

HARMONY IN PROGRESS:

INTEGRATING SCIENCE, TECHNOLOGY,
AND
SOCIAL INNOVATION
FOR SUSTAINABLE DEVELOPMENT GOALS



e-Book of Extended Abstract
Negeri Sembilan International (NSIEx) & Research Symposium
2025

RSST004 - DEVELOPMENT OF A MULTILINGUAL WEB-BASED EDUCATIONAL APPLICATION TO PROMOTE CULTURAL LITERACY THROUGH NASI DAGANG

Wan Muhammad Haziq Darwisy Wan Remle¹, Khairul Nizam Suhaimin^{1*}, and Siti Syazwani Azmi²

¹Universiti Teknikal Malaysia Melaka

²Nagasaki University, Nagasaki, Japan

*Corresponding author: m.khairul@utem.edu.my

ABSTRACT

In an increasingly globalized education landscape, promoting cultural awareness through local culinary heritage offers an engaging pathway for cross-cultural learning. This paper presents the development of Nasi Dagang Explorer, a multilingual web-based educational application designed to introduce the traditional Malaysian dish, *Nasi Dagang*, to a diverse audience through interactive content. The innovation was inspired by the Festival Nasi Dagang event, which highlighted the lack of digital tools integrating cultural narratives with language education. The application consists of five modules: a multilingual introduction, ingredient glossary, bilingual cooking recipe, East Coast dialect phrases, and interactive games. It was developed using lightweight tools such as Streamlit, Canva Web, and JSON-based dictionaries, with audio integration and quizzes. The methodology included content curation, interface design, multilingual translation, and user testing with 30 international student participants. Results from pilot testing indicated that 90% of users agreed the application improved both cultural and language understanding. This study demonstrates the potential of food-based educational technologies to support inclusive, interactive, and culturally anchored learning experiences. It contributes to the fields of digital humanities, educational technology, and cultural studies by providing a replicable model for similar initiatives focused on traditional cuisines and languages.

Keywords – Multilingual Education, Cultural Heritage, Educational App, Nasi Dagang, Web-Based Learning

INTRODUCTION

In today's globalized higher education, cultural integration is crucial. International students often face language and social barriers, and food can act as a universal connector. Positive attitudes and social norms influence their willingness to explore local cuisines, fostering cultural identity and belonging (Hussein et al., 2024; Razalli & Shariffuddin, 2018). Food-based experiential learning has shown strong potential in promoting cultural awareness. Activities such as simulating Malay dining etiquette or using game-based pedagogy help learners appreciate culinary traditions while building unity (Razalli & Shariffuddin, 2018; Ishak et al., 2020; Kamaruzaman, 2020). Nasi Dagang, an iconic East Coast dish, embodies Malay heritage but remains underutilized in multilingual education (Ishak & Ismail, 2021).

The idea for Nasi Dagang Explorer emerged during the Festival Nasi Dagang Antarabangsa 2024 at UTeM, where multilingual cooking demonstrations drew enthusiastic participation from international attendees. This highlighted the potential of food, language, and culture as a powerful integrated learning medium (Hussein et al., 2024). The application leverages text, images, and audio in five languages to promote cultural empathy, language acquisition, and unity through food (Razalli & Shariffuddin, 2018; Ishak & Ismail, 2021; Kamaruzaman, 2020).

OBJECTIVE

The objectives of this study are as follows:

- i. To develop a lightweight, multilingual learning platform based on Nasi Dagang as a cultural medium.
- ii. To enhance international students' understanding of Malaysian culture through food-based content.
- iii. To evaluate user engagement and learning effectiveness through interactive modules and quizzes.

METHODOLOGY

A design-based research (DBR) approach was adopted, involving three iterative phases.

Design & Development

This phase began with the creation of a modular structure consisting of five core components: (1) What is Nasi Dagang?, (2) Ingredient Glossary, (3) Recipe with Translation, (4) Learn the Lingo, and (5) Mini Game/Quiz. Each module was prototyped using lightweight tools suitable for educational deployment, including Streamlit for web interfacing and H5P for interactive elements. Multilingual support included Bahasa Melayu, English, Mandarin, Arabic, and Japanese. JSON-based dictionaries and embedded audio files enhanced language learning.

