



AI4ED

**TOWARDS AN AI DRIVEN EDUCATIONAL PROCESS
INTEGRATING MODERN CAREERS IN THE EDUCATIONAL SYSTEM**

Deliverable

D6.1 – Stakeholders' workshops reports, including the evaluation and conclusions

Deliverable Lead: AlchemyML
Deliverable due date: 13/05/25
Actual submission date: 28/05/25
Dissemination level: SEN
Version: COMPLETE



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Document Control Page	
Title	Stakeholders' workshops reports, including the evaluation and conclusions
Creator	AlchemyML
Description	This document contains information about the workshops done with the partners and also contains results and KPIs from the performance from the different use cases.
Contributors	AlchemyML
Creation date	13/05/2025
Type	Report
Language	English
Audience	<input type="checkbox"/> public <input checked="" type="checkbox"/> confidential
Review status	<input type="checkbox"/> Draft <input type="checkbox"/> Assigned Reviewer accepted <input checked="" type="checkbox"/> Coordinator accepted
Action requested	<input type="checkbox"/> to be revised by the Assigned Reviewer <input type="checkbox"/> for approval by the Project Coordinator <input type="checkbox"/> for acknowledgement by Partners

Revision history

Version	Author(s)	Changes	Date
V0	AlchemyML	Document creation	13/05/2025
V1	AlchemyML	Update data	20/05/2025

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I Introduction

The AI4ED project explores the application of generative artificial intelligence in educational settings, with a focus on enhancing learning experiences and outcomes through intelligent tutoring systems. At its core, the project aims to design, develop, and deploy an AI-powered chatbot integrated within Moodle—a widely used learning management system—to support students' academic journeys across multiple languages, subjects, and educational contexts.

Driven by a need to address persistent challenges in education such as student disengagement and dropout risk, the project adopted a student-centric approach to AI. The chatbot is not a mere question-answering tool but a pedagogical agent that encourages active learning, critical thinking, and knowledge reinforcement. From data preparation to deployment, each phase of the project has been shaped by collaboration between AlchemyML, the technological partner, and a diverse set of educational institutions across Europe.

Through careful content curation, user-centered interaction design, and multilingual adaptability, the AI4ED chatbot has been successfully implemented in multiple use cases. The project also prioritized ethical data practices, ensuring that no personal data was collected and that all interactions were grounded in course materials. With iterative testing, stakeholder workshops, and ongoing feedback, the chatbot has matured into a reliable educational assistant that aligns closely with institutional goals and pedagogical strategies.

2 Document objectives

This document provides a comprehensive overview of the AI4ED project, covering both technical development and pedagogical implementation. Its objectives are to:

1. **Present the methodology and objectives of the workshops** conducted with each partner.
2. **Describe the stakeholder engagement process**, including the asynchronous workshop model that empowered partners to customize and take ownership of their chatbot implementations.
3. **Analyze real-world deployment across use cases**, highlighting key interaction metrics, technical challenges, and user engagement insights across various partner institutions and languages.
4. **Evaluate project outcomes using KPIs**, providing early indicators of chatbot usage, participation rates, and learning reinforcement effectiveness.
5. **Identify technical challenges and lessons learned**, with a particular emphasis on Moodle compatibility and the evolving landscape of generative AI technologies.
6. **Propose forward-looking technical improvements**, focusing on chatbot proactivity, context-awareness, instructor-facing analytics, and system modularity to ensure future adaptability.
7. **Offer reflections for educators**, emphasizing the importance of human oversight, pedagogical alignment, and data-informed decision-making when integrating AI into education.

3 Workshops for stakeholders

The development of the chatbot has been a collaborative effort, with stakeholders playing an essential role in shaping the tool to fit their specific use cases.

AlchemyML, the technological partner, has led the software development, but customizing the chatbot to meet the unique needs of each partner has required additional work.

