Using a Chatbot for Student Onboarding and Learning in Projects: Technology as an Enabler of Active Learning

Erik T. Lopes[1], Yasmim Bezerra Oliveira Altoé[2], Pedro Gonçalves Prazeres[2], Luiza Oliveira de Araujo[2], Simone Borges Simão Monteiro[2], Diana Mesquita[3], Jens Myrup Pedersen[4], Rui M. Lima[1]

[1] ALGORITMI Centre, Department of Production and Systems, School of Engineering, University of Minho, Guimarães, Portugal
[2] Department of Production Engineering, University of Brasilia, Brasília, Brazil
[3] Universidade Católica Portuguesa, Faculty of Education and Psychology, Research Centre for Human Development, Porto, Portugal
[4] Cyber Security Group, CMI Section, Department of Electronic Systems, Aalborg University, Copenhagen, Denmark

Email: erik.lopes@algoritmi.uminho.pt, bezerrayasmim7@gmail.com pedroprazeres98@yahoo.com.br, loliveiradearaujo647@gmail.com, simoneborges@unb.br, dmesquita@ucp.pt, jens@es.aau.dk, rml@dps.uminho.pt

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Abstract

Using technologies as enablers of active learning methodologies is a recurring topic in the scientific literature. Various tools have been developed and applied in engineering education, yielding promising results. The rapid development and widespread adoption of generative artificial intelligence (AI) language models have recently sparked discussions on their use, regulation, and evaluation in the teaching and learning process. Chatbots represent a relevant application, offering opportunities such as enhancing the learning process, providing rapid and personalised access to knowledge, and enabling iterative support that benefits students. Additionally, chatbots can be applied in administrative and support activities, potentially reducing faculty workload, which is one of the challenges in adopting active learning approaches. Given this, this article presents a method for developing a chatbot using low-code tools to accelerate the onboarding process for the Erasmus+ Egalitarian project, which focuses on solid waste management and waste pickers. Organised into iterative cycles, this project has already engaged students of various nationalities, addressing challenges related to initial problem contextualisation, knowledge management, and the diverse concepts and tools adopted. Thus, students and faculty members who participated in the first three cycles of the project evaluated the developed tool, highlighting strengths and areas for improvement and comparing their experiences with and without the chatbot. The results indicate the feasibility of chatbot development without requiring programming skills, the potential of generative AI to provide fast and direct access to knowledge, and an improved experience for participants in projects involving active learning. Finally, this tool enables gradual and iterative training throughout the project cycles, reducing the effort required from faculty members and experienced students in the onboarding process in each new cycle.

Keywords: Active Learning; Engineering Education; Project Onboarding; Chat Bot; Project Management.

1 Introduction and Theoretical Background

The rapid pace of technological advancement, primarily driven by developments in generative artificial intelligence (AI), significantly transforms the global labour market and redefines the skill sets required from professionals (Ellingrud et al., 2023). According to the Future of Jobs Report 2025 by the World Economic Forum (2025), it is estimated that by 2030, approximately 86% of surveyed organisations expect AI-based and information processing technologies to cause structural changes in their business models. This transformation goes beyond the production sector, directly affecting education and requiring innovative pedagogical approaches aligned with the demands of the so-called Industry 4.0 (Führ, 2022). In this context, Education 4.0, and even Education 5.0, emerge as frameworks designed to prepare individuals for highly technological, collaborative, and dynamic environments, while also fostering the development of learning ecosystems and a strong sense of responsibility (Alharbi, 2023). Incorporating tools such as artificial intelligence, digital platforms, and methodologies based on experimentation and projects (learning by doing) is an effective strategy to promote the development of skills aligned with the dynamics of an increasingly automated and connected world (Führ, 2022). According to Bartolomé et al. (2018), two fundamental principles of Education 4.0 are

personalisation and flexibility, which allow students to adapt their learning paths to their own rhythms, styles, and needs.

