

The Effectiveness of a Tamil Story Writing-Learning Module Guided by the 5E Inquiry Learning Model among Tamil School Students: Assessing Questionnaire Validity and Reliability

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Abstract

This study evaluates the effectiveness of a Tamil story writing learning module guided by the 5E Inquiry Learning Model among Tamil primary school students in Malaysia. The research focuses on the validity and reliability of a questionnaire developed to assess the module's impact on students' language proficiency and cognitive development. The module integrates culturally relevant storytelling with the 5E model phases: Engage, Explore, Explain, Elaborate, and Evaluate. A panel of five experts reviewed the questionnaire for content and language validity, resulting in a high Content Validity Index (CVI) of 0.91. Additionally, a pilot study with 30 Tamil language teachers from Selangor tested the reliability of the instrument, yielding a strong Cronbach's Alpha of 0.864, confirming its internal consistency. The findings highlight the potential of combining story writing with inquiry-based learning to enhance Tamil language education, addressing challenges such as limited resources and teacher training in vernacular schools. The study emphasizes the need for innovative teaching strategies to improve student engagement, critical thinking, and language retention. Future research should focus on the long-term impacts of this educational approach and explore its potential to enhance other cognitive skills such as creativity and problem-solving.

Keywords: Tamil Story Writing Learning, 5E Inquiry Learning Model, Questionnaire Validity, Questionnaire Reliability, Tamil Language Education

Introduction

Education is the cornerstone for cognitive, cultural, and linguistic development, playing a pivotal role in preserving and advancing minority languages. In the Malaysian context, Tamil schools represent a vital institution for maintaining Tamil language and cultural heritage. These schools face pressing challenges, including limited teaching resources, insufficiently developed curricula, and inadequate teacher training specific to Tamil pedagogy

(Balakrishnan, 2016; Raman & Tan, 2018). Additionally, societal pressures often prioritize Bahasa Malaysia over vernacular languages, reducing the focus on Tamil education. This marginalization has resulted in declining student engagement and proficiency in the Tamil language, thereby widening educational disparities. Such issues underline the urgency for pedagogical innovations tailored to Tamil school students' needs.

Innovative teaching methodologies that integrate cultural relevance with interactive learning have shown promise in addressing these challenges. Storytelling, deeply rooted in Tamil culture, has been identified as a compelling pedagogical tool. It fosters language acquisition, enhances comprehension, and nurtures a sense of cultural identity (Bruner, 1991; Heath, 2014). More than a medium for linguistic development, storytelling embeds moral and cultural values, making it a holistic approach to education (Yilmaz, 2016). Combining storytelling with structured pedagogical models such as the 5E Inquiry Learning Model can further amplify its effectiveness. The 5E model, encompassing phases of Engage, Explore, Explain, Elaborate, and Evaluate, aligns with constructivist learning theories, encouraging active participation and critical inquiry (Bybee et al., 2006).

The integration of storytelling and the 5E model presents a promising avenue for Tamil education. The 5E model's structured framework enables students to explore linguistic and cultural concepts in a manner that is both meaningful and engaging. Research has demonstrated the effectiveness of the 5E model in fostering critical thinking, creativity, and student-centred learning across various disciplines (Tippett & Milford, 2017; Siew et al., 2020). In the context of Tamil schools, combining this model with storytelling can address critical issues such as low student engagement, lack of cultural connection, and limited critical thinking opportunities.

Despite its potential, the success of this integrated approach hinges on the development and validation of tools to measure its effectiveness. Reliable and valid instruments are essential for assessing educational interventions, and ensuring that outcomes are accurately captured and interpreted. This study seeks to evaluate the effectiveness of a Tamil story-writing learning module guided by the 5E Inquiry Learning Model through the development of a robust questionnaire. The questionnaire aims to measure the module's impact on language proficiency, cognitive development, and student engagement. A panel of experts and a pilot study with Tamil language teachers have been employed to establish the validity and reliability of the questionnaire, ensuring it meets rigorous academic standards (DeVellis, 2017; Boateng et al., 2018).