These customizations were achieved through a series of online workshops, conducted asynchronously to give stakeholders the flexibility to progress at their own pace. Communication was maintained primarily through email, allowing partners to receive individualized support as needed.

These workshops aimed to ensure that each partner understood the content and function of the chatbot and took ownership of the AI service in the context of their specific use case. This was especially important as some partners faced a more challenging process due to the complexity of their use cases, which required careful adaptation of the content.

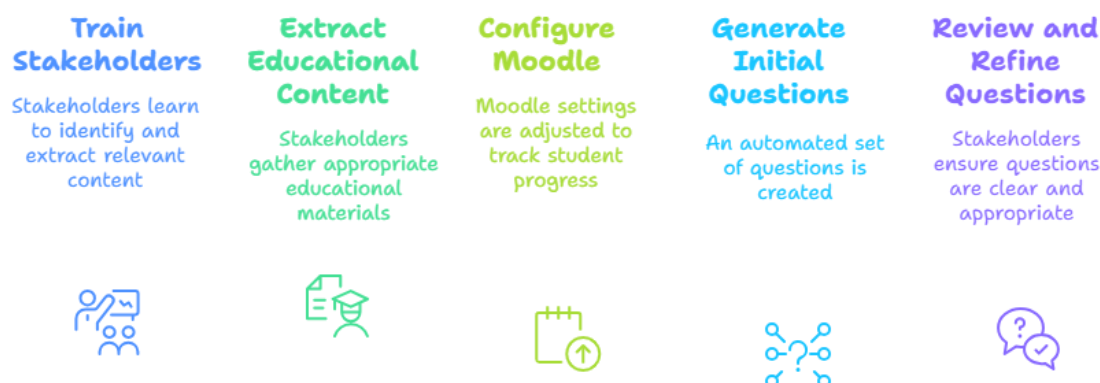
- **Goals and milestones of the workshops**

To achieve the primary goal of making the AI-driven chatbot a reality for each partner's specific use case, stakeholders were actively involved by assigning them three tasks:

1. **Preparing and Providing the Knowledge for the Chatbot:** Stakeholders were trained to identify and extract relevant educational content from various formats, ensuring that only the most appropriate content was included in the chatbot. They were also taught which types of content should be avoided to maintain the chatbot's effectiveness.
2. **Configure Moodle so that the progress of the student is tracked.** For this, the completion conditions of the elements in Moodle should be set so that the completion is marked as done automatically when the activity is finished, or the resource is viewed.
3. **Reviewing and Adapting the Initial Question Stack:** In the second phase, an automated set of questions was generated based on the content prepared in the first phase. Stakeholders reviewed and refined the questions to ensure they were clear and that the overall volume was appropriate.

These three tasks not only enabled the partners to effectively integrate and manage the chatbot within their context but also gave them ownership of the process and a deeper understanding of how the chatbot works and the underlying AI technology.

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○ Methodology and implementation

The methodology behind the workshops was designed to be flexible and responsive to the different needs of each partner. While the workshops were primarily asynchronous, they also included opportunities for real-time support via email, allowing issues to be addressed promptly. Each partner was able to complete tasks at their own pace, ensuring that no one was rushed and could dedicate the necessary time to fully understand and integrate the chatbot into their use case.

One of the additional challenges was that each use case had its own language (English, German, Portuguese, and Basque). This required careful consideration to ensure the chatbot could cater to the linguistic needs of each group.

Furthermore, some partners worked with test instances of the chatbot before it was made public, allowing them to evaluate its functionality before going live in real-world scenarios.

○ Challenges and technical support

The workshops also revealed some technical challenges, especially as many stakeholders were not familiar with the more technical aspects of the chatbot’s development. However, they made a significant effort to understand the underlying principles and technical details, even though they did not have a technical background.

To address the technical hurdles, AlchemyML provided personalized support, which was crucial in overcoming issues specific to each partner. Some partners faced a more tedious process of adapting their content, which required additional assistance and troubleshooting.

