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Expert Validation of a Research Culture Assessment Tool for Secondary Schools

Wan Mohd Khairi Bin Wan Ibrahim
University Malaysia Pahang Al-Sultan Abdullah, Malaysia
Email: wmkwi79@gmail.com

Suhaidah Binti Hussain
University Malaysia Pahang Al-Sultan Abdullah, Malaysia
Email: suhaidahh@umpsa.edu.my

Azim Azuan Bin Osman
University Utara Malaysia, Malaysia
Email: azim.azuan@uum.edu.my

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Abstract

The development of a strong research culture in secondary schools is critical for enhancing teachingpractices and encouraging student learning. However, there is a lack of reliable tools specifically designed to assess the level of research culture within these institutions. This study aims to develop and validate a research culture assessment tool customized for secondary schools in Malaysia. A survey questionnaire was created to measure core indicators of research culture and was evaluated by a panel of ten experts for content validity. The Content Validity Index (CVI) and Inter-Rater Agreement (IRA) were used to analyze the experts' ratings. Items with an I-CVI score of 0.80 or higher were retained, while items scoring lower were modified or removed. The findings showed robust content validity across most items, indicating that the tool accurately reflects the relevant dimensions of research culture in secondary schools. However, some items required revision based on expert feedback. Further statistical tests, such as construct validity and reliability analysis, are recommended to ensure the tool's robustness across diverse educational settings. This validated tool is expected to play a crucial role in guiding future efforts to cultivate research culture in schools, contributing to the professional development of teachers and the improvement of student outcomes

Keywords: Research Culture, Survey Questionnaire, Content-Validity, Inter-Rater Agreement, Educational Assessment

Introduction

In the sphere of current educational approaches, the promotion of a vigorous research culture is acknowledged as a fundamental component in propelling innovation, refining

pedagogical methodologies, and elevating student learning outcomes. An established research culture equips teachers with the competencies requisite for engaging in critical reflection, implementing evidence-based methodologies, and nurturing inquisitive intellects within the student populace (Burn et al., 2021; Hill & Haigh, 2012). This prioritization of research-oriented teaching methods aligns with global educational objectives, which stress the necessity of critical evaluation, problem-solving expertise, and adaptability in the face of changing conditions (Chakraborty & Biswas, 2020; Kwiek, 2020; Tadesse & Khalid, 2023). Nonetheless, despite its pivotal role, numerous secondary schools, particularly in Malaysia, encounter substantial obstacles in fostering and maintaining a research-driven educational atmosphere (Kanageswari et al., 2017).

Research culture refers to the collective values, practices, and support systems that encourage teachers to engagein continuous inquiry and professional development (Khoo, 2021). Within secondary schools, the cultivation ofa research culture is of paramount importance, as it enables teachers to explore and rectify classroom challenges,develop innovative instructional strategies, and contribute meaningfully to the wider academic conversation (Borg, 2010; Luo et al., 2022). Although the acknowledged advantages, empirical evidence suggests that educational leaders within numerous Malaysian secondary schools have not effectively integrated a research culture into their institutional structures (IAB, 2020). This deficiency is frequently linked to an unawareness, inadequate resources, and the lack of standardized methods to assess and promote research participation among teachers.

With growing recognition of research's role in instructional innovation, a reliable and valid tool is essential to assess research culture in schools. An effectively designed evaluation tool can yield vital insights into the current landscape of research involvement, identify areas requiring improvement, and function as a reference point for future actions (Bougie & Sekaran, 2020). Moreover, the accurate assessment of research culture is crucial for formulating policies that facilitate the professional development of teachers and enhance the overall effectiveness of academic institutions (Tatto, 2021).

Literature Review

Assessing research culture in secondary schools is crucial for innovative teaching and teachers' professional growth (Schmidt et al., 2021). A robust research culture fosters critical thinking, creativity, and problem-solvingabilities for teachers as well as students (Munawaroh et al., 2022). However, existing literature reveals an absence of thorough instruments designed to measure this culture effectively in school environments, especially in secondary schools.

Research culture is described as the environment in which research activities are promoted, supported, and embedded within the daily practices of educational institutions (Hui Min & Rashid Mohamed, 2015). The cultivation of a robust research culture allows teachers to engage in continuous professional development, improving their instructional techniques and improving student outcomes (Hill & Haigh, 2012; Santo et al., 2009). Despite this, studies show that in many educational contexts, particularly in Malaysia, school leaders do not adequately cultivate such a culture (IAB, 2020). This highlights the need for reliable tools to assess and support the development of research culture in schools.

