



OPEN SMART BOT:
AI-DRIVEN CHATBOT FOR THE OPEN UNIVERSITY OF SRI LANKA'S BACHELOR OF SCIENCE
STUDENTS

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Abstract: Recent graduates from the Open University of Sri Lanka often find it hard to land jobs in their field, which can lead to a low job satisfaction rate. Lack of adequate career guidance in course selection has led to this problem. “Open Smart Bot”, an innovative AI-powered chatbot, was developed to solve this problem by improving the counselling process for students in the BSc degree program. “Open Smart Bot” serves as an information hub and provides detailed guidance for both OUSL's Bachelor of Science program and Advanced Science Certificate program. It helps students identify career goals and recommend appropriate subject options while choosing courses. By integrating with the university's database, “Open Smart Bot” can assess students' BSc degree program results in real-time to determine their degree eligibility. When users enter their A Level or Advanced Certificate in Science results, the chatbot provides personalized guidance on their eligibility for the BSc degree Programme. A chatbot simplifies the application process by giving step-by-step directions and breaking everything down for users. Beyond academic support, “Open Smart Bot” provides information on financial aid options including loans and scholarships, ensuring holistic support for students. A dedicated FAQ section further enhances the user experience by addressing common queries. A survey was conducted to gather feedback on “Open Smart Bot” and understand users' career preferences and needs. Leveraging the latest research in career counseling, “Open Smart Bot” was developed using the Botpress framework. It is designed to understand user input and deliver reliable, relevant responses. “Open Smart Bot” represents a significant improvement in OUSL's student support systems, enhancing student engagement, facilitating academic success and fostering a student-centered learning environment. It is hoped that the positive results of this research will encourage the adoption of similar methods in other educational institutions, leading to better-informed career choices and greater job satisfaction among graduates.

Index Terms: Open Smart Bot, chatbot, BSc Degree Program, Career guidance, Open University of Sri Lanka

1 INTRODUCTION

“Open Smart Bot” is an innovative chatbot designed to enhance the counseling process for students during the BSc degree program registration at the Open University of Sri Lanka (OUSL). This counseling process is crucial for guiding students from their initial application through to graduation. Unlike traditional universities, where students enroll based on predefined criteria, OUSL requires students to apply for the BSc degree program based on their A-level results or other recommended qualifications. Students can only register if they meet the eligibility criteria. However, the lack of immediate access to academic advisors during the application process can impact students' career decisions.

At OUSL, students are required to select three disciplines from a diverse range, including Zoology, Botany, Physics, Chemistry, Computer Science, Applied Mathematics, and Pure Mathematics. This flexible curriculum allows students to tailor their education to their interests, unlike conventional universities. While this flexibility is beneficial, it can also pose challenges. Students may struggle to align their course selections with their career goals, leading to confusion and uncertainty about the consequences of their choices. Although academic advisors are present during the registration process to guide students, they are experts in their respective fields and may lack comprehensive knowledge across all disciplines, resulting in gaps in the guidance provided. This highlights the need for a more interdisciplinary approach to academic advising to help students achieve clear career goals.

Typically, academic advisors provide counseling to both new and already registered students during the course registration process each academic year. However, counseling already registered students is challenging, as advisors must offer courses based on students' past performance. This requires advisors to have comprehensive knowledge of all course registration rules as well as the academic history of each student. The manual nature of this process is time-consuming and inconsistent, often failing to provide the timely and personalized support that students need. As a result, students may make erroneous decisions, potentially delaying their graduation. Additionally, academic advisors may occasionally forget to convey valuable information, such as scholarship details, further complicating the students' decision-making process.

Enough academic advisors are not always available to meet with students, leading to delays in important decisions regarding course selection and registration. This limited availability is particularly problematic during peak registration periods. The manual nature of the current advisory process results in lengthy student interactions. Students often spend significant time scheduling appointments, waiting for availability, receiving necessary guidance, and completing the registration process. Additionally, the high student-to-advisor ratio limits the provision of personalized support. Advisors may not have sufficient time to thoroughly understand each student's unique background, interests, and career goals. These challenges underscore the need for a more efficient and systematic approach to academic advising to ensure timely and personalized support for students.

