Exploring K–12 Teachers' Assessment Literacy and Self-Efficacy in China

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Abstract: Over the past three decades, assessment literacy has become a global priority for teachers, but its overall status in China remains underexplored. Previous research suggested that teachers' assessment literacy significantly influenced their self-efficacy in assessment. This study used a quantitative survey, including the "Questionnaire of Teacher Assessment Self-Efficacy" and the "Teacher Assessment Literacy Inventory", to examine this dynamic among 312 teachers from Shanghai, China. Key findings included: (1) most Chinese teachers lacked a fundamental understanding of assessment literacy; (2) assessment literacy significantly impacted teachers' self-efficacy, particularly in areas related to selecting and developing methods; and (3) secondary school teachers, mathematics teachers, and both novice and highly experienced teachers showed the greatest impact of assessment literacy on self-efficacy. These insights highlighted the need for enhanced professional development in assessment literacy in Asia and offered perspectives for Western educators working with teachers and students from Asia.

Keywords: Assessment Literacy, Self-efficacy, Confucian Heritage Culture, K–12 Teachers' Development

Introduction

Assessment literacy has become one of the most crucial components for teachers to navigate educational assessment challenges in the 21st century (Koh, 2011). Teachers who lack assessment literacy can undermine the overall quality of education (Popham, 2009; Popham & Kirst, 1991). While teachers in Western classrooms, such as those in the U.S., U.K., and Australia (e.g., Brown et al., 2019; DeLuca & Lam, 2014; Popham, 2011), have made significant strides in improving their assessment literacy over the past three decades, the global outlook on teachers' assessment literacy remains less optimistic (DeLuca, 2012) due to limited resources for corresponding professional development (Stiggins, 2001).

The cultural and societal context plays a pivotal role in shaping and practicing assessment (Chan & Luk, 2022). The situation may be even more concerning in Confucian Heritage Culture (CHC) contexts, where teachers tend to rely solely on high-stakes summative assessments due to historical conventions and the competitive societal ladder that filters students (Miyazaki, 1976/1963). However, there is a lack of empirical evidence regarding the comprehensive assessment literacy of K–12 teachers in CHC societies, such as mainland China, which represents one of the most traditional societies in education. On the other hand, since knowledge and experience can impact an individual's self-efficacy (Bandura, 1986), numerous studies conducted in western classrooms (e.g., Crusan et al., 2016; Hartell et al., 2014) verified that there is a dynamic between teachers' assessment literacy and their assessment self-efficacy to some extent.

The purpose of the current study was to examine the overall status of Chinese teachers' assessment literacy and explore how it might influence their assessment self-efficacy within the CHC context. Ultimately, the findings aimed to complement global research on K–12 teachers' assessment literacy and to offer insights for developing future programs within CHC societies. They also can provide valuable information for Western educators, such as those in Canada, to better understand and support the growing number of Asian immigrant teachers and students.

Literature Review

What is assessment literacy?

Stiggins (1991) first introduced the concept of assessment literacy as a fundamental understanding of educational assessment and the related skills required to apply this knowledge to various measures of student achievement. The original concept of assessment literacy was technology-focused and centered on teachers' assessment competencies, emphasizing rigid standards like selecting appropriate methods for various scenarios (Coombs & DeLuca, 2022; Stiggins, 1995). Furthermore, the core elements of assessment literacy include both conceptual and practical knowledge of assessment (McMillan, 2001). As Koh (2019) emphasized, the construct of assessment literacy places significant importance on teachers possessing both declarative knowledge ("know-what") and procedural knowledge ("know-how") (p. 21). By extension, teachers' assessment literacy encompasses multiple facets, including disciplinary knowledge and pedagogical content knowledge, as well as knowledge related to feedback, and assessment bias and ethics (Xu & Brown, 2016). It also involves the proficiency to continuously develop a repertoire of knowledge and

skills pertinent to the design and development of assessment tasks (Koh et al., 2018), along with the analytical prowess to interpret relevant assessment data and use it judiciously (Fulcher, 2012). In short, today, assessment literacy is recognized as encompassing a broader understanding and proficiency in the purposes, methods, and implications of assessment practices for teachers. In terms of format, assessment literacy is a broad concept that primarily encompasses both summative and formative assessment (Lau, 2016; Taras, 2005).