Several tools have been formulated to assess research practices and academic culture within higher education settings (Lodhi, 2012; Naoreen & Adeeb, 2014; Patel, 2016; Schmidt et al., 2021). These tools typically emphasize the regularity of research activities, the access to resources, and institutional support for research endeavours (Mpuangnan & Roboji, 2024; Schmidt et al., 2021). However, the application of these tools to secondary schools hhas been restricted by various structural and operational hurdles faced by these institutions. For instance, secondary schools commonly lack allocated research resources, and teachers may have have limited chances to participate in research activities alongside their teaching duties (O'Sullivan, 2017).

One of the most adopted methods for validating assessment tools is content validation, where an expert panel evaluates the instrument to ensure that it reliably measures the target construct (Rubio et al., 2003). This method has been applied successfully in various fields, including education and management. For example, in the manufacturing industry, (Osman et al., 2021) developed a Lean Transformation Sustainability AssessmentTool, which was validated using a panel of experts through a Content Validity Index (CVI) and Inter-Rater Agreement (IRA). This technique assured the tool's items represented of lean sustainability practices, offering a strong foundation for content validation in educational research as well.

In educational research, content validity is crucial for guaranteeing that instruments assessing research culture cover all essential dimensions, such as institutional support, teacher engagement, and collaboration opportunities (Koller et al., 2017; Oktavia et al., 2018; Rubio et al., 2003). Content validation through expert panels is seen as the ideal approach for enhancing and optimizing research instruments (Boateng et al., 2018). The inter-rater agreement (IRA) enhances content validation by ensuring consistency in expert ratings. When experts are unified on the relevance and clarity of the items in an instrument, it provides additional reliability to the tool (Osman et al., 2021; Rubio et al., 2003).

Although instruments for evaluating research culture exist in higher education, limited research has concentratedon the development and validation of tools specifically tailored for secondary schools (Gleeson et al., 2023; Penuel et al., 2017). The unique characteristics of secondary education, where research activities are often less formalized, demands a tailored tool capable of capturing the unique challenges and opportunities faced by principals and teachers in fostering a research-oriented environment (Leuverink & Aarts, 2019; Plummer et al., 2014). This study aims to fill that gap by developing a research culture assessment tool for secondary schools in Malaysia, validated through rigorous content analysis by an expert panel.

In conclusion, the academic discussion highlights the imperative necessity for the creation of a reliable assessment tool aimed at quantifying the research culture within secondary schools. Although numerous instruments and frameworks have been developed for the area of higher education and various other sectors, secondary schools embody distinctive challenges that require tailored solutions. The process of validation, which encompasses both content validity and inter-rater reliability, constitutes a fundamental component in ascertaining that such an instrument is both dependable and efficacious within educational contexts.

Method

This study was undertaken with the objective of developing and validating an assessment instrument for research culture specifically designed for secondary schools in Malaysia.

Tool Development

The beginning of the development process for the research culture assessment instrument began with an in- depth review of the extant literature pertaining to research culture within educational contexts. Keys constructsof research culture were identified, including research engagement encouragement, skill development, support for research publication and dissemination, and collaborative opportunities. Based on these constructs, a survey questionnaire aimed at assessing research culture was carefully crafted, consisting of five items. The items were intentionally crafted to encapsulate the essential constructs of research culture within secondary schools, thus guaranteeing consistency with both the theoretical framework and the practical realities of the school milieu.

Each item was assessed utilizing a 5-point Likert scale, where a rating of 1 denoted “strongly disagree” and a rating of 5 denoted “strongly agree.” This methodological approach was selected to foster meticulous evaluations of each dimension of research culture while concurrently mitigating ambiguity in participant responses.

Content Validation

Content validity, as articulated by Fraenkel et al. (2012), relates to the extent to which a measurement tool apparently measures a specified construct. To determine the content validity of the instrument, a group of ten subject matter experts was convened. The panel was comprised of specialists with significant expertise around educational research and practices pertaining to secondary education, in addition to methodologists possessing advanced knowledge in the design and validation of surveys (Carpenter, 2018; Fisher, 2020; Rubio et al., 2003). The experts were tasked with evaluating the relevance, clarity, and representativeness of each item in the questionnaire.