Despite these challenges, the stakeholders showed exceptional proactivity. They worked diligently to understand the technical aspects of the chatbot and ensured the successful completion of their tasks. This proactive approach, along with the customized support from AlchemyML, helped keep the project on track and contributed to its overall success.

○ Evaluation and outcomes

Looking back at the workshops, the results have been overwhelmingly positive. All partners have demonstrated a clear understanding of the core concepts of the chatbot, even though they did not fully comprehend every technical detail behind its development. They gained a deep understanding of how to manage and customize the chatbot within their specific use cases.

While technical challenges were encountered, they were promptly addressed by AlchemyML or the technical teams at the partner’s center. Additionally, some partners faced more complex tasks due to the nature of their use cases, which were demanding both in terms of content adaptation and technical setup. However,

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despite these hurdles, the workshops achieved their objectives. The partners not only contributed to bringing the chatbot to life in their respective use cases but also gained ownership of it.

In conclusion, the workshops were key in ensuring the chatbot's success across a diverse set of use cases and languages. The dedication and effort of all partners, along with the tailored support provided, helped make the implementation process smooth and effective. The successful integration of the chatbot into each partner's use case has been a significant achievement for all involved.

4 KPI definition and results evaluation

Key Performance Indicators (KPIs) are defined as the metrics that help evaluate how effectively the chatbot is performing according to expectations. While it would be ideal to measure the chatbot's long-term impact on students' academic outcomes and learning experience across different use cases, the current data primarily allows us to analyze usage patterns. Specifically, we can identify the most frequently used functionalities and understand how students are engaging with the chatbot.

At this stage, the following KPIs are being tracked:

- **Total number of interactions**
- **Number of active sessions** (sessions where at least one message was sent)
- **User participation rate** (percentage of students who interacted with the chatbot)
- **Most common types of queries**

These KPIs provide a solid foundation for understanding the chatbot's usage and initial effectiveness. As more data becomes available, additional KPIs—such as student satisfaction, performance correlations, and longitudinal usage trends—can be incorporated to further assess impact.



○ Use cases evaluation

The data results presented in this document are up to date as of **May 19th, 2025**.