As Willis et al. (2013) pointed out, teachers should be aware of dynamic cultural contexts when initiating, developing, and practicing assessment with students. That is, cultural settings also play a crucial role in shaping teachers' assessment literacy, particularly in the higher-level psychological and behavioral aspects (Pastore & Andrade, 2019; Xu & Brown, 2016). For example, Chan and Luk (2022) asserted that Asian teachers' assessment literacy tends to focus more on traditional ethics, particularly when assessing students' academic performance with careful consideration. Therefore, it is crucial to acknowledge that societal contexts significantly shape assessment literacy, resulting in considerable variation in teachers' assessment literacy across the world (e.g., Koh et al., 2018; Wyatt-Smith et al., 2010; Xu & Liu, 2009).

Assessment literacy in mainland China

The research on assessment literacy in mainland China initially focused on introducing and analyzing the western academic terminology of assessment literacy (Zhang & Qin, 2019). Some scholars systematically reviewed the construct of assessment literacy based on either Chinese literature or Western literature (Lv, 2019). The previous empirical studies primarily investigated English teachers' assessment literacy (Jiang, 2019). Moreover, the prevailing method was qualitative interviews for university teachers or model teachers from K–12 schools (Song & Gao, 2020). From these studies, it was nearly impossible to identify the holistic status of local teachers' assessment literacy.

Teacher assessment self-efficacy

Besides macro sociocultural factors, assessment literacy, as an intrinsic characteristic for teachers, is consistent with other psychological traits. According to Xu and Brown (2016), the construct of assessment literacy also encompassed several higher-order thinking skills, such as decision-making, action-taking, reflection, and even (re)constructing one's identity as an assessor. In the social cognitive domain, Bandura (1977) articulated how self-efficacy, as a belief, can drive thoughts and behaviors to achieve specific outcomes. Evidence indicated that in education, teachers' self-efficacy was closely linked to the quality of educational practices and influences their professional development (Tschannen-Moran et al., 1998; Tschannen-Moran et al., 2001). Teachers' assessment self-efficacy was an important component for their holistic self-efficacy as educators (Wolters & Daugherty, 2007). Furthermore, teachers' self-efficacy in assessment may play a crucial role in impacting students' learning and motivation (Vaino et al., 2013). For example, teachers' beliefs and confidence in scoring accuracy can influence their assessment literacy, helping them avoid feelings of frustration and challenges (Crusan et al., 2016). Hartell et al. (2014) found that teachers who had received training in subject-specific assessment expressed greater self-efficacy in assessing their students and clearly articulating expectations for student performance. Popham (2001) reviewed the feelings of discomfort associated with assessment and the lack of assessment preparation among K–12 teachers. The study highlighted how the limited assessment literacy of teachers impacted their competence to effectively engage in assessment practices. Confusion and discomfort stemming from a lack of assessment literacy have been reported among both preservice and in-service teacher populations (Kahl et al., 2013).

Methodology

Instruments

The researcher utilized a toolkit consisting of two instruments and a demographic survey for the investigation: five basic questions on individual information, *Questionnaire of Teacher Assessment Self-efficacy* (*QTAS*) and *Teacher Assessment Literacy Inventory* (*TALI*). Teacher self-efficacy is a broad domain, and there has been limited research specifically focused on teachers' self-efficacy in assessment practices. Locally adapted from Chapman's relevant questionnaire (2008), the *QTAS* was a 5-point Likert-scale instrument, with responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). It consisted of 14 items designed to assess how teachers would perceive, feel about, and view assessment practices, along with their corresponding levels of confidence. At the same time, the researcher localized the open inventory developed by Campbell and Mertler (n.d.) to create the *TALI*, which consisted of 28

multiple-choice items, each with a correct answer. These items were grouped into six dimensions that aligned with the *Standards for Teacher Competence in Educational Assessment of Students* (American Federation of Teachers et al., 1990) (see Table 1).

