StudyBot 2.0: Development of the Educational Chatbot

1. Project report:

StudyBot 2.0: Development of the Educational Chatbot is a continuation project aimed at further enhancing the new version of the StudyBot chatbot. Initially, StudyBot was developed to support students and faculty at Tallinn University. For the new phase of the project, we planned to expand the chatbot's content, making it more comprehensive and inclusive of a broader range of academic and support-related topics. The central problem of the project is the limited availability of source materials in the source file, which serves as the foundational document containing all the information StudyBot relies on to generate responses. To enhance the chatbot's accuracy and effectiveness, it is essential to review existing sources, expand the database with additional academic materials, and identify gaps in the current content. Moreover, our plan was also to analyze the main target group of the StudyBot users. In order to achieve these objectives, our team was divided into 3 groups: Literature Review and Marketing Team, Survey Team, and Source File Team.

The importance of the problem, its description and choice of methods

The **Enhancing the Academic Library Experience with Chatbots** study highlights that chatbots can reduce **library anxiety, provide structured guidance**, and improve access to academic resources (Mckie & Narayan, 2019). Additionally, chatbots enhance self-regulated learning through gamification and personalized learning paths, improving student motivation and course completion rates (Bozkurt, 2023). AI-driven assistants also reduce stress and improve accessibility to academic resources, making educational tools more inclusive (Bozkurt, 2023). This aligns with StudyBot 2.0's goal of offering academic support in a user-friendly, stress-free manner.

The **Designing Learning Technology Collaboratively** study emphasizes the importance of involving stakeholders (students, lecturers) in chatbot development to create a **user-centered, pedagogically effective tool** (Durall Gazulla et al., 2023). This aligns with our iterative approach, as we chose to involve the students of Tallinn University to conduct research and get information that is relevant specifically to our project. The first half of the questionnaire covered the general attitudes of students towards AI driven solutions for their studies, their needs and expectations. This approach not only provides accurate information about the students' priorities and requirements but allows us to compare our findings from literature review.

Beyond learning support, chatbots have been successfully implemented to **enhance student services in higher education institutions** (HEIs). A case study of three Brazilian universities found that chatbots significantly reduced staff workload, improved response times, and provided 24/7 assistance for student inquiries (Silva Gonçalves et al., 2022). These benefits make chatbot solutions particularly useful for handling frequent administrative questions, such as those related to course enrollment, financial aid, and university policies – features that align with StudyBot 2.0's objectives.

The students' **behavioral intentions in regards to adopting the chatbot** were covered by various articles, pointing out that perceived relative advantages, sense of compatibility with the chatbot's technology, importance of trialability, association between perceived usefulness and perceived ease of use and the impact of perceived trust - all build up to a greater intention to adopting the chatbot (Ayanwale & Ndlovu, 2024). Moreover, studies showed that students view chatbots as reliable and trustworthy when they are easy to use and provide correct answers instantly (Pillai et.al, 2023). The study on **AI-driven student assistants in the classroom** found that students overwhelmingly support chatbots for learning assistance, particularly for **providing quick answers, study tips, and course-related guidance** (Chen et al., 2023).

The previous project, although generally successful, had several shortcomings. Possibly the most pressing one was the lack of information about several fields, such as language requirements for foreign students seeking admittance to Tallinn University and requirements for admission to different majors.

From a technical side, the aim of this project was to look into options that can potentially solve those problems. The issues relating to the lack of the information the bot was able to provide were to be

solved by analyzing and supplementing the original source file used by the chatbot. Further in the project, we also ended up discovering new features of the software used for the development of the chatbot and utilizing them, such as scraping the TLU website for information. Furthermore we tested the chatbot both amongst ourselves and the other students in order to verify successful addition of the new information.

Description of activities and reaching the stakeholders

The stakeholders of this project include the current and prospective TLU students. Our stakeholders are also Tallinn University's academic and administrative staff, as the chatbot has a potential to decrease their workload in answering the students' questions.

As a combined group working on Marketing, Surveys, and IT, our efforts reached a wide and diverse student audience across Tallinn University. Through survey distribution, we engaged approximately 40 students, both local and international, across various departments and study levels. Importantly, our results will guide further improvements to the chatbot's design and functionality. In the long term, once the improved version of StudyBot is fully launched, these changes have the potential to support students, particularly those who struggle with access to academic help, like international, first-year, or special needs students.

During the current stage of development of the StudyBot, a limited number of stakeholders was reached. Due to the fact that the StudyBot is not yet available for use, it was distributed with limited access for testing and feedback from the students. The main activities to reach the students from Group 2 included:

- Designing comprehensive survey and interview questions to assess user experience, satisfaction, and expectations of StudyBot.
- Creating a structured Google Form with sections on general usage, usability, preferences, and suggested improvements.
- Conducting a pilot test of the survey to ensure clarity and logic before final distribution.
- Distributing the survey across university channels (classmates, student groups, messaging platforms).
- Collaborating with other groups to combine multiple survey drafts into a single, unified version.

- Analyzing initial feedback to identify common patterns and technical issues experienced by students.

Sustainability of the StudyBot 2.0 Project

Ensuring the sustainability of StudyBot 2.0 is one of the key goals of our development process. Initially, the chatbot was built using only a static source file within the Chatbase platform. However, during testing it became evident that this approach severely limited the chatbot's ability to answer a wide range of questions due to the restricted content base.