The method for content validation encompassed two principal methodologies: the Content Validity Index (CVI) and Inter-Rater Agreement (IRA) (Polit & Beck, 2006; Rubio et al., 2003). The Content Validity Index (CVI) was computed for each individual item (I-CVI) to assess the extent of consensus among experts regarding its pertinence to the construct of research culture.

An item was considered valid with an I-CVI score of 0.80 or higher, following Polit and Beck's (2006), guidelines; items below this threshold were revised based on expert feedback or removed. In addition to the I- CVI, the Scale-Level Content Validity Index (S-CVI) was calculated to assess the overall validity of the entire scale. This provided a broader understanding of the tool’s content coverage across all items.

Inter-Rater Agreement

To support the Content Validity Index (CVI), the inter-rater agreement (IRA) was evaluated to determine the degree of consistency among the judgments given by the experts (Polit & Beck, 2006; Rubio et al., 2003). The IRA serves to ensure that the evaluations are not only legitimate but also consistent among different experts (Leung et al., 2018; Schilling et al., 2007). An IRA

score of 0.80 or above Was regarded as sufficient for indicating reliability in the assessments rendered by the experts (Hallgren, 2012). Items that exhibited an IRA score falling below this predetermined threshold were identified for adjustment or elimination

Expert Feedback and Revision

Following the completion of the initial content validation process, the feedback provided by the experts was thoroughly examined. Frequent issues highlighted by the panel included the duplication of some items and the need for clarification in the wording of others (Boateng et al., 2018). In response to this feedback, a second round of revisions was made to the tool. Items that were flagged for adjustments were implemented in terms of clarity, while redundant items were consolidated or removed altogether (Osman et al., 2021).

Finalization of the Tool

After incorporating the feedback provided by subject matter experts and confirming that all components satisfied the set standards for content validity and inter-rater reliability, the definitive iteration of the research culture assessment tool was created. The finalized tool consists of 6 items, each of which exhibited robust content validity and inter-rater reliability as evaluated by expert reviews.

Future Validation

Despite the content validation process offered substantial preliminary support for the tool's validity, further validation steps are necessary to confirm its reliability and construct validity (Martín-dorta et al., 2021).Upcoming phases of validation will involve conducting a pilot study with secondary school teachers to collect empirical evidence. This data will be used for exploratory and confirmatory factor analyses to assess the tool’s construct validity (Gleeson et al., 2023). Additionally, reliability tests such as Cronbach's alpha will be appliedto ensure internal consistency.

Results

The outcomes of this study focus on the content validation procedure pertaining to the research culture assessment instrument. The evaluation performed by the expert panel provided valuable findings regarding the instrument's validity, with analyses at both the item level and scale level demonstrating strong support for its overall effectiveness.

Boateng (2018) suggests that a panel of five to seven experts is typically sufficient for content validation purposes, given their diverse backgrounds. Therefore, this study selected seven of the eight returned rubrics for evaluation. Table 1 presents the values of CVI and IRA for both item-level and scale-level assessments. The results indicate that the research culture construct successfully met the criteria for content validity and inter-rater agreement, leading to its acceptance. Nevertheless, certain remedial actions have been implemented in response to additional comments provided by panel experts concerning the grammatical inaccuracies.

Table 1
CVI and IRA for Research Culture Constructs

Construct	Itemcode	n_r	I-CVI	S-CVI	Σn_a	I-IRA	S-IRA
esearch culture	RC01	7	1.000	1.000	7	1.000	1.000
	RC02	7	1.000		7	1.000	
	RC03	7	1.000		7	1.000	
	RC04	7	1.000		7	1.000	
	RC05	7	1.000		7	1.000	

Note. n_r = number of experts rated the item as "representative" (score 3 and 4). Σn_a = sum of individual item'sagreement (score 3 and 4).

