Development of an E-Learning System for Learning and Multiple-Choice Testing with AI Question Answering

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***Abstract*—This thesis develops a Windows Forms application for e-learning and multiple-choice testing with AI question answering. The source documents account and question management, test creation, automatic grading, statistics, and export of results. An integrated chatbot answers knowledge questions and suggests review material from individual test outcomes. The author reports completion of the basic functions but acknowledges minor remaining errors, a Windows-only interface, and no deployment with a large user population. Web and mobile access and anti-cheating functions are future proposals. The manuscript does not measure learning gains or performance at scale.**

***Index Terms*—E-learning, AI, Question and Answering, Windows Forms, Database**

I. Introduction

The thesis introduces the development of an e-learning system that combines traditional testing and learning with AI for question answering. The system was designed to address the needs of students and educators by providing a comprehensive platform for managing user accounts, questions, tests, and grading. The project also aims to enhance user experience through the integration of a chatbot AI. The system is currently limited to a Windows-only environment, which restricts access from browsers and mobile devices. The author acknowledges the need for further development to support web and mobile platforms, as well as online examination and anti-cheating functions [1]. Related earlier ICTU undergraduate theses provide context for this English summary [7], [8]. Published books on the methods and subject of this project provide context for this English summary [9].

II. Methods

The author first surveyed user needs and separated functional from nonfunctional requirements. The implemented modules manage accounts and question banks, assemble tests, run quizzes, grade answers, and present results. SQL Server stores the application's data, while a chatbot answers knowledge questions and suggests review material from individual test outcomes. The report describes the implementation on Windows Forms; it does not document testing under a large concurrent user load [1].

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III. Results

The report states that the Windows application implements account administration, question management, test creation, test taking, and automatic grading. It also presents result statistics and export to Excel and PDF, alongside an AI question-answering chatbot and study suggestions. The author acknowledges remaining small defects and a limited deployment scale. The thesis contains no measured evidence that the chatbot improves learning outcomes or that the system performs reliably for many users [1].

IV. Discussion

The source supports a functional account of a desktop learning and testing application. Its AI component is described as an aid for questions and review, rather than evaluated as a teaching intervention. The current Windows-only scope limits access from browsers and mobile devices. Online examination, simultaneous access, and anti-cheating functions are proposed extensions. Further study would need user testing and operational measurements before claims about educational effect or scalability could be made [1].

V. Conclusion

The thesis delivers a Windows Forms e-learning and multiple-choice testing application integrated with an AI question-answering component. Its documented functions cover question and account management, test generation, automated grading, reporting, and study assistance. The author reports small remaining errors and no deployment to a large real-world user population. Web and mobile versions, online examinations, and anti-cheating measures remain future work. The source establishes an implemented student prototype, without quantitative evidence of learning improvement or large-scale performance [1].

References

[1] Nông Văn Hảo, "Development of an E-Learning System for Learning and Multiple-Choice Testing with AI Question Answering," internal undergraduate thesis (original in Vietnamese), Thai Nguyen University of Information and Communication Technology, 2026.

[2] N. T. Vinh, N. T. Thắng, Đ. N. Phương, N. T. Phương, and N. T. Dung, Giáo trình Công nghệ phát triển ứng dụng, [Online]. Available: https : / / repository . ictu.edu.vn/hoc- lieu- so/giao- trinh- cong- nghe- phat-trien- ung- dung/

[3] N. X. Công, “Xây dựng ứng dụng thi trắc nghiệm cho môn toán cho học sinh tiểu học,”
[4] M. T. Long, “Xây dựng website thi trắc nghiệm tiểu học tích hợp trợ lý ai giải thích đáp án dựa trên nội dung giáo viên cung cấp,” Accessed: May 24, 2026.
[5] W. Contributors, Educational assessment, [Online]. Available: https : / / en . wikipedia.org/wiki/Educational_assessment, 2026
[6] G. T. L. Brown, Assessment of Student Achievement. New York: Routledge, 2018, [Online]. Available: https://www.routledge.com/Assessment-of-Student- Achievement-Brown/p/book/9781138061866
[7] ICTU Student 134, ”Construction of an Online E-Learning System,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2009.
[8] ICTU Student 207, ”Construction of a Multiple Choice Exam Program and Educational Support,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2010.
[9] A. Silberschatz, H. F. Korth, and S. Sudarshan, Database System Concepts, 5th ed. McGraw-Hill, 2005. ISBN 9780072958867.