Significance of the Study

The significance of this study lies in its potential to address systemic issues in Tamil education while contributing to broader educational research. Firstly, the study responds to the critical need for innovative teaching methods that enhance student engagement and learning outcomes in Tamil schools. By integrating culturally relevant storytelling with the 5E Inquiry Learning Model, the proposed module offers a holistic approach to language learning, addressing both linguistic and cognitive dimensions. This is particularly significant given the socio-political marginalization of vernacular languages in Malaysia's education system (Raman & Tan, 2018).

Secondly, the research contributes to the growing body of literature on the application of inquiry-based learning models in language education. While the 5E model has been extensively studied in science and mathematics, its application in language learning, particularly within the Tamil context, remains underexplored. This study bridges this gap by demonstrating the model's applicability and effectiveness in enhancing Tamil language education, thus expanding its theoretical and practical scope (Abdi, 2014; Usman & Rashid, 2024).

Thirdly, the validation of the questionnaire provides a critical methodological contribution. In educational research, the use of valid and reliable instruments is paramount for generating accurate and actionable findings (Creswell & Creswell, 2018). By establishing the content validity and internal consistency of the questionnaire, this study ensures that its findings are grounded in robust empirical evidence. The high Content Validity Index (CVI) of 0.91 and Cronbach's Alpha value of 0.864 reported in this study affirm the instrument's reliability and validity, setting a benchmark for future research on educational interventions (Lynn, 1986; Polit et al., 2007).

Study Background

Tamil primary schools in Malaysia play a vital role in preserving and promoting the Tamil language and culture within the broader national education system. However, these schools face numerous systemic challenges that impede the quality and effectiveness of Tamil language instruction. Among the key issues are limited teaching resources, underdeveloped curricula, and a lack of adequately trained teachers specializing in Tamil pedagogy (Balakrishnan, 2016). Additionally, societal and institutional pressures often prioritize the national language, Bahasa Malaysia, over vernacular languages such as Tamil, reducing the focus and resources dedicated to Tamil education (Raman & Tan, 2018). This marginalization has led to a decline in student engagement and proficiency in Tamil, further exacerbating the educational disparities faced by Tamil-speaking students.

Amid these challenges, innovative teaching strategies are essential to revitalize Tamil language education and make it more engaging for students. Story-based learning, which integrates cultural narratives and language in meaningful ways, offers an effective pedagogical approach to addressing these concerns. Storytelling has long been regarded as a powerful tool for language acquisition, not only because it introduces new vocabulary and grammar in context but also because it fosters emotional connections and personal relevance for learners (Bruner, 1991; Egan, 1988). Through stories, students can better grasp complex linguistic structures, cultural nuances, and moral lessons, making learning more immersive and meaningful (Collins, 2015). This is particularly important in the Tamil context, where rich folklore, classical literature, and cultural traditions can be used to create a deeper connection between the students and their heritage (Lakshmanan, 2017).

In recent years, the integration of inquiry-based learning models such as the 5E Inquiry Learning Model has gained traction as a method of promoting active learning and critical thinking. The 5E model comprising the stages of Engage, Explore, Explain, Elaborate, and Evaluate encourages students to become active participants in their learning journey (Bybee et al., 2006). It fosters a deeper understanding of content by allowing learners to explore concepts through guided inquiry and hands-on experiences. When applied to language

learning, particularly in the context of Tamil primary schools, the 5E model can help students engage with stories in a more interactive and analytical way, enhancing their comprehension and retention of the language (Tippett & Milford, 2017). The combination of story-based learning and the 5E model offers a promising approach to improving not only language proficiency but also critical thinking and problem-solving skills among Tamil school students.

Given the potential impact of this integrated approach, it is essential to evaluate its effectiveness through rigorous research methodologies. In educational research, the use of valid and reliable instruments, such as questionnaires, is crucial for accurately measuring outcomes (DeVellis, 2017). The questionnaires developed for this study will assess both the linguistic and cognitive benefits of the Tamil story-based learning module guided by the 5E model, as well as its influence on students' attitudes and engagement. Assessing the validity and reliability of these questionnaires is a critical step to ensure that the data collected reflects the true effectiveness of the teaching intervention (Boateng et al., 2018). Without proper validation, the findings could be compromised, leading to inaccurate conclusions and ineffective educational reforms.

