

Perspective

Impact of online resources on assessment literacy of polytechnic educators

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Abstract: This study investigates the impact of online assessment resources on the assessment literacy of polytechnic educators in Singapore. Assessment literacy, defined as educators' knowledge and skills in designing, implementing, and interpreting assessments, is crucial for ensuring fair and valid evaluation of student learning. With the increasing reliance on online resources for professional development, this study investigates the impact of such resources on the assessment literacy of polytechnic educators. Twenty-three educators from diverse disciplines participated in a pre- and post-survey based on adapted questions from the Scale of Teacher Assessment Practices (STAP). The intervention comprised a six-week engagement with curated online resources, articles, and interactive tutorials on formative and summative assessment strategies. Results from paired *t*-tests indicated significant improvements in educators' confidence and competence in designing and implementing assessments, as evidenced by increased mean scores across key domains of assessment literacy. The accessibility and relevance of online resources were highlighted in qualitative feedback, emphasizing their potential for bridging professional development gaps. This study underscores the potential of online resources as an accessible and scalable means of enhancing assessment literacy among polytechnic educators. Implications for integrating such resources into institutional professional development programs and considerations for future research are discussed.

Keywords: assessment literacy; online resources; polytechnic; educators

1. Introduction

Polytechnic education in Singapore plays a crucial role in equipping students with industry-relevant skills across diverse disciplines. These institutions provide practice-oriented diploma programs across various disciplines, aiming to equip students with industry-relevant skills and knowledge. Collectively, the 5 polytechnics in Singapore offer nearly 150 diploma programs, maintaining close connections with industry to ensure curricula remain aligned with evolving economic demands. Given the applied nature of polytechnic education, effective assessment strategies are essential in measuring student learning and competencies. Educators must possess strong assessment literacy to design, interpret, and implement assessments that align with learning outcomes and industry expectations [1]. Assessment practices across Singapore's polytechnics are designed to evaluate students' theoretical understanding and practical competencies. Common methods include semestral examinations, continuous assessments, project work, and practical evaluations.

The majority of polytechnic educators enter the education sector without prior teaching and learning experience. A comprehensive mandatory teaching and learning program was designed for all new polytechnic educators in 2011. This program covers fundamental aspects of teaching and learning, such as curriculum design and development as well as assessment design and implementation. Despite structured

assessment frameworks and training, educators face challenges in aligning assessment methods with diverse learning objectives and student needs. The development of assessment literacy among polytechnic educators remains a challenge, necessitating targeted professional development initiatives. Assessment literacy is a cornerstone of effective teaching, enabling educators to design, interpret, and apply assessments to support student learning [1]. In the context of polytechnic education in Singapore, where diverse disciplines require tailored assessment strategies, developing the assessment literacy of the educators is particularly important.

In addition, due to a rigorous timetable, polytechnic educators may not be able to afford the time for synchronous professional development workshops. Therefore, to support the polytechnic educators, online resources were designed to support the educators in their assessment literacy. This study investigates the impact of online resources on the assessment literacy of polytechnic educators. The findings will inform strategies for developing scalable and flexible professional development programs, ultimately supporting polytechnic educators in implementing high-quality assessment practices that enhance student learning.

2. Literature review

2.1. Importance of assessment literacy

Assessment literacy encompasses educators' understanding and application of assessment principles and practices to enhance student learning outcomes. The link between teachers' assessment literacy and student achievements is well-established. Johnson and Lee [2] explore this relationship between teachers' assessment literacy and student achievements. Their research shows that improved assessment literacy leads to better student performance, particularly in writing skills. In addition, Wang et al [3] investigated this same relationship and found that enhanced assessment literacy positively influences teaching efficacy. This suggests that educators with higher assessment literacy are more confident and effective in their teaching roles. However, research has shown a gap in educators' skills to effectively create, administer, and interpret assessments [4]. Therefore, there is a need for continuous professional development to improve assessment literacy amongst educators.