To address these challenges, the development and implementation of AI-based chatbot assistants such as “Open Smart Bot” are proposed. “Open Smart Bot” aims to provide personalized academic and career guidance, streamline the course selection process, and ensure alignment with students' career goals.

“Open Smart Bot” represents a significant advancement in OUSL's student support system. Through its intelligent interactions, it seeks to increase the efficiency of the registration process for both new and returning students, thereby reducing the burden on academic advisors. This paper highlights the development and capabilities of “Open Smart Bot” and discusses the positive impact of AI-based solutions in higher education, advocating for their broader use to enhance student outcomes.

2 LITERATURE REVIEW

AI technologies have revolutionized various industries, including education, by improving student experiences and support systems. AI-powered chatbots can greatly enhance the academic journey of university students through personalized assistance and improved learning efficiency (Martínez-Requejo et al., 2024 [6]; Verleger & Pembridge, 2018 [8]). This literature review examines the role of AI-based chatbots in enhancing the journey of undergraduates, focusing on effectiveness, usability, impact, challenges, and opportunities, with an emphasis on personalized learning and academic advising, empowering students' learning and its impact on their journey.

AI-powered chatbots facilitate personalized learning by providing tailored feedback and guidance. Studies indicate that integrating AI-powered chatbots in courses enhances learning experiences, boosts student engagement, and improves academic performance (Verleger & Pembridge, 2018 [8]; Huang et al., 2019; Winkler & Söllner, 2018 [10]). These chatbots also enhance academic advising by offering customized responses to student queries (Le Hoanh Su et al., 2020). To promote self-regulated learning among students, AI-powered chatbots facilitate goal setting, feedback, and personalization (Chang et al., 2023). Moreover, they provide round-the-clock support, assisting students whenever necessary (Banerjee, 2021). Research demonstrates significant improvements in grades and retention rates for students utilizing AI chatbots for academic support (Roll & Wiley, 2016; Liu & Wang, 2020). AI-based chatbots have a substantial impact on students' academic journeys, offering prompt answers to questions and enhancing learning efficiency (Wang et al., 2023; Martínez-Requejo et al., 2024 [6]). These bots promote personalized learning, academic guidance, and self-regulation, resulting in improved grades and a positive learning experience.

Despite the extensive research on AI-based chatbots in academia, there is a deficiency in studies specifically addressing the guidance of students during their course registration, which is a specific requirement for students registering for the BSc degree program at the Open University of Sri Lanka. However, existing literature indicates the potential applicability of AI-powered chatbots to address the challenges of the existing registration process at OUSL. This underscores the potential benefits and challenges of utilizing AI-powered Open Smart Bot's to support BSc students at the Open University of Sri Lanka.

3 METHODOLOGY

Initially, the chatbot was developed using appropriate technologies. Subsequently, its user-friendliness was evaluated to ensure the application's effectiveness. The waterfall model was adopted for the development of "Open Smart Bot". This approach enabled me to systematically address the specific needs and challenges of the system.

Requirement Gathering:

Initially, I analysed the current system to gather precise requirements. The prospectus of the BSc degree program, relevant web pages of the OUSL website, application submission system, and documents utilized in the registration process (such as counsellors' guides and R3/4/5 forms) were the primary sources consulted to understand the manual process. Additionally, I collected information from academic advisors to enhance the accuracy of the gathered information about the manual process. Based on the gathered requirements of the manual system, an AI-powered chatbot was proposed as the solution.

Design and Development:

In the initial phase of this step, I conducted research on various chatbot development frameworks to determine the most appropriate platform for this project. Several options were evaluated based on criteria including commercial

availability, user-friendliness, customizability, and open-source nature, all of which significantly impact the software development process.

Table 1: Bot-Building Framework Comparison

Framework	Commercial	Non-Commercial	User-Friendly	Customizable	Open - Source
Botpress	×	☑	☑	☑	☑
Dialogflow	☑	×	☑	×	×
Microsoft Bot Framework	☑	×	×	☑	×
Rasa	×	☑	×	☑	☑

Botpress is a highly customizable, open-source platform for chatbot development. It provides a user-friendly development environment that allows for extensive flexibility and robust features, making it an excellent choice for developing “Open Smart Bot”. Its non-commercial nature and extensive documentation support easy installation and innovation. Rasa is another open-source framework that supports both machine learning and rule-based conversation management. It is particularly notable for its customization capabilities and active community support, though it is less user-friendly compared to some other frameworks. DialogFlow is powered by Google, widely used for its ease of integration with various communication channels and its powerful AI capabilities, though it is not open source. The Microsoft Bot Framework is a commercial framework that offers extensive integration options with Microsoft Azure and other Microsoft services, making it a strong contender for enterprise-level projects. While it supports advanced chatbot development, it is not very user friendly.