Higher education institutions are a key pillar in preparing professionals to face contemporary challenges. In this context, traditional teaching models are being replaced by student-centred approaches that promote personalised learning. Active learning fosters essential competencies such as creativity, autonomy, and critical thinking (Murillo-Zamorano et al., 2021). Strategies like Problem-Based Learning (PBL) and Project-Based Learning (PjBL) enhance student engagement through real-world challenges and the development of tangible solutions (Marnewick, 2023). These methodologies can significantly improve learning outcomes when combined with the purposeful integration of digital technologies (Krull & Duart, 2017). However, there are challenges, such as increased workload, students' insecurities and engagement, and demanding teachers to develop skills, including the use of new technologies, empathy and feedback (Das Neves et al., 2021).

Low-code/no-code development platforms (LCDPs) have emerged as strategic tools, enabling individuals without detailed technical knowledge to create functional digital solutions. Combining these platforms with generative AI technologies expands the possibilities for innovation, encourages agile application development, and democratises access to the creation of adaptable and scalable educational tools (Sido & Emon, 2024). Among the most promising technological solutions in this scenario are chatbots, defined as computer systems that interact with users through natural language, offering personalised support for learning and communication (Hwang & Chang, 2023). In addition to optimising knowledge management, recent studies have demonstrated their potential as pedagogical assistants, providing both student support and reducing teachers' workload by answering frequently asked questions and offering continuous guidance (Pérez et al., 2020). In this context, ensuring access to technology for all students, training the educators and allowing the configuration of the agents without the need for programming skills are some of the existing challenges (Ramandanis & Xinogalos, 2023; Rooein et al., 2022).

Based on these premises, this article proposes a method for developing a chatbot using low-code/no-code tools to support the onboarding process of students in the Egalitarian project, an initiative of the Erasmus+ program. This initiative aims to develop digital solutions for solid waste management and improve working conditions for waste pickers in the Federal District of Brazil. The project brings together students and faculty from different countries and academic fields and is structured around iterative cycles, which demand effective strategies for integrating and transferring knowledge among participants (Egalitarian, 2025). The developed chatbot addresses recurring challenges such as initial contextualisation, knowledge integration, and information transfer between project cycles, contributing to a more efficient and sustainable educational experience. The proposal explores the potential of chatbots as support tools for active and collaborative learning, detailing the development process, user perceptions, and benefits observed during the initial cycles of the initiative.

2 Methodology

This paper is an exploratory case study applied in the context of the Erasmus+ Egalitarian Project. A case study is an empirical approach that gathers data from a specific system and analyses it in depth (Gil, 2002). Its goal is to deepen understanding of a problem and develop related hypotheses and theories (Mattar, 2005). In the development of chatbots, numerous stages can be identified, which should be adapted according to the complexity level, objectives, and tools used (Lopes et al., 2024). Therefore, this study followed the six-step approach from Lopes et al. (2024). Table 1 summarises the methodological approach and decisions in each step.

Table 1. Methodological Approach. Source: Developed by the authors.

Step	Main Definitions
Initial analysis	• Software Choice: Microsoft Copilot has been selected due to its license availability within universities, minimal technical expertise requirements, and ease of implementation. • Context: The chatbot will support the onboarding process for the Egalitarian Project. It will assist staff and academic personnel in providing key information to new students involved in each project cycle.
Definition of characteristics	• Tone and Accessibility: The chatbot will adopt a friendly, non-technical tone. It will be publicly accessible to all project participants and the wider public, without needing authentication. • Response Style: Responses will be concise and direct, offering further details upon user request. • Information Management: The chatbot will limit its responses to publicly available information and will be programmed to avoid sharing sensitive or unpublished data. • Languages: While English will be the primary language, the chatbot will also offer support in Portuguese, Dutch, and Danish to accommodate the linguistic diversity of project participants.
Design	• Introduction: Upon activation, the chatbot will provide a brief overview of the Egalitarian Project, its objectives, and limitations. It will also include a link to the project feedback survey. • Project Information: The chatbot should provide details about the Egalitarian Project, including participating universities, project cycles, and organisational structure. • Context on Waste Pickers: The bot should be able to explain the challenges faced by waste pickers and the broader waste management issues in Brasília, offering examples and relevant data. • Project Activities: The chatbot will present information about programmes and initiatives under the Egalitarian Project to inform students about ongoing and past activities. • Redirect and Support: In cases where the chatbot cannot address a specific query, it will provide appropriate contact details for further assistance.
Implementation	• Technical Development: Chatbot development may include using Microsoft Power Virtual Agents, with customisable flows, triggers, and actions tailored to specific user needs. • Model Configuration: A standard large language model (LLM) will be used, without internet access, to reduce the risk of hallucinations and misinformation. • Language Support: English will serve as the default language, with additional support for Portuguese, Dutch, and Danish, aligning with the project's international context. • Privacy and Authentication: No user authentication will be required, though the chatbot will be designed to handle private matters cautiously and appropriately. • Training Resources: The model will be trained using PDF and text-based documents, particularly those related to the Egalitarian Project's official resources and guidelines.
Testing	• Synchronous: A session with students from the Egalitarian Project Management Office at the University of Brasília will be conducted. • Asynchronous: An online survey will be distributed to students, supervisors, and professors involved in the project's current and past cycles.
Evaluation	• Data Analysis: Responses will be analysed through both quantitative and qualitative methods. • Interviews: Informal interviews will be conducted with selected participants, primarily from the Project Management Office and the University of Minho.