2.2. Impact of professional development

The impact of professional development on teachers' assessment literacy has been widely documented. A pilot study by Williams et al. [5] investigates the effects of professional development programs on educators' assessment practices, highlighting the importance of continuous learning. Similarly, Jones and Smith [6] highlight the necessity for professional development to enhance educators' assessment literacy, noting that online resources provide accessible and flexible learning opportunities. Traditional professional development often relies on synchronous face-to-face workshops, which may be limited in scalability and accessibility. While assessment literacy is crucial for educators, the lack of time for synchronous face-to-face workshops makes online professional development courses the best alternative. With the rapid advancement of technology, online professional development

resources—including webinars, interactive tutorials, and digital articles—are increasingly recognized as flexible alternatives that enable self-directed learning [7].

Various approaches have been suggested to enhance assessment literacy among educators. According to the National Center for the Improvement of Educational Assessment [8] professional learning modules and state-supported initiatives play a crucial role in providing educators with the necessary skills and knowledge. These approaches underscore the role of online resources in offering continuous and adaptable professional development opportunities. Although online professional development is known for its cost-efficiency and scalability [9], limited research has examined its specific impact on assessment literacy in the polytechnic context. This study aims to address this gap by investigating whether curated online resources can enhance the assessment literacy of polytechnic educators.

3. Materials and methods

3.1. Participants

This study was conducted with 23 polytechnic educators from multiple disciplines to assess the impact of curated online resources on their assessment literacy. Participants represented diverse disciplines, including engineering, business, healthcare, and applied sciences, ensuring a broad representation of teaching contexts. Participants were recruited through institutional mailing lists and voluntary sign-ups. Inclusion criteria required educators to have at least one year of teaching experience and active involvement in assessment design. Ethical approval was obtained from the institutional review board, and informed consent was secured from all participants.

3.2. Measures

The survey instrument comprised 20 items adapted from Howell [10] Scale of Teacher Assessment Practices (STAP), which focuses on three key domains: knowledge, skills, and attitudes related to assessment practices. Individual items were generated to measure five domains of assessment literacy (selection and development of assessment methods, administering, scoring and interpreting results, using results to inform day-to-day decisions, communication of results to others, and ethical use of assessment). STAP demonstrates strong construct validity, as it was designed to measure key dimensions of teachers' assessment literacy, including their knowledge, application, and interpretation of assessment data. Through rigorous item development and validation processes, the scale effectively captures the underlying constructs of effective assessment practices, ensuring that it aligns well with established theoretical frameworks in educational assessment. The STAP was adapted to assess educator evaluation literacy in the polytechnic context. Given the distinct characteristics of polytechnic education, modifications included terminology adjustments and context-specific assessment scenarios. A pilot study with a small group of educators ensured content validity, and internal reliability was assessed using Cronbach's alpha. A pilot study typically involves a small sample size to test the feasibility and design of the research, allowing for the identification of potential challenges and refinement of

methodologies. Future research will build on these findings by expanding the sample size, ensuring broader generalizability, and making more robust conclusions.

3.3. Research design and procedure

A pre-test/post-test design was implemented to measure changes in assessment literacy. Prior to the intervention, participants completed the adapted STAP scale to assess baseline knowledge, skills, and attitudes. The participants rated their level of agreement on a five-point Likert scale, which ranged from one (strongly disagree) to five (strongly agree). Five response categories were used because, although research indicates that as the number of response categories increases, so do reliability and validity, such small differences within a large number of response categories may not reflect actual differences in the construct being measured. The reliability of the STAP was examined by calculating Cronbach's alpha. Cronbach's alpha was calculated for the entire set of items to measure the internal consistency of the scale. Results were indicative of the extent to which items measure the same construct. To analyze teacher assessment literacy using pre- and post-test scales, the best statistical method would typically be a paired *t*-test if the data is normally distributed. This test compares the means of two related groups to determine if there is a statistically significant difference between the pre-test and post-test scores.

The intervention involved a six-week engagement with curated online resources, designed to address the specific needs of polytechnic educators. The resources included:

- 1) Webinars: Topics covered formative assessment techniques, designing rubrics, and providing effective feedback. Sessions were conducted by experienced polytechnic educators, with live Q&A segments to address participants' queries and contextual challenges.
- 2) Articles: Participants were provided with access to peer-reviewed articles and case studies, selected to deepen their theoretical understanding and illustrate practical applications of assessment strategies.
- 3) Interactive tutorials: Self-paced tutorials with practical exercises, such as designing assessment rubrics, interpreting assessment data, and aligning assessments with learning outcomes, were included to foster active engagement.