Considering the software's non-commercial nature, user-friendliness and customizability, Botpress Studio was chosen as the platform to develop the “Open Smart Bot” development platform. De Nardis et al. (2022) emphasize the importance of open-source platforms in academic research for their accessibility and customization capabilities. Similarly, Khan and Kim (2022) emphasize the importance of user-friendly and customizable platforms for effective application development. Moussiades, L.. (2023) emphasises the suitability of open-source platforms such as Botpress for academic projects, stressing their flexibility and ease of use. Aligning well with project requirements, given its robust features and flexibility.

Based on the gathered requirements, the initial phase of the system design and development involved designing the development of the dialog flows of all possible paths of all use cases using Botpress Studio. This phase primarily focused on guiding new students through the eligibility process for degree program registration, assisting with discipline selection, and facilitating course registration for undergraduates. Figure 1 depicted a sample dialog flow of eligibility checking to apply for a degree programme. Then the Graphical User Interfaces (GUI) were designed using the facilities in the same framework. The sample GUI of the same use case was depicted in Figure 2. Similarly all the dialogue flows and relevant GUIs were developed. Finally, the chatbot was tested for all the possible paths to check the accuracy of its outcome.

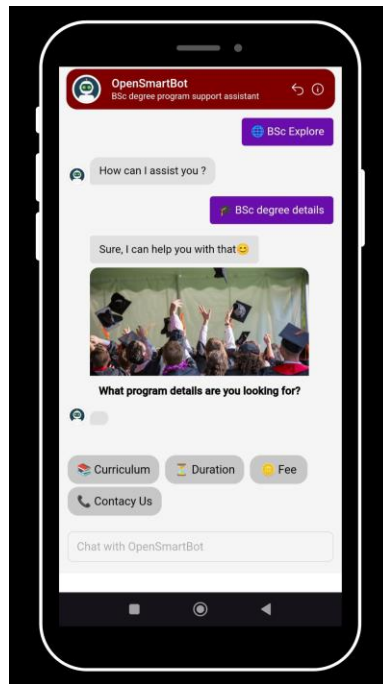
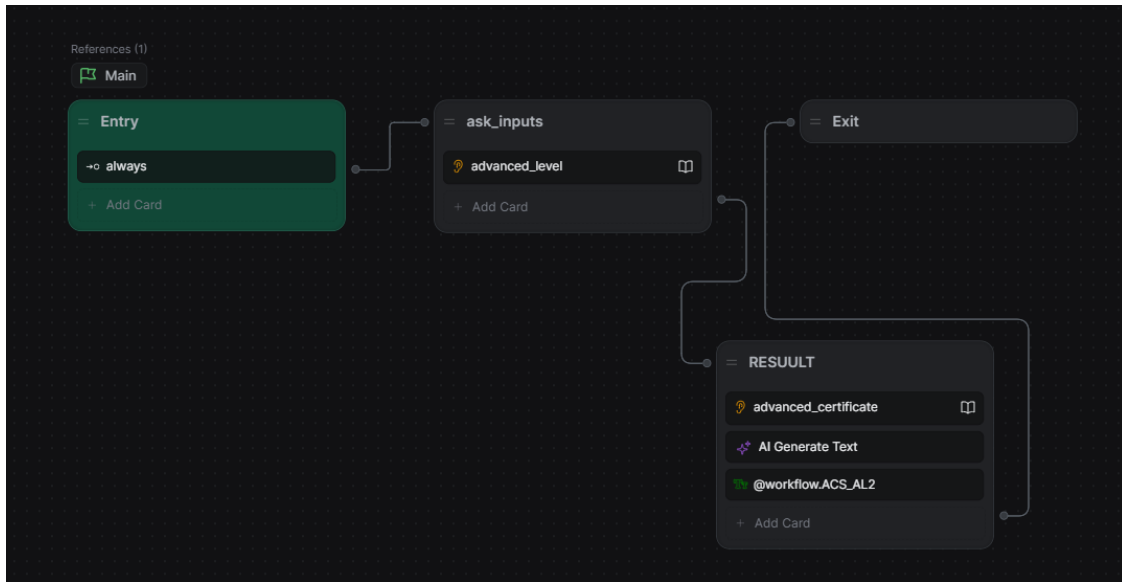


Fig. 2: GUI of Open Smart Bot

I tested the chatbot for all the possible paths to check the accuracy of its outcome.