3 Results

The chatbot "Naira" was developed using Microsoft's Copilot tool, a generative artificial intelligence solution integrated into low-code development platforms. Naira was designed as a virtual assistant for the Erasmus+ Egalitarian project to facilitate the onboarding process for students and other participants. Figure 1 illustrates the Studio interface, highlighting its user-friendly language and the adopted conversational format. The development process is simplified, resembling a conversation with a chatbot. It involves providing general information and adding instructions and sources of knowledge into specific fields. Naira's development followed the six methodological steps described in this article: initial analysis, definition of characteristics, design, implementation, testing, and evaluation. This structured sequence of activities enabled the creation of a functional solution without requiring advanced programming skills.

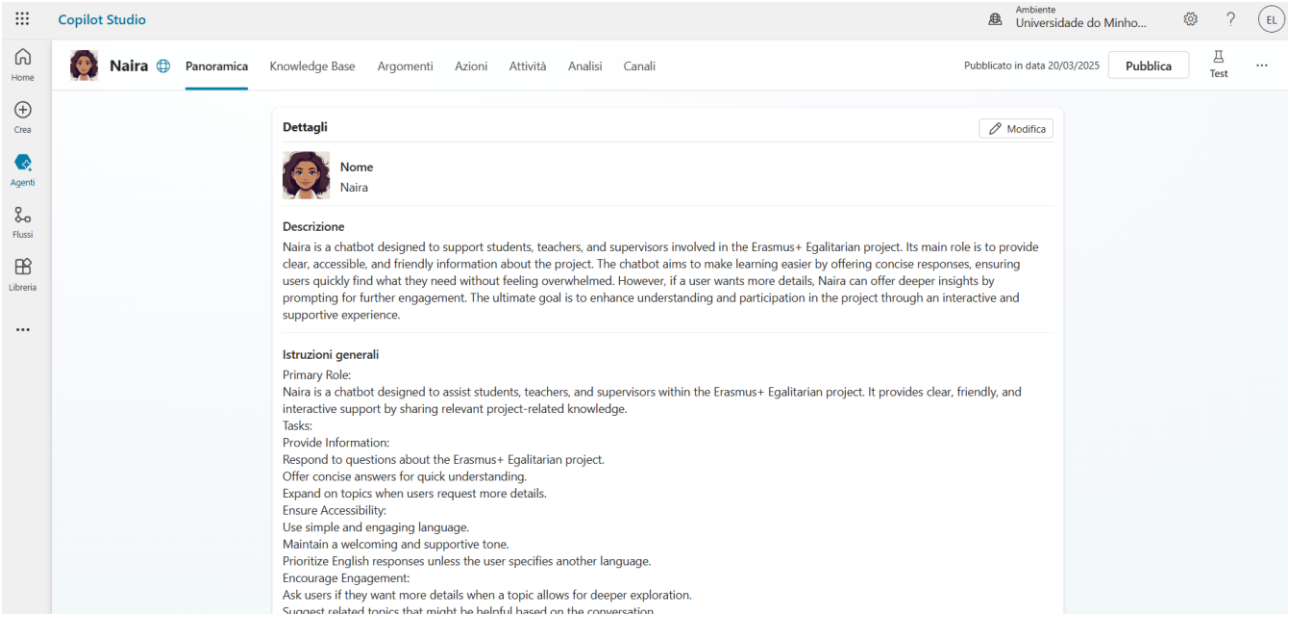

Figure 1. Copilot Studio overview. Source: Developed by the authors (2025).