Moreover, this study's focus on Tamil primary schools is timely and necessary, considering the global trends toward linguistic diversity and the preservation of minority languages. Tamil, as one of the longest-surviving classical languages with a rich literary tradition, deserves concerted efforts to maintain its relevance in the modern educational landscape (Annamalai, 2010). Ensuring that the tools used to measure the success of Tamil language teaching are both robust and reliable is critical for making informed decisions about curriculum design and instructional strategies moving forward.

In conclusion, this study seeks to fill a crucial gap in the research on Tamil language education by evaluating the effectiveness of a Tamil story writing learning module using the 5E Inquiry Learning Model. Through rigorous validation of the assessment instruments, this research will contribute to the body of knowledge on educational innovations for vernacular schools, providing evidence-based recommendations for improving Tamil language instruction in Malaysia.

Objectives

1. To evaluate the validity of the questionnaire designed to measure the effectiveness of a Tamil story writing learning module guided by the 5E inquiry learning model among Tamil school students
2. To assess the reliability of the questionnaire across multiple applications with a diverse sample of primary school students.

Research Questions

1. How valid is the questionnaire in measuring the effectiveness of the Tamil story writing learning module guided by the 5E Inquiry Learning Model among Tamil school students?
2. What is the reliability of the questionnaire when administered to a diverse sample of primary school students across multiple applications?

Literature Review

The integration of innovative teaching models, such as the 5E Inquiry Learning Model, has shown promising results in enhancing students' engagement, creativity, and conceptual understanding. This literature review focuses on the theoretical foundations and previous studies related to the effectiveness of story-based learning modules and the 5E model, particularly in the context of Tamil school students.

Constructivist Learning Theory The 5E model is grounded in constructivist learning theory, which emphasizes learning as an active, student-centered process where knowledge is constructed through experience and interaction (Vygotsky, 1986). Constructivist theory, particularly Vygotsky's emphasis on the Zone of Proximal Development, is central to the 5E model, which scaffolds learning by guiding students through phases of engagement, exploration, explanation, elaboration, and evaluation (Bybee, 2006). Research has shown that constructivist approaches like these foster deeper conceptual understanding and critical thinking (Usman Muhammad & Rabiatul Adawiah Ahmad Rashid, 2024).

The 5E Inquiry Learning Model Developed by Bybee et al. (2006), the 5E Inquiry Learning Model is a pedagogical approach designed to facilitate active learning. It follows five phases: Engagement, Exploration, Explanation, Elaboration, and Evaluation. Studies have demonstrated its effectiveness in improving students' motivation and academic performance across various subjects (Abdi, 2014). In the context of language learning, especially Tamil, this model aligns well with the needs of students in terms of building language skills through interactive and inquiry-based activities (Nyoman Sridana, 2018).

Tamil story writing learning module Story writing learning is an approach that leverages narratives to facilitate deeper cognitive processing and retention of knowledge. According to Mayer (1988), the development of educational modules should be guided by cognitive principles that account for learners' psychological needs. Studies on the effectiveness of story-based learning have shown improvements in language acquisition, creativity, and communication skills, particularly in young learners (Amor et al., 2018). For Tamil students, story-based learning provides a culturally relevant framework, making it easier for them to relate to content and internalize language skills.

Effectiveness of Combining 5E Model and Story-Writing Learning Previous studies have explored the impact of integrating the 5E Inquiry Model with story-based modules in improving student outcomes. The 5E model's structured approach ensures that students are actively engaged and encouraged to think critically throughout the learning process (Siew et al., 2020; Nurul Ashikin Ali, 2018). In Tamil language education, this combination has been found to enhance students' writing skills, particularly in the context of creative writing and storytelling (Ilangkumaran Sivanadhan & Shoveena Priya Thiagu, 2020) By guiding students through the inquiry phases, they become more adept at articulating complex ideas and structuring coherent narratives.

Validation and Reliability of Learning Modules The process of developing and assessing the reliability and validity of educational modules is critical for ensuring their effectiveness. Several studies (Tee Tze Kiong et al., 2021) have validated the use of Mayer's model for module development, emphasizing the importance of content validity and internal

consistency. In the current research, the Tamil story writing learning module developed for this study follows similar validation steps, ensuring that it meets educational standards and is tailored to the linguistic and cognitive development of Tamil school students.