To improve this, we proposed enabling the website crawling feature in Chatbase and linking it to Tallinn University's official website. This would allow the chatbot to dynamically retrieve information directly from the university's web pages, significantly broadening its knowledge base and reducing the need for constant manual updates to the source file.

After implementing this change, we discovered a new limitation: while the chatbot could crawl and read web pages, it was unable to index and access PDF documents embedded within the site. To solve this issue, we compiled a proposed solution involving the creation and submission of a dedicated PDF sitemap, which lists all relevant documents hosted on the university's website. A working example of such a sitemap was created and sent to the project coordinator along with a detailed guide.

At this point, we are still waiting for confirmation from the university regarding whether someone with administrative access to the website infrastructure can implement the sitemap update. Once completed, this enhancement would ensure that the chatbot has access to both static and dynamic content, including PDFs, greatly improving its reliability and long-term sustainability.

Ownership of the chatbot and its architecture remains with Tallinn University. We recommend that ongoing maintenance and periodic retraining be handled by the university's IT department in collaboration with academic and support services, ensuring that the tool continues to meet student needs over time.

Summary of the results and annexes

Group 1: [Literature review](#)

Our very first task consisted of the group members' selection of the interest group "Literature Review and Marketing Group". After it was finalized, we moved on to work on the literature view. The database search identified 52 relevant papers, filtered from an initial 119. Each member reviewed assigned abstracts (4 members: 9 abstracts each, 2 members: 8 abstracts each) and analyzed the articles based on their relevance. As the process of writing and compiling the literature reviews were in action, in the Excel document we color coded the articles based on relevance and usefulness for Group 2 (Survey and Interview Group). Finally, the literature review document was done and we started to work on the mid-term session slides and mid-term report. After our mid-term presentation our group leader gathered all the feedback and presented them in our meeting. We decided to take the feedback and comments into consideration and work on them. The second term approached and our goal was to disseminate the questionnaire link, to make sure both local and international students from all levels of degree studies could participate. As a result, we were able to share the questionnaire with 12 groups/organisations of Tallinn University.

Group 2: Questionnaire

📕 **Survey report.pdf**

☒ **Tallinn University StudyBot 2.0 Survey (data).xlsx**

To accomplish our objective of enhancing StudyBot 2.0, we used a number of techniques. We created a structured survey with 29 targeted questions, covering areas like usability, user satisfaction, AI trust, and feature preferences. Afterwards, we conducted pilot testing with around 2–4 students to ensure the clarity and flow of the survey before launching it more widely. After careful analysis of the drafts we successfully merged multiple drafts from different subgroups into a single, well-organized Google Form and distributed the final survey across at least 6 different student channels, including course chats, WhatsApp groups, and faculty mailing lists with developers. A survey (N = 35) gathered both quantitative and qualitative data on AI-tools usage, StudyBot's perceived usefulness, and desired improvements. Most students used AI tools regularly, especially for writing and summarising. While 69.6% reported that StudyBot saved them time, they also noted limitations such as generalised answers, lack of links to official sources, and incomplete information. Open-ended responses highlighted demand for deadline reminders, integration with Moodle/ÕIS, and transparency when the bot is unsure. Students also emphasised that the tool needs promotion and

onboarding. Based on the findings, the report provided recommendations for improving accuracy, personalisation, and usability.

Group 3: Source file

In order to improve the [StudyBot,](StudyBot) we first had to analyze the original source file the first version of the bot used as its knowledge base. We started by removing unnecessary information that was not relevant to the information the bot was supposed to provide. Then we proceeded to find information that was reported to be missing from the chatbot, such as information about language requirements for various majors. We also had to format the gathered information to be readable by the artificial intelligence model so it could be added to the bot's knowledge. After adding the necessary information, we also tested the bot with the questions that needed to be answered using the added information.

We also experimented with adding all of the information from the TLU website using a web-scraping script to convert the website contents into a format readable by the language model. However, that proved to be unnecessary, as the platform used for the development of the bot was also capable of scraping the website itself. Nevertheless, as the information we had added previously was from the other websites and PDF files hosted on the TLU website that the web scraper was unable to read, our previous efforts were not for nothing.

2. Project action plans

[Action Plan Group 1](Action%20Plan%20Group%201)

[Action Plan Group 2](Action%20Plan%20Group%202)

[Action Plan Group 3](Action%20Plan%20Group%203)

3. Communication to stakeholders

To communicate with the stakeholders we reached out to several groups and organizations within the university:

- Shared the survey with international and local student groups via Telegram, WhatsApp, and other messaging platforms;
- Contacted students from different faculties and programs through course mailing lists and online forums.
- Discussed the questionnaire informally with peers during classes and via online study platforms such as Google Meet.
- Exchanged drafts and feedback with members of other project groups, especially when merging versions of the survey into a single final format.
- Distributed the final survey through social media groups, Moodle forums, and student networks to maximize reach across diverse student profiles
- Emailed the Communication Management 1st year group, ,
- Messaged @tallinnuniversity instagram page
- Emailed @tluesindus because DM was not possible
- Messaged @tlujap,
- Emailed TLU English Major,
- Messaged @ir_society_tlu,
- Emailed TLU Civitas,
- Messaged Humanities school page
- Messaged Tallinn University Institute of Educational Sciences and the Student Council of the Institute of Educational Sciences (KÜN).

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