

**AN ADAPTIVE SOFTWARE ARCHITECTURAL
FRAMEWORK FOR AN INTERACTIVE LEARNING
TOOLKIT**

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Master of Science (by Research)

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DECLARATION

I declare that this is my own work and this thesis/dissertation does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any other University or Institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgment is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

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Date: 16/01/2023

The above candidate has carried out research for the Masters thesis/dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

Name of Supervisor: Professor Dulani Meedeniya

Signature of the Supervisor: *UOM Verified Signature*

Date: 16/01/2023

DEDICATION

I would like to dedicate “iLearn” to every benefactor who was there to support me in this research.

Furthermore, I dedicate this research project to all teachers and students of Sri Lanka who will reap the benefits of “iLearn”.

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ABSTRACT

At present, a significant demand has emerged for online education tools that can be used as a replacement for classroom education. Due to the ease of access and the high availability of mobile devices, the preference of many users is focused on m-learning applications. Thus, this study presents an adaptive software architectural framework for an interactive learning toolkit. As a case study, the application is applied to the primary education sector in Sri Lanka, as there is a lack of learning tools that allow teachers and students to interact effectively. Accordingly, a software architectural framework was designed with the features of adaptivity, learning content authoring, learning content management, low resource utilization, and low power consumption. The study includes an extensive literature review conducted to identify unique gaps in existing studies. Further, the study designs and develops an architecture with the intended feature effectively embedded in it. Furthermore, an m-learning application named “iLearn” is developed as a proof-of-concept by implementing the architectural design. Moreover, the prototype was evaluated for functional requirements by successfully conducting unit tests and user interface tests. The non-functional requirements of the application were evaluated by conducting a system usability survey for 20 teachers and 20 students, which received a good usability score of 80.5% and 83.6%, respectively. Also, the performance of the application was tested and received a good overall outlook on performance where it was found that the application has a below-average consumption of memory, CPU, and battery at peak performance. The application is concluded as a success, with the potential to enhance with cutting-edge technology.

Keywords: Adaptive learning, competency-based adaptivity, learning content authoring, interactive learning, personalized learning, m-learning

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