Evaluation

For the evaluation phase, a survey was designed to gather insights of the chatbot from a diverse group of students across various stages of their academic journey. The total sample size consisted of ten students and included a mix of first year students, level 2 students, level 4 and level 5 students, and new registrants. This sampling approach allowed the survey to capture a wide range of perspectives and experiences, providing a comprehensive understanding of the chatbot's impact. The sample included two first year students who recently started their academic journey at OUSL.

Two students from level 4 participated in the survey. These students were in the middle stages of their BSc degree program and had gained considerable experience with course selection, re-registration, and other administrative processes. The survey included 4 Level 5 students who were nearing the end of their BSc degree programme. Finally, 2 new registrants who recently signed up to OUSL were surveyed.

The survey was administered online using Google Forms, ensuring ease of access and convenience for respondents. It consisted of a combination of questions designed to capture detailed feedback on various aspects of the chatbot's functionality and user experience.

4 DATA ANALYSIS

User satisfaction is measured on a 5-point Likert scale, with 1 representing 'very dissatisfied' and 5 representing 'extremely satisfied'. The average of each category is calculated, and the result as depicted in Fig.3

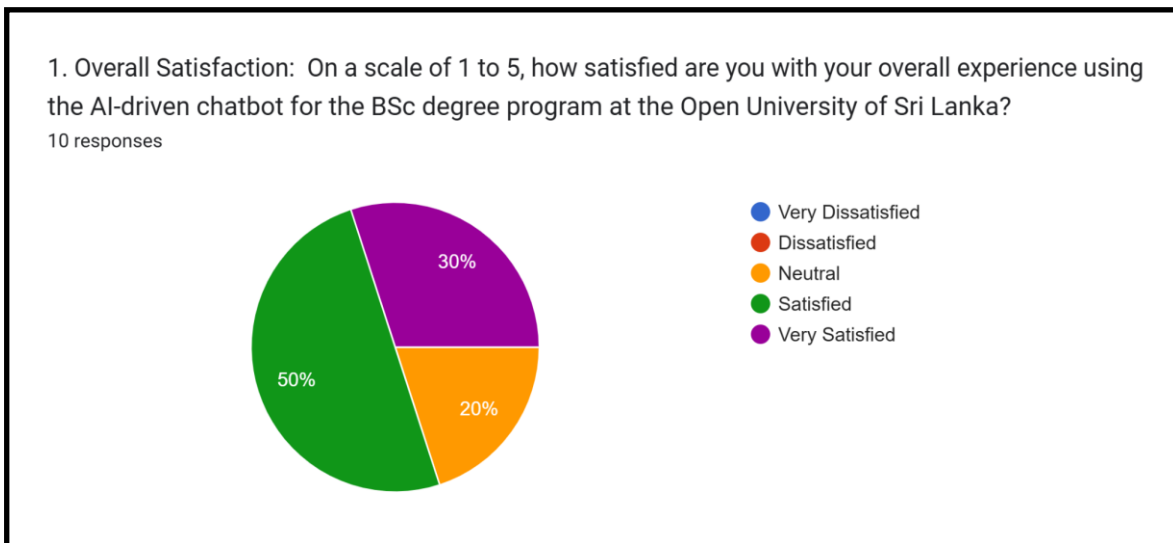


Fig. 3: User Satisfaction Survey Form

To assess Open Smart Bot's usefulness in supporting academic needs, students were asked to rate its effectiveness on tasks such as information retrieval, eligibility screening, and credit tracking. The feedback revealed that 60% of users found the chatbot very useful and 10% rated it as extremely useful. This indicates that a majority of students appreciate the support of AI-based chatbots in managing their academic responsibilities. Only a small proportion of students found it moderately useful (30%), suggesting areas for potential improvement to further increase its effectiveness.

