

A Conceptual Framework for a Localized Artificial Intelligence Teaching Assistant Incorporating Fine-Tuning, Prompting, and Retrieval-Augmented Generation for Personalized Education in the Malaysian SPM Context

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Abstract : Large language models (LLMs) are a type of artificial intelligence designed to comprehend and generate human-like text. Their emergence offers significant benefits in education, providing students with a supplementary learning tool while fostering critical thinking instead of passive acceptance of information. However, existing models lack alignment with the SPM syllabus, do not tailor their prompts to mimic the structure, format, or style of past exam papers, rely on only a single teaching method, and struggle with expressions, slang, and regional variations, leading to less fluent and accurate responses. The literature highlights the gap in educational AI tailored to specific regional curricula, particularly in the Malay language, which limits the application of LLMs in Malaysian educational settings. This research paper presents the application of a localized AI model, MaLLaM, which utilizes the Malay language to assist Malaysian students in preparing for the Sijil Pelajaran Malaysia (SPM). The conceptual framework model are proposed to be trained with datasets based on the SPM syllabus, including past examination questions, and incorporate variations in teaching methods to create a more engaging educational experience. Survey findings reveal a strong demand for localized, syllabus-specific AI tools, affirming the relevance of MaLLaM in addressing the community's needs for SPM preparation. Additionally, this research identifies challenges and potential risks of using LLMs in education and evaluates the psychological impact of AI as a teaching aid. This study aims to advance technology for educators and students, leveraging LLMs to create personalized learning environments and improving students' academic performance.

Keywords : artificial intelligence, curriculum alignment, education technology, malaysia SPM preparation, malay large language model

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