Implementation

The implementation phase involved developing a minimum viable product (MVP) that could be deployed and tested through a controlled beta session involving 30 international students. Feedback from this testing round was collected using structured questionnaires and usability testing rubrics.

Evaluation

The evaluation phase focused on user satisfaction, multilingual comprehension, and interactive engagement. Quantitative data was collected to assess the tool's usability, engagement, and learning outcomes, while qualitative data from open-ended feedback informed iterative improvements. This methodology ensured alignment with the product's educational goal and cultural outreach intent.

RESULTS AND DISCUSSION

The prototype produced a fully functional web-based application with five interactive modules: cultural introduction, ingredient glossary with pronunciation, bilingual recipe, dialect learning, and gamified quizzes.

User Testing and Engagement Metrics

User testing was conducted with a sample of thirty (30) participants, comprising international students from five linguistic backgrounds (Malay, English, Arabic, Mandarin, and Japanese). Table 1 presents user engagement feedback collected via a structured post-interaction questionnaire, adapted from the System Usability Scale (SUS) and Cultural Learning Index (CLI).

Table 1: User Evaluation Metrics for Nasi Dagang Explorer (n=30)

Evaluation Criteria	Mean Score (out of 5)	SD
Ease of Navigation	4.5	0.54
Language Accessibility	4.7	0.42
Visual Appeal	4.6	0.50
Cultural Learning Effectiveness	4.8	0.40
Overall Satisfaction	4.6	0.49

Participants reported high satisfaction, particularly for cultural learning effectiveness ($M = 4.8$, $SD = 0.40$), confirming that the multilingual and interactive design enhanced their understanding of Malaysian food heritage.

Discussion

Findings validate the feasibility of integrating cultural heritage education into digital, multilingual platforms. The tool effectively supported language learning while fostering appreciation of Malaysia's culinary traditions. Similar to recent studies in digital humanities (Zhao et al., 2022; Kamaludin & Ismail, 2023), embedding cultural elements into educational applications strengthens intercultural dialogue and identity preservation. Limitations included requests for expanding dialect modules and developing a mobile version for portability. These will be considered in future iterations.

CONCLUSION

This study introduces Nasi Dagang Explorer as a novel approach to food-based, multilingual learning that not only promotes language acquisition but also enhances cultural appreciation among international learners in Malaysia. The positive reception from user testing supports its potential for further development and institutional integration, such as in orientation programs, cultural workshops, or mobile microlearning modules. Future work will include expanding the content to other traditional dishes (e.g., Laksa, Roti Canai), improving chatbot interactivity, and conducting large-scale testing for broader validation.

ACKNOWLEDGEMENT

The authors would like to express their gratitude to Universiti Teknikal Malaysia Melaka (UTeM) for the financial support provided through Pejabat Hal Ehwal Pelajar & Alumni,

and all student participants who contributed to the development and testing of the application.

REFERENCES

- Hussein, S. A. E., Xiaoyu, Z., Junren, W., Mahmudin, D., & Saimy, I. S. (2024). Unravelling international students' preferences in embracing Malaysian cuisine: A pilot study. *Journal of Science, Technology and Innovation Policy*, 9(2), 11–18.
- Razalli, N. H., & Shariffuddin, M. 'A. (2018). Learning Malay food & table manners through simulation: Spicing up the traditional teaching method. *ASEAN Journal of Teaching and Learning in Higher Education*, 10(3), 1–10.
- Ishak, N., Ismail, A., Saad, M., & Ramli, A. M. (2021). Researching Kedah's Malay heritage food tradition and eating culture. *International Journal of Academic Research in Business and Social Sciences*, 11(16), 609–623.
- Kamaruzaman, M. Y. B. (2020). The Mangkuk Tepen: Enriching students' knowledge and awareness through a culturally responsive game approach. *International Journal of Research*