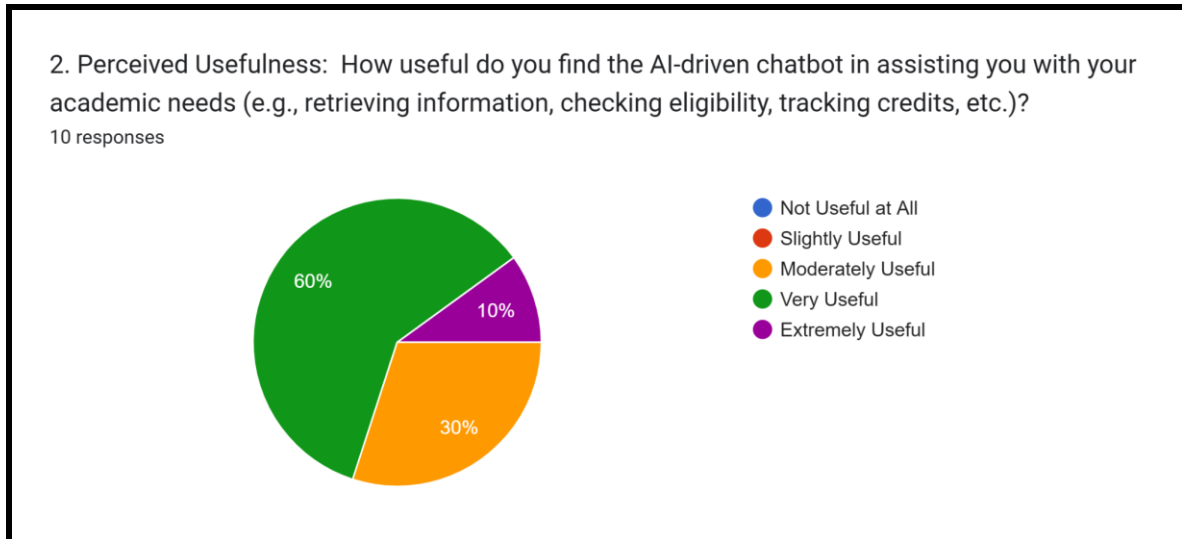


Fig. 4: perceived usefulness of chatbot support

Students were asked to rate the ease of use of AI-powered chatbots. The results showed that the majority found the chatbot to be user-friendly: 60% of respondents rated it easy to use and 30% rated it very easy. A small percentage, 10%, felt neutral about ease of use. This feedback highlights that most users had a positive experience with the chatbot's interface and functionality.