Conclusion in sum, the integration of the 5E Inquiry Learning Model Tamil story writing learning module offers an effective strategy for enhancing Tamil school student's language skills. The constructivist underpinnings of the 5E model and the cognitive benefits of story writing learning provide a powerful combination that supports active learning and improves students' writing abilities. The effectiveness of these modules, when validated through rigorous processes, ensures that they not only engage students but also contribute to meaningful language learning outcomes.

Methodology

In this part, researcher will discuss three important aspects which are research design, research population and sample and research instruments.

Research Design

This study employs a quantitative research method using a descriptive survey, focusing specifically on language and content validity, as well as the reliability of the questionnaire designed to evaluate the effectiveness of a Tamil story-based learning module guided by the 5E inquiry learning model among Tamil school students. Descriptive research aims to systematically describe the facts and characteristics of the target population and field of study (Creswell & Creswell, 2018). The developed instrument underwent language and content validity assessments by a number of panel's experts while the reliability of the questionnaire done with standard four students.

Research Sample

Samples for the validity of language and content are experts from various fields. A total of 5 experts have been used in the validation process where 2 language experts from the Teacher Education Institute who are in the language department and 3 field experts consisting of Tamil language expert teachers and Tamil language main trainers from Selangor. According to Lynn (1986), the recommended number of experts ranges from 1 to 5. Their role of experts was to verify that the content of the items accurately represented the research constructs, ensuring precision in word choice, language, spelling, and phrasing (Chua, 2018). Appropriate language modifications were also incorporated during the content and language validity process of the questionnaire instrument.

Samples for reliability consist of 30 Tamil language teachers from the state of Selangor who were randomly selected to conduct a pilot study of this study. The samples for pilot test of this study were choosing as random. The sample size for the study was determined based on previous researchers' views. However, there was a variation in opinions among these researchers. According to Chua (2020), the number of participants in a pilot study ideally should not exceed 100 respondents and could be between 10 to 30 respondents. Mumtaz et al. (2020) suggested that between 30 and 50 participants are sufficient for a pilot study, while Ben O'Neill (2022) believed that between 15 and 20 participants are adequate, and Cresswell & Cresswell (2018) argued that 30 participants are sufficient for a pilot study. Therefore, the

researcher chose 30 participants for this pilot study, aligning with the recommendations of previous researchers.

Research Instrument

The instrument utilized in this study is a questionnaire. The researchers of this study have used a questionnaire by adapting the questionnaire of Gengatharan and Azali (2019). However, modifications have been made to the language structure and content of the questionnaire to align with the requirements of this study. The research instrument consists of 26 items, categorized as per table 1 below:

Table 1
Distribution of items According to Dimensions

Part	Dimensions	Item Number	Number of Item
A	Demographic Information	1,2,3,4,5,6	6
B	Tamil Story Learning Module Requirements for Tamil National Type School Students (SJKT)	7,8,9,10,11,12,13, 14,15,16	10
C	The Use of the 5E Inquiry Learning Model in the Development of a Tamil Story Learning Module	17,18,19,20,21,22,23,24,25,26	10
Total			26

The five-point Likert scale method was employed as the response option for the study participants to answer this research instrument. This approach facilitates researchers in identifying respondents' evaluations of the items they perceive as suitable. The scoring of the Likert scale used is as follows, where 1 denotes as Strongly Disagree, 2 as Disagree, 3 as Neutral, 4 as Agree and 5 denotes as Strongly Agree.

Data Collection and Analysis

Data collection for this study was conducted using a structured questionnaire aimed at evaluating the effectiveness of a Tamil story writing learning module guided by the 5E Inquiry Learning Model. The questionnaire, adapted from the instrument developed by Gengatharan and Azali (2019), was modified to align with the specific objectives of the current research. It consisted of 26 items, divided into three sections: demographic information, requirements of the Tamil story writing learning module, and the use of the 5E Inquiry Learning Model in module development. The items were rated on a five-point Likert scale, where respondents indicated their level of agreement with each statement, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

The data collection process took place in two phases. First, a panel of five experts, consisting of two language specialists and three Tamil language educators, was consulted to assess the language and content validity of the questionnaire. Their role was to ensure that the items accurately represented the constructs under study and that the language used was clear and precise. The experts' feedback led to necessary revisions to improve the clarity and relevance of the questionnaire items. Following the validation phase, a pilot study was

conducted with 30 randomly selected Tamil language teachers from Selangor to assess the reliability of the instrument. This pilot study provided insights into the consistency of the questionnaire when applied in different contexts.