The table delineates the Content Validity Index (CVI) and Inter-Rater Agreement (IRA) metrics for five items (RC01 to RC05) encompassed within the construct of research culture. Each item was appraised by a cohort of seven experts (nr = 7), all of whom classified the items as representative (scores 3 and 4), culminating in an impeccable I-CVI of 1.000 for every item. Furthermore, the scale-level content validity index (S-CVI) also stands at 1.000, signifying a consensus among the evaluators that these items are pertinent and accurately encapsulate the research culture construct. In a similar vein, the inter-rater agreement (IRA) is recorded at 1.000 across all items, thereby underscoring the elevated level of consistency among the experts in their assessments. These findings underscore the instrument's robust content validity and reliability, with all items effectively satisfying the validation criteria without necessitating any revisions. The flawless scores imply that the constructof research culture is adeptly represented by the chosen items, and the experts achieved complete concordance regarding the tool's suitability for evaluating research culture within secondary educational institutions.

Additionally, the expert panel rendered significant qualitative insights alongside their numerical evaluations. Frequently articulated apprehensions encompassed the possible redundancy of specific items and recommendations for more precise phrasing. For instance, two specialists observed that items RC03 and RC05 seemed to target analogous dimensions of research culture, potentially resulting in ambiguity for respondents. Consequently, these items were reformulated to more effectively delineate their respective focal areas.

Discussion

This study effectively formulated and validated a research culture survey questionnaire designed specifically for Malaysian secondary schools. Using a comprehensive content validation process, involving a panel of experts, the instrument's content validity and inter-rater agreement were carefully reviewed and verified. The experts offered significant insights that ensured the items within the questionnaire were pertinent, unambiguous, and indicative of the fundamental aspects of research culture within secondary school environments. Items that failed to satisfy the established criteria for content validity were either modified or eliminated, thereby enhancing the overall efficacy of the instrument.

The results indicated that the construct of research culture met the necessary standards for both content validity and inter-rater reliability, thereby affirming the instrument's suitability for use within secondary educational institutions. This validated tool is poised is positioned to play a crucial role in the evaluation and enhancement of research culture in schools, enabling teachers and school leaders to acquire valuable insights regarding the prevailing research practices and attitudes exhibited by teachers. Consequently, these insights can be leveraged to foster a more research-focused environment, ultimately contributing to the professional growth of teachers and the progression of pedagogical methodologies throughout Malaysia.

The validation of the instrument signifies a critical advancement in bridging the existing void in the assessment of research culture within secondary schools, a sector that has historically attracted less scrutiny in comparisonto tertiary education. As research increasingly assumes a pivotal role in the landscape of educational reform, this tool provides a pragmatic and dependable approach for schools to evaluate their present levels of research involvement and undertake well-informed initiatives for enhancement.

Nevertheless, although the content validation and inter-rater reliability demonstrate substantial preliminary endorsement for the instrument's effectiveness, supplementary statistical evaluations are imperative to further affirm its robustness. Subsequent investigations ought to concentrate on executing assessments of construct validity, such as exploratory and confirmatory factor analyses, to ascertain that the instrument accurately reflectsthe intended constructs. Furthermore, reliability analyses, including the determination of Cronbach’s alpha, are essential for assessing the internal coherence consistency of the instrument across various educational environments.

Beyond the confines of Malaysia, the instrument possesses the capacity for adaptation and implementation in various educational contexts, both at the regional and global levels, where analogous challenges in cultivating a research culture are present. Subsequent research endeavors could investigate the instrument's adaptability and efficacy across diverse educational frameworks, thereby ensuring its continued relevance and applicability within a multitude of cultural and institutional environments.

Conclusion

In conclusion, the validated research culture assessment instrument represents a significant advancement within the educational domain, particularly in fostering evidence-based methodologies and an inquiry-driven culture in secondary educational institutions. It not only provides a mechanism for evaluating the research milieu within schools but also establishes a framework for sustained enhancements in pedagogical quality and student academic performance. Ongoing endeavors to validate and enhance the instrument will guarantee its influenceon the cultivation of research culture within educational establishments, facilitating substantive transformations in the integration of research into secondary education.

Recommendations

In view of the empirical findings, it is advisable to pursue further statistical validation of the research culture assessment instrument, which should include both exploratory and confirmatory factor analyses, in addition to reliability assessments. A more extensive pilot

study carried out across a range of educational contexts is essential to evaluate its adaptability. Ongoing enhancement of the instrument, informed by user feedback, willensure its relevance and effectiveness. Integrating this tool into professional development initiatives can facilitate schools in strategically fostering a research-oriented culture. Finally, the instrument's potential for application on an international scale warrants investigation, necessitating its adaptation to various educationalframeworks to enhance global research engagement.

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