In the initial analysis phase, the team identified the main doubts and difficulties faced by participants during previous project cycles. Based on this information, the chatbot's development was guided by a focus on accessibility, natural language interaction, and multilingual support. Naira's design emphasised an intuitive conversational interface, with dialogue flows designed to simulate a humanised and friendly interaction. Using Microsoft platforms, the team organised knowledge blocks by topic, linked to a knowledge base constructed from project documents, support materials, and FAQs. Copilot was employed to refine these conversational flows through AI-generated suggestions, streamlining the development process and enhancing the coherence and naturalness of the responses. Figure 2 presents the protype interaction with the user.

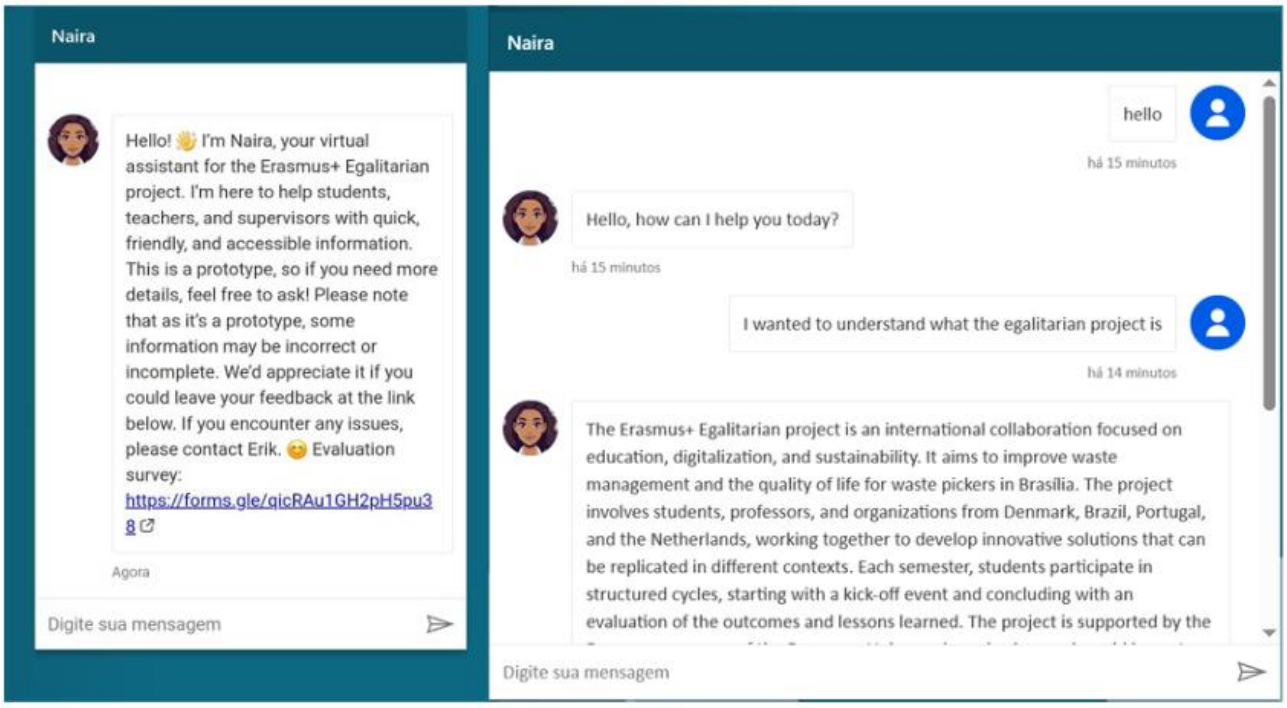

Figure 2. Naira chatbot interaction. Source: Developed by the authors (2025).