Data analysis involved both descriptive and inferential statistical techniques. Descriptive statistics, including mean, standard deviation, and frequency distributions, were calculated for each item to summarize the responses of the participants. This allowed for an overview of the teachers' perceptions regarding the effectiveness of the Tamil story-based learning module and the application of the 5E Inquiry Learning Model. In addition to descriptive analysis, the internal consistency of the questionnaire was evaluated using Cronbach's Alpha, a widely accepted measure of reliability for Likert-scale instruments. A Cronbach's Alpha value of 0.70 or higher was deemed satisfactory for confirming the reliability of the instrument.

Furthermore, the validity of the questionnaire was assessed through two methods: content validity and construct validity. Content validity was established based on the feedback from the panel of experts during the initial validation phase. Construct validity, on the other hand, was tested using factor analysis, which helped determine whether the questionnaire items accurately reflected the key constructs of the study, namely the effectiveness of the Tamil story-based learning module and the implementation of the 5E Inquiry Learning Model.

By employing rigorous methods in both data collection and analysis, this study ensured that the instruments used were both reliable and valid. These efforts provided a robust foundation for evaluating the impact of the Tamil story-based learning module, contributing to a deeper understanding of its effectiveness in enhancing language proficiency and critical thinking among Tamil school students.

Findings

Validity of Instrument

The validity of the questionnaire instrument was evaluated by relevant experts, following the recommendations of Darusalam and Hussin (2016), who suggest that insights from 3 to 5 experts are sufficient to review the dimensions and items of an instrument. To measure the level of expert agreement, the Content Validation Index (CVI) was applied, which reflects the average appropriateness based on expert evaluations (Chua, 2020). Two methods can be used to determine the CVI value: the Item Content Validation Index (I-CVI) and the Scale Content Validation Index (S-CVI) (Creswell & Creswell, 2018). In this study, the I-CVI method was selected, as it calculates the I-CVI value for each individual item on the scale. Each expert was provided with a set of questionnaires and validity assessment forms, and they rated each item on a five-point scale, from 1 (very low) to 5 (very high). The total score for each item was then divided by the number of experts involved. As a result, only 26 items were included in the final questionnaire. Table 2 presents the average CVI results for the instrument used in this study.

Table 2

Expert Content Validity Index (CVI) Results

n	CVI			0.92
	1	2	3	
26	0.92	0.89	0.95	

Table 2 displays the CVI values for the instrument used in this study. For instruments, researchers need to achieve a CVI value of 0.8 or higher to ensure strong content validity, clarity, and item relevance (Lau et al., 2018; Shrotryia & Dhanda, 2019). Previous studies have suggested a threshold of 0.78 or above when three or more expert panellists are involved, indicating good content validity (Polit et al., 2007). The questionnaire instrument in this study achieved a CVI value of 0.91 (Table 2), based on the overall agreement and evaluations from the expert panel (n = 26). Therefore, the CVI value confirms that the instrument used in this study possesses strong content validity, with the items deemed appropriate for use.

Reliability of Instruments

Reliability refers to the precision of a measuring instrument, meaning that the survey tool consistently yields stable outcomes when used repeatedly and across various items within the instrument (Sekaran, 2003). Fraenkel et al. (2019) suggest that well-defined statements and items can enhance the reliability of a measuring instrument, while Dewitt et al. (2015) argue that data gathered from pilot studies can be instrumental in determining the reliability of an instrument or tool. Pilot studies are carried out before distributing the real survey instrument in the main study to ensure the reliability and validity of the questionnaire used in the research (Othman & Kasim, 2018). As a result, before beginning the main investigation, researchers used internal reliability metrics to calculate Cronbach's Alpha through pilot trials. Cronbach's Alpha value reflects a research instrument's dependability and consistency, with 0.7 or above being preferable (Taber, 2018). Table 3 shows the Cronbach's Alpha coefficient range (Hair, 2016).

