critically important study that may contribute to our understanding of teachers' beliefs in assessment across different contexts.

Finally, to further explore teachers' beliefs in assessment, there is a need to explore factors that influence their beliefs including teaching beliefs, motivation, demographic profiles, and other factors that affect teacher beliefs and practices.

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