During the implementation phase, usability tests were conducted with pilot groups, leading to adjustments in question triggers and improvements in response accuracy. The final stage involved applying a feedback form regarding the chatbot's use. This evaluation aimed to assess its usability, educational and informational value, and impact on understanding the project's social context. The responses were collected through a Likert scale ranging from 1 to 5 and organised into three respondent groups: Total Participants (n=23), Teachers/Supervisors, and Students/Others. This segmentation allowed for observing both the general perception and potential variations in the experience across different user profiles involved in the Egalitarian Project.

4 Discussion

Overall, the scores presented in Figure 3 indicate a very positive evaluation of the chatbot, with most items reaching averages close to or above 4.5. These results suggest that the tool adequately fulfilled its role as a support instrument for active learning and the onboarding process of new participants. Among the highest-rated items are: "Recommend using Naira to other students and professionals that want to understand Egalitarian better" (4.95), "Could help people understand faster and better aspects related to the Egalitarian Project" (4.86), and "Adds value to project-based learning experiences by supporting students with useful information in an interactive way" (4.86). This also demonstrates the interest of both students and teachers in the use of new technologies in education, signalling opportunities for research that follow this direction. The synergy between new technologies and active learning had previously been highlighted (Lima et al., 2023; Souza & Debs, 2024), representing a potential alternative for increasing engagement in both curricular and extracurricular initiatives.

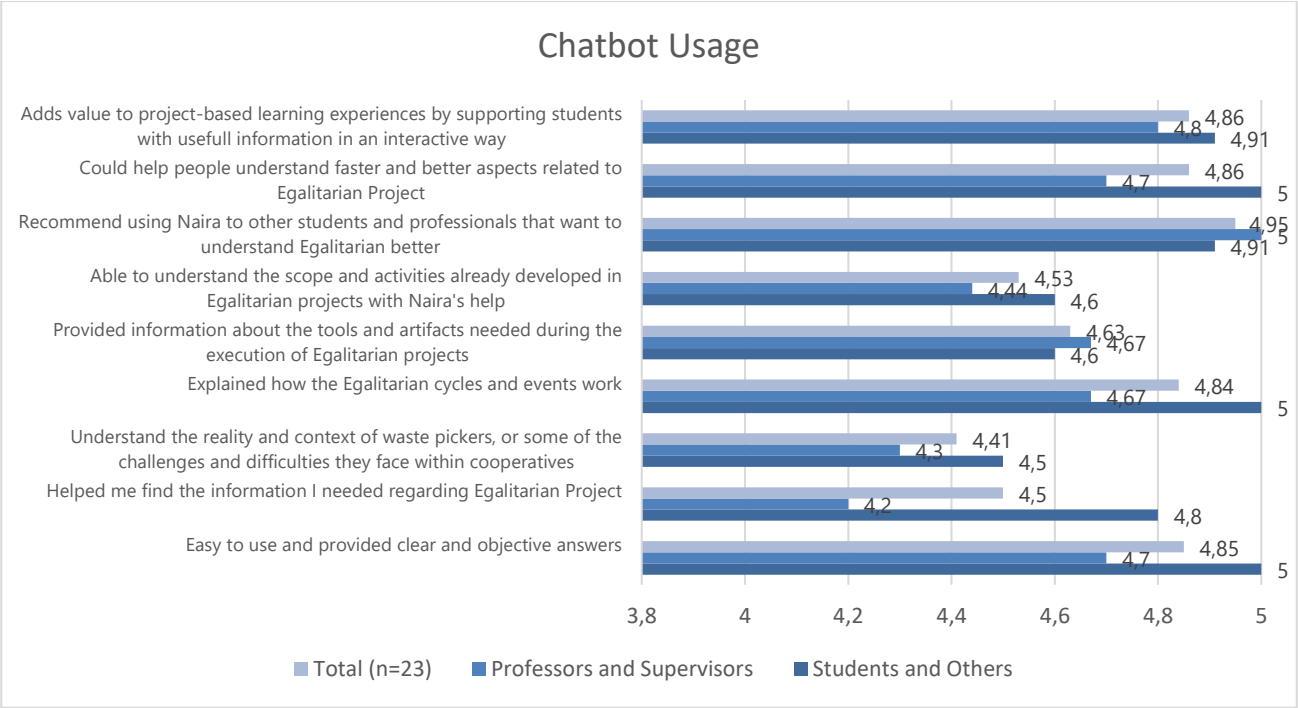

Figure 3. Results Related to the Use of the Chatbot. Source: Developed by the authors (2025)