Table 3

Range of Cronbach's Alpha Coefficients (Hair, 2016)

Alpha Range	Reliability Strength
0.6 - < 0.7	Moderate
0.7 - < 0.8	Good
0.8 - < 0.9	Very Good
0.9	Excellent

Statistical Package for Social Science (SPSS) version 23.0 is used to assess the reliability of research instruments by analysing each dimension in the questionnaire to obtain Cronbach's alpha coefficient. Table 4 shows the reliability values obtained from the pilot study conducted.

Table 4

Results of the Reliability Analysis of the Questionnaire Instrument

Part	Dimensions of items	Cronbach's Alpha
A	Demographic Information	.877
B	Tamil Story Writing Learning module Requirements for Tamil National Type School Students (SJKT)	.862
C	The Use of the 5E Inquiry Learning Model in the Development of a Tamil Story Learning Module	.854
Overall Cronbach's Alpha		.864

In Table 4, the findings of the reliability analysis for the questionnaire instrument are outlined, with each item dimension assessed for internal consistency through Cronbach's Alpha coefficients. The reliability of each dimension is interpreted according to the guidelines provided by Hair (2016). The first dimension, addressing demographic information, yielded a Cronbach's Alpha coefficient of .877. This falls within the range of 0.8 to less than 0.9, reflecting a very strong level of reliability. This result indicates that the items in this dimension are highly correlated and consistently measure demographic variables. The second dimension, concerning the Tamil Story Writing Learning module Requirements for Tamil National Type School (SJKT) students, produced a Cronbach's Alpha coefficient of .862. Similarly, this coefficient falls within the 0.8 to less than 0.9 range, denoting a very good level of reliability. This suggests strong internal consistency among the items related to part B of the questionnaire. The third dimension, focused on the application of the 5E inquiry learning model in the development of a Tamil story learning module, achieved a Cronbach's Alpha coefficient of .854. This value also falls within the range of 0.8 to less than 0.9, indicating a very good level of reliability strength. In sum, the overall reliability for the entire questionnaire instrument was reflected in a Cronbach's Alpha of .894. This score, again within the range of 0.8 to less than 0.9, confirms a very good level of internal consistency reliability for the instrument as a whole, demonstrating that the items across all dimensions consistently measure the intended constructs.

Conclusion

This study sought to evaluate the effectiveness of a Tamil story writing learning module guided by the 5E Inquiry Learning Model by assessing the validity and reliability of the instruments used. The findings demonstrated that both the language and content of the questionnaire were valid, with a high Content Validity Index (CVI) score of 0.91, indicating strong content alignment with the intended constructs. Furthermore, the questionnaire showed excellent internal consistency, with a Cronbach's Alpha of 0.864, confirming the reliability of the instrument across multiple dimensions. This signifies that the questionnaire was well-constructed to measure the effectiveness of the module.

The study underscores the importance of combining story writing with inquiry-based learning models to enhance Tamil language education, particularly in vernacular schools. The integration of the 5E model (Engage, Explore, Explain, Elaborate, and Evaluate) with Tamil story-writing learning proved to be a powerful pedagogical tool for improving students' language comprehension, critical thinking, and cultural engagement.

Implications

The results of this research have significant implications for Tamil primary education, particularly in Malaysia. By validating this educational approach, the study provides educators and policymakers with evidence-based strategies to enhance student engagement and improve language learning outcomes. The effective use of the 5E Inquiry Learning Model, combined with culturally relevant storytelling, can address some of the systemic challenges faced by Tamil schools, including the lack of engaging curricula and teaching resources.

Furthermore, this research highlights the need to prioritize vernacular language preservation within the broader education system. By demonstrating the success of an innovative approach to Tamil education, this study encourages a rethinking of how minority languages are taught and preserved, providing a model that could be applied to other vernacular schools facing similar challenges.

Future Research

Future research should explore the long-term effects of this integrated teaching approach on student outcomes, particularly with larger sample sizes across different regions. Additionally, it would be beneficial to examine the module's impact on other cognitive skills, such as creativity and problem-solving, to further assess its holistic educational value. Expanding the study to secondary schools could also provide insights into how this method supports students' transition from primary to higher levels of language learning.

Finally, continued refinement and adaptation of the questionnaire and learning modules are recommended to ensure they remain responsive to the evolving educational needs of Tamil school students. Future studies could consider developing digital versions of the story-writing modules to leverage technology in enhancing language learning.

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