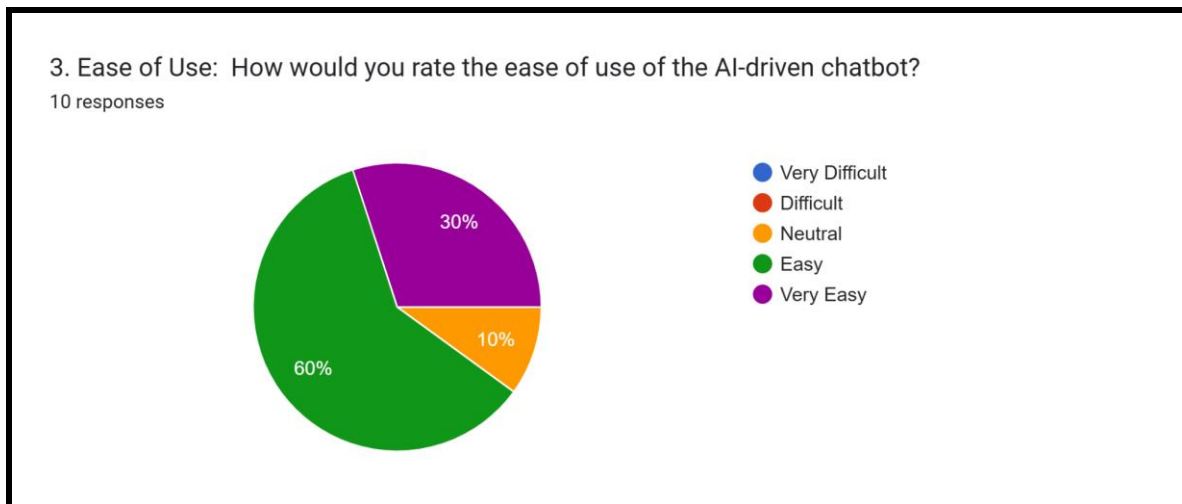


Fig. 5: Easy of use rating for the AI-driven chatbot

Respondents provided feedback on specific features of the chatbot, including BSc degree information, admissions and application processes, pathway selection for career guidance, re-registration, GPA and financial journey, and FAQ centre. The most positively reviewed feature was route selection for eligibility checks, with 80% of users finding it 'extremely useful'. On the other hand, the GPA and re-registration feature received mixed reviews, with 60% of users rating it 'useful' and 20% rating it as 'moderate' or 'not useful'.

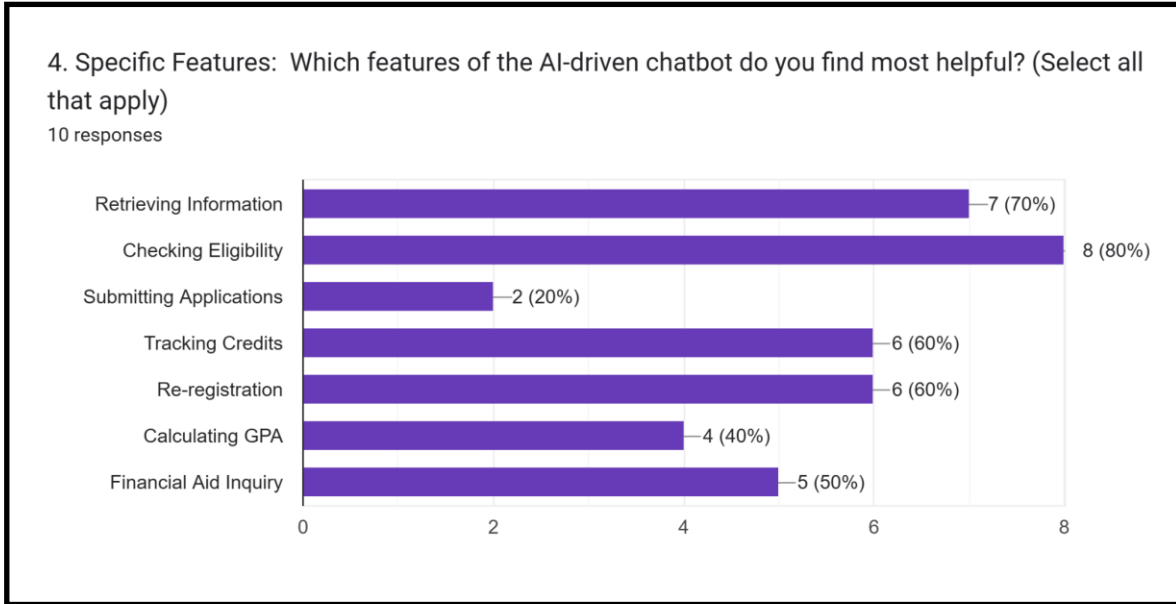


Fig. 6: interest of different paths of chatbot support

Survey results show varying levels of engagement with AI-powered chatbots. A significant 40% of respondents use chatbots infrequently, about once a month. Another 50% of users interact with chatbots several times a month. Meanwhile, 10% of participants reported using the chatbot frequently, several times a week, indicating that they relied heavily on the chatbot for their academic needs. None of the respondents reported using chatbots on a daily basis, suggesting that there is room for increased integration of chatbots into daily academic activities.