3.4. Data analysis

Before conducting paired *t*-tests to compare pre- and post-test scores, data normality was assessed using the Shapiro-Wilk test. If normality assumptions were violated, non-parametric alternatives such as the Wilcoxon signed-rank test were applied. Effect sizes were calculated to determine the magnitude of observed changes. Participants completed the pre-survey prior to engaging with the resources and the post-survey immediately after the six-week intervention. Data were analyzed using paired *t*-tests to determine the significance of changes in survey scores. To ensure engagement, completion of key learning activities was monitored through learning analytics, and periodic email reminders encouraged continued participation.

Qualitative feedback was collected through open-ended questions administered via an online survey platform, allowing participants to elaborate on their perceptions

of the resources and their applicability to teaching practices. This method was chosen for its flexibility and capacity to gather in-depth insights from diverse participants asynchronously. For the qualitative data, a grounded theory approach was used for thematic analysis. Data from open-ended survey responses and participant reflections were systematically coded. Initial open coding identified recurring patterns, followed by axial coding to establish relationships among themes. Selective coding refined overarching themes while addressing any contradictions in participant responses. To enhance reliability, two independent researchers reviewed the coding framework, and discrepancies were resolved through discussion.

The demographics of the participants are appended in **Table 1** below.

Table 1. Demographics of participants

Demographic Variable	Frequency (<i>n</i>)	Percentage (%)
Gender		
Female	13	43.5
Male	10	56.6
Age Group		
25–34 years	5	21.7
35–44 years	8	34.8
45–54 years	6	26.1
55 and above	4	17.4
Subject Area		
Applied Science	3	13.0
Design Studies	5	21.7
Business	4	17.4
Engineering	3	13.0
Health and Social Sciences	5	21.7
Information Technology	3	12.0

4. Results

Table 2 presents the quantitative findings displaying the mean pre- and post-survey scores across three domains of assessment literacy: knowledge, skills, and attitudes. Significant improvements were observed in all domains ($p < 0.05$), indicating the positive impact of the intervention.

Table 2. Quantitative findings

Domains	Pre survey Mean (SD)	Post-survey Mean (SD)	Mean Difference
Selection and development of assessment methods	3.2 (0.8)	4.1 (0.7)	0.9
Administering, scoring and interpreting results	3.0 (0.9)	4.0 (0.8)	1.0
Using results to inform day-to-day decisions	3.5 (0.7)	4.3 (0.6)	0.8
Ethical use of assessment	3.2 (0.8)	4.0 (0.8)	0.8

Qualitative feedback highlighted the accessibility and relevance of the resources. Participants expressed increased confidence in designing rubrics, aligning assessments

with learning outcomes, and interpreting student performance data [11]. Many participants noted a preference for online learning over traditional workshops, citing the flexibility to engage with materials at their own pace as a key advantage. These findings (shown in **Table 3**) align with recent research emphasizing the benefits of self-directed and asynchronous learning in professional development contexts [12]. Suggestions for improvement included integrating peer discussion components to enhance collaboration and providing case studies specific to polytechnic education contexts, which would increase contextual relevance and applicability [13,14].

Table 3. Qualitative findings

Theme	Key Insights	Example Feedback
Accessibility and Relevance	Participants found the resources easy to access and highly relevant to their teaching contexts.	“The materials were very clear and applicable to my work in polytechnic education.”
Confidence in Assessment Design	Increased confidence in designing rubrics and aligning assessments with learning outcomes.	“I feel more capable of creating rubrics that match my students’ learning goals.”
Flexibility of Online Learning	Preference for online learning due to the ability to engage at their own pace and convenience.	“I can revisit the content anytime, which is a huge plus over traditional workshops.”
Need for Peer Collaboration	Suggestions to include peer discussion components to foster collaborative learning.	“Adding forums or discussion groups would help us learn from each other.”
Case Studies	Desire for context-specific case studies to enhance practical application.	“I’d love to see more examples specific to polytechnic courses.”

5. Discussion

The findings of this study demonstrate that curated online resources can significantly enhance the assessment literacy of polytechnic educators. Improvements in knowledge scores suggest that the resources effectively conveyed theoretical concepts, while gains in skills indicate their practical applicability [15]. Enhanced attitudes reflect increased confidence and motivation among participants to implement effective assessment strategies. These results align with prior studies emphasizing the potential of online professional development [16,17].