Table 1: Dimensions, Themes & Items of *TALI*

	Themes	*Items*
Dimension 1	Choosing assessment methods	Q20 Q27 Q35 Q36 Q38 Q42
Dimension 2	Developing assessment	Q21 Q28 Q32 Q33 Q39 Q43 Q44
Dimension 3	Administrating, scoring and interpreting results	Q22 Q25 Q29 Q30 Q34
Dimension 4	Utilizing assessment results	Q23 Q26
Dimension 5	Developing grading procedures	Q24 Q40 Q41 Q45
Dimension 6	Recognizing inappropriate assessment methods	Q31 Q37 Q47

Research Questions

To provide a more comprehensive and detailed understanding of Chinese K–12 teachers' assessment literacy, and identify the factors from their assessment literacy impacting on their corresponding self-efficacy, this study aimed to address the following questions:

(1) What is the current status of teachers' assessment literacy and their corresponding self-efficacy in China?
(2) How does overall assessment literacy influence self-efficacy, and which dimensions of assessment literacy are most impactful?
(3) Which aspects of teachers' backgrounds influence the impact of their assessment literacy on self-efficacy?

Context

Admittedly, Shanghai is one of the most developed regions in Mainland China, boasting an outstanding educational system, sufficient funding, high standards for teacher recruitment and so on. Therefore, to achieve the generalizability of the quantitative research method (Price & Barrell, 1980), the researcher selected schools in the Lingang Free Trade Zone in Shanghai. This special administrative area features a more diverse range of teacher backgrounds and greater educational innovation. Here, to a large extent, students and teachers are not constrained by the jurisdictional policies typical of Shanghai.

Participants

Data were collected from 312 volunteer teachers across 10 Shanghai schools, comprising 3 primary, 4 secondary, and 3 high schools. The demographic backgrounds of the participants were varied. The sample included 95 primary school teachers (30.4%), 114 secondary school teachers (36.5%), and 103 high school teachers (33.1%). Among them, 75% were female (n = 236), and 24.4% were male (n = 76). Regarding educational qualifications, the majority (92.6%) held bachelor's degrees (n = 289), 5.1% held master's degrees (n = 16), and the remainder held college diplomas (n = 7). Moreover, 143 teachers had over 20 years of working experience (45.8%), 92 had between 11 to 20 years (29.5%), 43 had between 4 to 10 years (13.8%), and the remaining 34 were beginning teachers with less than 3 years of experience (10.9%). In addition, the teaching subjects included: 80 Chinese literature teachers (25.6%), 64

Mathematics teachers (20.5%), 67 English teachers (21.5%), 47 Science teachers (15.1%), 19 Social Studies teachers (6.1%), and 35 teachers of other subjects (11.2%)[1].

Procedure

The research was conducted online using the Chinese domestic questionnaire platform wjx.cn. Initially, the researcher obtained consent from the school principals and administrators. Subsequently, the survey link, QR code, and a general introduction were distributed to the participating school teachers through digital and paper flyers. The responses were automatically collected through the platform once participants clicked "submit". All participants were informed about the purpose of the study, the confidentiality of their data, the handling of their responses, and their right to withdraw or dispose of their data at any time.

After collection, all the data were cleaned, coded, calculated, and analyzed using SPSS Statistics 28. In particular, in the *QTAS*, several negatively worded items were first reverse-coded, and then all the responses were summed to calculate the total scores. Additionally, in the *TALI*, the responses from the 28 multiple-choice items were scored as 1 or 0 based on correctness, and finally, the scores for each of the six dimensions, as well as the total score, were summed.