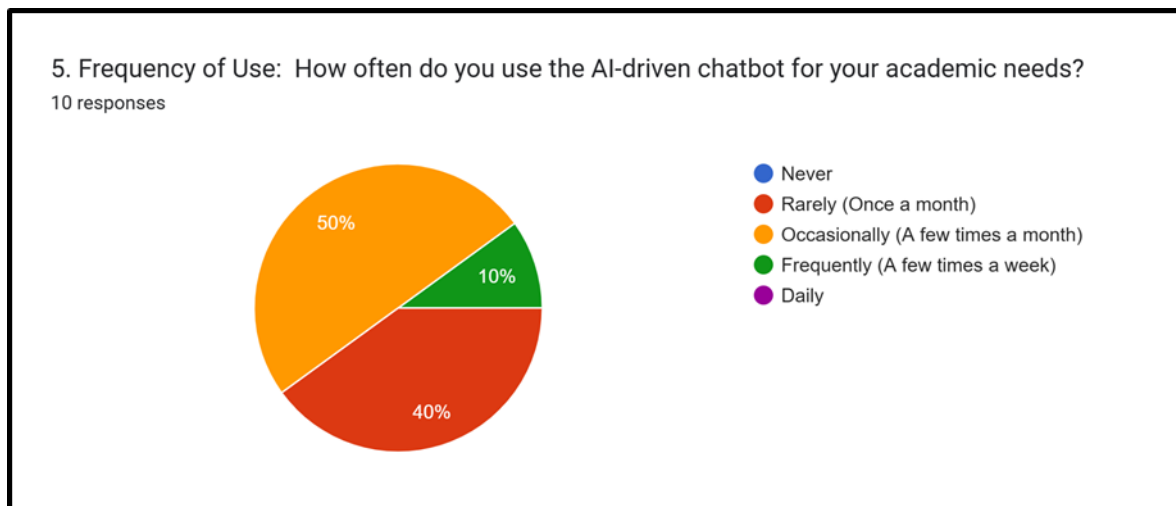


Fig. 7: frequency of use of chatbot

The new AI-driven chatbot is better than the old manual system when we talk about efficiency. About 60% is better and another 30% is better. It is similar to the manual method only about 10% of the time. So overall, a chatbot makes things smoother and faster compared to doing everything manually.

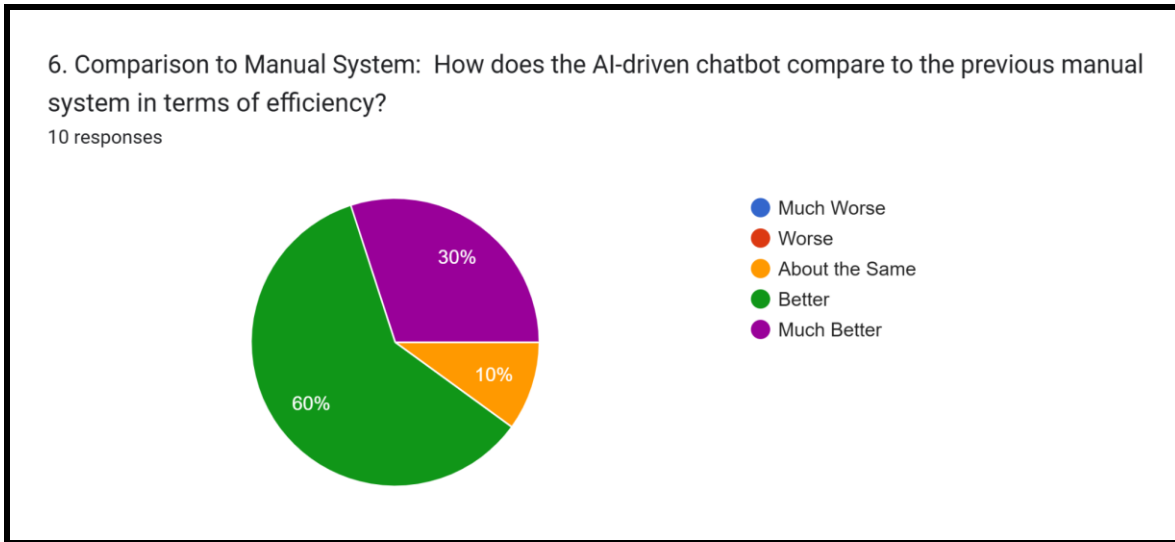


Fig. 8: Efficiency Comparison of “Open Smart Bot” vs. Manual System

5 CONCLUSIONS

The development of an AI-based chatbot for BSc undergraduate students at the Open University of Sri Lanka has been a significant achievement, demonstrating the potential of AI technology to improve educational support systems. By providing instant, accurate and comprehensive support, “Open Smart Bot” has transformed the student counselling process to become more efficient and accessible. Despite some limitations, the positive impact observed underlines the value of integrating AI solutions in higher education.

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