In contrast, the items with the lowest averages were "Understand the reality and context of waste pickers, or some of the challenges and difficulties they face within cooperatives" (4.41) and "Helped me find the information I needed regarding the Egalitarian Project" (4.5). The relatively lower evaluation regarding understanding waste pickers' reality may be associated with limitations of the language model used in the chatbot. More complex social issues, such as the challenges faced by waste pickers, require sensitivity, context, and appropriate language. These aspects are not always fully represented in the knowledge bases that support the chatbot's functionality, which may compromise the depth and nuance of the responses generated. Moreover, there may be a limitation regarding the content used to train the chatbot, with less specific information, as mainly public documents were utilised for this topic. Incorporating additional sources of knowledge, pre-processing the documents prior to training the model, or enabling internet connectivity so that the model itself can locate further references may be considered alternatives to enhance the quality of the responses.

A notable discrepancy between the groups was observed in relation to the effectiveness of finding information about the project. While students gave an average score of 4.80 to the item "Helped me find the information I needed regarding the Egalitarian Project," teachers/supervisors gave a significantly lower score of 4.2. This difference may reflect varying expectations between user profiles. Teachers and supervisors, being more familiar with the project's content, tend to seek more detailed or analytical answers. At the same time, students and other participants likely value the clarity, objectivity, and accessibility of the responses more. This may prompt discussions regarding the extent to which the chatbot should be generalist or specialist, potentially leading to modifications during the solution design phase. In this context, one option would be to create specific agents for distinct project topics: a chatbot dedicated to the waste picker context, another for completed projects, and a third for operational and management aspects. Although this alternative increases the workload, it allows for a more explicit structuring of user personas, which could be explored in future research.

Finally, the scope of interaction and the time spent using the chatbot seem to have influenced respondents' perceptions. Users who interacted more superficially or with overly generic questions may have had a less accurate experience, directly impacting the evaluation of the tool. This hypothesis is supported by the fact that 12.56% of responses marked the option "Not Applicable," indicating that some participants likely did not use the chatbot enough to provide a well-informed evaluation. This option also suggests that some interactions may not fully explore the features and functionalities offered, potentially contributing to less accurate or informed assessments. Again, this may indicate that the chatbot covers too many topics without providing sufficient detail on the subjects it addresses. Therefore, managing users' expectations regarding the depth of content during its presentation is essential.

5 Conclusion

The article presented the development and application of a chatbot in the context of the Egalitarian Erasmus+ project to assist in onboarding new participants throughout the development cycles. The creation of the tool became necessary due to the high turnover of students during the development periods and the need to optimise the process of introducing information to new entrants. Thus, the chatbot was structured to provide information about the context of the projects: solid waste management systems with a focus on recyclable material cooperatives, the context of the projects currently under development, and the processes of each cycle of the Egalitarian Project.

Applying the six-step methodology highlighted the importance of systematisation in building a low-code/no-code chatbot in a limited programming and development environment. Coupled with the chatbot, the use of artificial intelligence (AI) provided a personalised learning experience at the beginning of the cycle, allowing for an adequate understanding for each student and teacher according to the context they experienced.

Additionally, the results demonstrated the potential of the solution in the Egalitarian project and the tool's effectiveness for the students and teachers involved. Among the positive aspects observed, it is worth highlighting the recommendation of the Naira chatbot to other students and teachers who wish to learn more about the project, which shows the importance of using the tool to understand the initial context. In contrast, the implementation of the tool revealed limitations of the solution both in relation to the users and the tool itself. For example, users had limited time to interact with Naira, the solution was applied with a limited number of participants, and contextualising documents were created to ensure the effectiveness of the responses. To provide more accurate results, it is necessary to repeat the described methodology, align the chatbot's objective with the participants, ensure more interaction time with the solution, and add more content to the chatbot to ensure the effectiveness of the responses.

Therefore, this study contributes to the understanding and application of chatbot solutions in the context of active learning for Engineering. Future approaches could improve the chatbot's capabilities to personalise according to the user's knowledge level and the ability to provide more complex answers. Additionally, it could include integration with other solutions such as Microsoft Power Virtual Agents, Teams, and SharePoint.

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