Findings

Descriptives

The overall results of *QTAS* were acceptable (Mean = 54.11, SD = 9.29), with a percentage score of 77.3%. This result demonstrated a relatively high level of teachers' self-efficacy in assessing student achievement.

However, the *TALI* scores were less encouraging (Mean = 13.32, SD = 3.08), with a percentage score of 47.57%. If evaluated against the common 60% passing rate, the *TALI* results could be considered a failure. By extension, the dimensions of *TALI* indicated detailed percentage scores were significantly different (see Table 2). The knowledge across each dimension of assessment literacy revealed that Chinese teachers performed poorly compared to the parallel Western-setting research by Mertler (2004), where the average score percentage was 78.57%. In particular, Dimension 1 *Choosing assessment methods* (Mean = 3.16, SD = 1.30), Dimension 2 *Developing assessment* (Mean = 2.18, SD = 1.20), Dimension 3 *Administrating, scoring and interpreting results* (Mean = 2.39, SD = 1.09) and Dimension 5 *Developing grading procedures* (Mean = 1.49, SD = 0.81) showed a dispersive data set. This indicated that participants' assessment literacy in these aspects was varied and polarized.

Table 2: The Results of Each Dimension in *TALI*

	M	*SD*	*Percentage Score*
Dimension 1	3.16	1.30	52.67%
Dimension 2	2.18	1.20	31.14%
Dimension 3	2.39	1.09	47.80%
Dimension 4	1.58	.63	79.00%
Dimension 5	1.49	.81	37.25%
Dimension 6	2.53	.74	84.33%
Total	13.32	9.29	77.3%

Note. *M* = Mean

Reliability

The Cronbach's Alpha for *QTAS* was ideal (= 0.966), while the Cronbach's Alpha for *TALI* was satisfactory (= 0.810).

[1] The category of Sciences included Physics, Chemistry, Biology, and Nature for primary school. Social Studies encompassed Politics, History, Geography, and Ethics & Laws for primary school. The others category comprised Fine Arts, Physical Education, and unidentified subjects.

Impact of assessment literacy on self-efficacy

The following data analyses were conducted using univariate analysis within the General Linear Model in SPSS 28.0. In general, Chinese teachers' assessment literacy showed a significant influence on their corresponding self-efficacy (F = 1.708, p = 0.037) (see Table 3). Specifically, when Dimension 1 and Dimension 5 were associated, they had a significant influence on teachers' self-efficacy (F = 3.112, p = .016). Additionally, when Dimension 1, Dimension 2, and Dimension 5 were associated, they also significantly influenced teachers' self-efficacy (F = 3.112, p = 0.021). In other words, these three dimensions of assessment literacy can impact the level of teachers' assessment self-efficacy, and the combined effect of these dimensions was the key influential factor.

Table 3: Impact of Assessment Literacy on Self-Efficacy by Dimensions

	df	*F*	*p*
Corrected Model	18	1.708	.037
*Dimension 1 * Dimension 5*	4	2.214	.016
*Dimension 1 * Dimension 2 * Dimension 5*	4	3.112	.021

Note. $p < .05$

While categorizing the participants by schools, only secondary school teachers showed that their assessment literacy had an impact on their self-efficacy (F = 2.005, p = 0.031) (see Table 4).

Table 4: Impact of Assessment Literacy on Self-Efficacy by Schools

	df	*F*	*p*
Primary	16	.672	.812
Secondary	42	2.005	.031
High	14	1.683	.072

Note. $p < .05$

Furthermore, regarding subject backgrounds, only mathematics teachers' assessment literacy influenced their self-efficacy (F = 3.108, p = 0.002), while no evidence could reveal teachers' situation (see Table 5).

