

APPLICATION OF CHATGPT IN BUILDING MULTIPLE CHOICE QUESTION BANK: A STUDY IN HIGHER EDUCATION

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ABSTRACT

This study explores the application of ChatGPT in building a multiple-choice question bank for theory modules in higher education. Using ChatGPT, the study aimed to automate the process of generating diverse and relevant questions based on lecture content. The theoretical framework includes understanding the basic concepts and working principles of ChatGPT, along with an explanation of the multiple choice question banks and their significance in higher education. Methodologically, the study included data collection and preparation, adjustment of the ChatGPT model, and assessment of the quality of the generated questions. The results showed that a large number of questions were generated, demonstrating diversity and relevance to teaching materials. Evaluation criteria include accuracy, richness, level of difficulty and relevance. The discussion highlights advantages such as increased productivity and resource diversification, along with challenges such as limits on data accuracy and complexity. The study concludes with recommendations for further research and development in this area.

Keyword: ChatGPT, Multiple-choice question bank, Higher education

1. INTRODUCTION

In the modern era, the intersection of artificial intelligence (AI) and education has opened up innovative methods in many aspects of teaching and learning. Among them, the use of natural language processing (NLP) models, such as ChatGPT, offers promising opportunities in the field of education and training. This article focuses on exploring the application of ChatGPT in building multiple-choice question banks designed for theoretical courses in higher education.

The traditional process of creating multiple-choice questions for tests often requires a significant investment of time and effort on the part of teachers. Furthermore, ensuring diversity, relevance, and quality of these questions can be difficult. By leveraging advanced artificial intelligence models like ChatGPT, there is the potential to optimize and enhance this process. The significance of this lies in reducing the burden on teachers while providing students with a rich and varied learning experience through access to a carefully created question bank. squirrel.

The main goal of this study is to investigate the feasibility and effectiveness of using ChatGPT to automatically create multiple-choice questions based on lecture content in theoretical modules of undergraduate training programs. learn. Specifically, we set the following goals:

- Determine ChatGPT's ability to create multiple choice questions appropriate to the lecture content provided.
- Evaluate the quality and diversity of questions created by ChatGPT compared to the original lecture content.
- Analyze the performance and feasibility of using ChatGPT as a support tool in the question bank creation process..

The scope of the research focuses on testing and evaluating ChatGPT's ability to create multiple-choice questions based on lecture content. This process did not aim to develop a new systematic method but focused on investigating ChatGPT's ability to automatically generate questions and evaluate the feasibility of applying it in a higher education environment.

2. THEORETICAL BACKGROUND

2.1. ChatGPT: A transformer-based NLP model

ChatGPT is a variant of the Transformer model, a neural network architecture that has demonstrated high performance in many natural language processing (NLP) applications. Developed by OpenAI, ChatGPT is trained on a large amount of data from the Internet, including text and conversations, with the aim of "capturing" and reproducing how speakers naturally respond. This model is known for its ability to generate structured and relevant text, based on the context and specific requirements of the problem.

2.2. Multiple choice question bank in higher education

Multiple-choice question banks are an important resource in the exam process and assessment of student knowledge in higher education. The questions in this bank are often designed to test students' understanding, ability to analyze and evaluate the content being learned. The variety and quality of questions in the bank directly affects the fairness and accuracy of the assessment process.

2.3. Purpose of using ChatGPT in building a multiple choice question bank

Applying ChatGPT in building multiple-choice question banks brings a number of important benefits. First, ChatGPT can automatically create questions based on lecture content quickly and effectively, reducing the time and effort teachers have to spend. Second, using ChatGPT can create diversity in the question bank, while providing new and creative questions without being limited by the teacher's knowledge or experience. Finally, using AI technology like ChatGPT can improve the accuracy and fairness of the assessment process by creating more diverse and objective questions.

3. RESEARCH METHODOLOGY

3.1. Data collection and preparation process

- Collecting lecture data: First, the data sets are created from collecting lectures of theoretical modules in the university training program. This data includes lectures presented in text format.
- Prepare data for training: Next, lecture data is processed to prepare for training the ChatGPT model. Preprocessing steps include removing special characters, correcting spelling errors, and segmenting text into shorter paragraphs to improve training performance.

3.2. Use ChatGPT to automatically create questions

- Fine-tune the ChatGPT model: Before use, prompt commands are executed to fine-tune the ChatGPT model on the prepared lecture data set. This process aims to improve understanding and create questions that are appropriate to the lecture content.
- Create multiple-choice questions: After fine-tuning, the ChatGPT application is used to automatically create multiple-choice questions from text passages in the lecture. ChatGPT will create multiple-choice questions based on each small part of the theoretical content of the provided module to ensure that the questions cover the entire theoretical content of the module.

3.3. Evaluate the quality of the questions

- Evaluation criteria: a series of criteria to evaluate the quality of questions generated by ChatGPT, including accuracy, richness, difficulty, and relevance to lecture content.

- Evaluation method: To ensure objectivity and reliability, course management departments evaluate questions created by ChatGPT based on predetermined criteria.

4. RESULTS AND DISCUSSION

4.1. Results

- Number of courses taken: 05 courses
- Number of question banks created: 100 multiple choice questions/1 course

Table -1: Performance Summary of Question Bank for Various Courses

Course	Total Questions	Correctly Answered Questions	Correct Answer Rate
Course 1	100	72	72%
Course 2	100	68	68%
Course 3	100	45	45%
Course 4	100	52	52%
Course 5	100	56	56%
Average			58.6%

The multiple-choice questions created fully cover the knowledge content provided in the lecture, creating diversity and richness for building the multiple-choice question bank of the module. However, some questions are not accurate and there is a large percentage of answers that are not consistent with the content of knowledge provided or are outside the scope of the content of knowledge provided. The average rate of correct questions about content is: 58.6%.

Questions are classified into 3 levels: difficult, medium and easy. Through evaluation, ChatGPT has classified the generated questions well.

4.2. Discussion

4.2.1. Advantages of using ChatGPT in building question banks

- Increase productivity: Using ChatGPT increases question generation productivity by automating the process.
- Diversifying question banks: ChatGPT creates questions that are diverse in content and structure, helping to diversify question banks and improve students' learning experience.
- Save time and effort: Lecturers do not need to spend a lot of time and effort on creating questions but can focus on teaching activities and student consulting.

4.2.2. Limitations and challenges

- Limitations in accuracy: Although ChatGPT can automatically generate questions, these questions may not be accurate or reflect the true meaning of the lecture content.
- Complexity of input data: ChatGPT may have difficulty processing complex lecture data or incomplete lecture data.

4.2.3. Next development direction

- Model optimization: Continue to optimize the ChatGPT model to improve the accuracy and richness of generated questions.
- Combine with manual method: Combine using ChatGPT and manual method to create higher quality and more diverse questions.

5. CONCLUSION

In this study, we have applied the ChatGPT model in the process of building multiple-choice question banks for theoretical modules in higher education. The results show that using ChatGPT can automatically create multiple-choice questions that match the lecture content, while ensuring the diversity and quality of the question bank. Although encountering certain limitations in accuracy and complexity of input data, the potential of using ChatGPT in building multiple-choice question banks is huge.

Taken together, the application of ChatGPT in building multiple-choice question banks is an important step forward in automating the question creation process in higher education. This method can help reduce teachers' time and effort, while providing students with a diverse and high-quality resource to practice knowledge and skills. To further develop and optimize this method, it is necessary to continue researching and testing improved methods, while strengthening the combination of technology and manual methods to ensure the highest quality for Multiple choice question bank.

6. REFERENCES

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