Despite these promising findings, several limitations must be considered when interpreting and generalizing the results. The relatively small sample size may have affected the statistical power of the study, limiting the robustness of the conclusions drawn. A larger sample size would allow for more reliable estimates of the impact of online resources on assessment literacy. Additionally, the reliance on self-reported data introduces the possibility of response bias, where participants may overestimate their improvements due to social desirability or subjective perceptions of their learning gains. Future studies could incorporate objective measures, such as performance-based assessments, to complement self-reported data and strengthen validity.

The qualitative feedback provided key insights into the perceived effectiveness and areas for improvement of the online resources. Participants consistently highlighted the accessibility and flexibility of the resources, noting that the ability to engage with materials asynchronously allowed them to better balance professional development with teaching responsibilities. Furthermore, many participants reported increased confidence in designing rubrics and aligning assessments with intended learning outcomes, or constructive alignment, suggesting that the resources

successfully addressed critical aspects of assessment literacy [13]. However, some participants expressed a desire for greater opportunities to engage in peer discussions, reinforcing the value of collaborative learning in professional development contexts [15]. The suggestion to incorporate case studies tailored to polytechnic education reflects a need for more context-specific content to enhance the applicability of the resources. These findings underscore the importance of not only providing accessible and flexible online resources but also integrating collaborative and contextual elements to maximize their impact [12].

Future research could explore additional avenues to deepen understanding of online resources' effectiveness in enhancing assessment literacy. Expanding the study to include larger, multi-institutional samples would improve generalizability and provide insights into variations across different polytechnic contexts. Moreover, longitudinal studies examining the long-term retention and application of assessment literacy skills would offer valuable perspectives on sustained professional development. Comparative studies analyzing online resources against alternative professional development modalities, such as blended learning approaches or mentorship programs, could provide further evidence on the most effective strategies for improving assessment literacy among educators.

From a practical standpoint, these findings offer concrete recommendations for practitioners and policymakers. Polytechnic institutions should consider integrating structured peer discussions and collaborative learning opportunities into their online professional development programs. Additionally, the incorporation of case studies and real-world assessment challenges relevant to polytechnic education could enhance the contextual relevance of these resources. Institutions could also explore scaffolding online modules with guided reflection activities to reinforce key assessment principles and encourage deeper engagement with the material.

Finally, strengthening the theoretical grounding of this study by integrating established frameworks on assessment literacy and professional development would further enhance its contributions to the field. For instance, drawing on models such as the Assessment Literacy Framework [18] or the TPACK framework [19] could provide a more structured lens through which to examine the impact of online resources. By situating the findings within these theoretical contexts, future research can build a more comprehensive understanding of how educators develop and apply assessment literacy skills in digital learning environments.

6. Implications for future research

The current methods used in this research may introduce response bias, as self-reported data can be influenced by social desirability or individual perceptions. To mitigate this, future research can adopt more objective evaluation methods, such as classroom observations and student feedback, providing a more comprehensive and accurate assessment of educators' assessment literacy. Additionally, qualitative findings suggest a strong desire for more opportunities for peer discussion during professional development training. In response, future research will explore the integration of collaborative learning elements into online resources, such as online forums and group discussions, to enhance communication and collaboration among

educators. Furthermore, future studies should investigate the long-term impacts and sustainability of assessment literacy improvement, examining how ongoing support and collaborative practices influence educators' ability to apply and maintain effective assessment strategies over time.

7. Conclusion

This study highlights the efficacy of online resources in improving the assessment literacy of polytechnic educators. As institutions seek scalable solutions for professional development, integrating such resources can address the diverse needs of educators while promoting effective teaching practices. The findings support the potential of online professional development to bridge gaps in assessment literacy, particularly in resource-constrained or multidisciplinary educational contexts. Continued research is needed to refine these interventions, explore their long-term impacts, and identify best practices for their implementation. By leveraging the flexibility and accessibility of online resources, institutions can empower educators to enhance their assessment practices and, ultimately, improve student learning outcomes.

Institutional review board statement: This study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of Nanyang Polytechnic (CTLD-2024-001 and 30th September 2024).

Informed consent statement: Informed consent was obtained from all subjects involved in the study..

Conflict of interest: The author declares no conflict of interest

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