Table 5: Impact of Assessment Literacy on Self-Efficacy by Teaching Subjects

	df	*F*	*p*
Chinese language	15	.973	.493
Mathematics	12	3.108	.002
English	11	1.375	.211
Sciences	13	1.399	.212
Social Studies	9	.977	.514
Others	11	1.247	.313

Note. $p < .05$

In terms of different teachers' working experience, beginning teachers with less than 3 years of experience showed a marginal statistical outcome (F = 2.253, p = 0.050), which can be considered significant. On the other hand, the most experienced teachers, with more than 20 years of experience, demonstrated that their assessment literacy had a significant impact on their related self-efficacy (F = 1.731, p = 0.049).

Table 6: Impact of Assessment Literacy on Self-Efficacy by Years of Teaching Experience

	df	*F*	*p*
Less than 3 years	12	2.253	.050
4 to 10 years	13	1.040	.443
11 to 20 years	13	1.416	.171
More than 20 years	16	1.731	.049

Note. $p < .05$.

Last but not least, from the aspect of educational levels, the assessment literacy of the participants with bachelor's degree showed a significance ($F = 1.767$, $p = .029$) that their assessment literacy influenced the self-efficacy. Due to the number of participants holding other degrees is minimal, the other data had no analytical outcomes.

Discussion

Regarding Question One, the dimensions with low scores all correspond to the more basic aspects of assessment literacy standards, such as selecting and developing assessment approaches. It is evident that the majority of teachers in China lack a fundamental understanding of assessment literacy (Zhang, 2015). This reliance on summative assessment is deeply rooted in sociocultural and historical factors at the macro level, while at the micro level, there are limited development programs available during both preservice and inservice learning (Howlett, 2021). Despite this, teachers' self-efficacy remains high, likely due to their extensive experience with assessment practices and the deep respect students have for teachers (Berthrong & Berthrong, 2000). It is understandable that Chinese teachers tend to establish a role of authority in front of students, a convention largely rooted in Confucianism and its societal hierarchy.

Regarding Question Two, the data analysis indicated that teachers' assessment literacy generally influenced their assessment self-efficacy. By extension, the aggregation of Dimensions 1, 2, and 5 was influential, as these dimensions represented how teachers would choose and develop assessment methods and practices. This required teachers to possess a more advanced literacy in knowledge comprehension and flexible adaptation, along with a willingness to improve and implement a more systematic approach to assessment design (DeLuca & Klinger, 2010). Given that their assessment literacy in these areas was low as well, the aggregation likely impacted their self-efficacy.

In Question Three, several differences based on teacher backgrounds were identified. First, the secondary school teachers faced significant pressure to help students pass high school entrance examinations, which made their assessment literacy highly demanding and closely linked to their self-efficacy in evaluating student performance (Sheng, 2014). Second, Mathematics, one of the most critical disciplines in Chinese schooling, showed that Mathematics teachers' assessment literacy significantly impacted their self-efficacy in assessing students. Third, there was a polarized effect of assessment literacy on self-efficacy between the most experienced and the least experienced teachers. Beginning teachers, lacking instructional experience, may not feel confident in conducting assessments (Lin & Wu, 2014). On the other hand, experienced teachers face challenges adapting to new instructional and assessment requirements, especially with the growing emphasis on incorporating formative assessment into classrooms (He, 2017; Jiang & Cai, 2017).

Conclusion

To effectively promote assessment literacy globally, it is essential to focus on research in CHC regions (Yan & Brown, 2021). Insights from Asia can guide global educators and researchers in enhancing assessment literacy and improving assessment self-efficacy. While the research initially focused on exploring and discussing teachers' assessment literacy and self-efficacy, it also provided a foundation for understanding how students in the same classroom perceive and engage with teachers' assessment practices. Future research could investigate students' perspectives as a promising direction. Furthermore, the characteristics of CHC teachers and students, when brought to Western countries, have the potential to influence and reshape local educational practices and traditions (Chi, 2012).

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