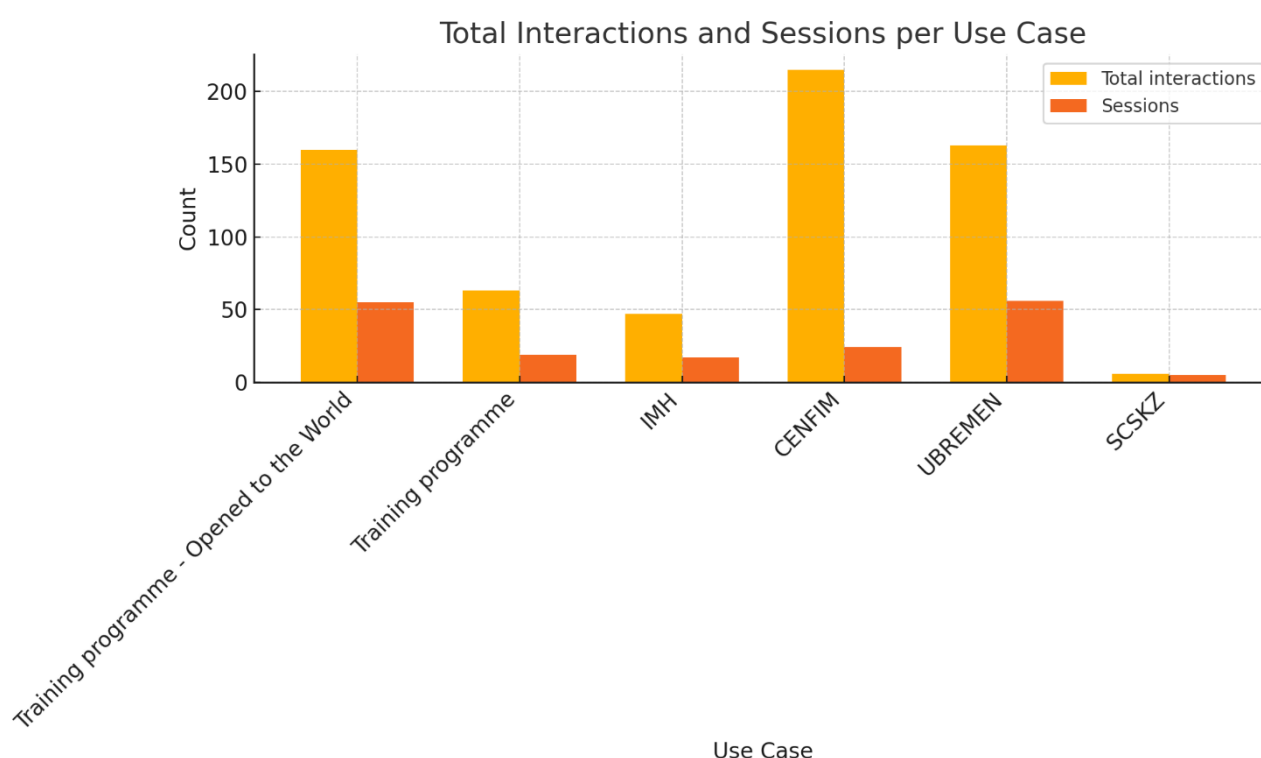
The number of interactions with the chatbot has varied across use cases, mainly due to differences in the total number of students and the duration for which the chatbot has been installed. This section presents overall metrics as well as specific results for each use case.

To begin with, the following table shows the total number of interactions students had with the chatbot. The **"Total interactions"** column represents the number of messages sent by users to the chatbot. The **"Sessions"** column indicates the number of sessions in which a user sent at least one message. Note that test sessions have, as much as possible, been excluded to ensure the accuracy of the data.

Use Case	Total interactions	Sessions
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Training programme - Opened to the World	160	55
Training programme	63	19
IMH	47	17
CENFIM	215	24
UBREMEN	163	56
SCSKZ	6	5



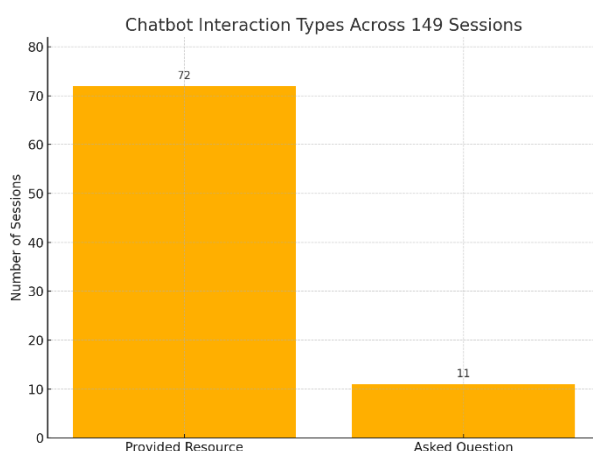
In total, there have been **1282 sessions**, and in 263 of these sessions, students sent at least one message to the chatbot. This means that more than 1 out of 5 times students were on Moodle, they interacted with the chatbot. It is understandable that students do not engage with the chatbot every time they log in to Moodle. However, it is surprisingly **positive that out of a total of 274 students, 190 interacted with the chatbot at least once** — representing almost a **70%**.

Out of a total of **149 chatbot sessions**, in **72 (48%)** the chatbot provided a learning resource to the student. Additionally, in **11 sessions (7.38%)**, the chatbot actively engaged the student by asking a question to test their knowledge.

Out of a total of **149 interactions** with the chatbot, in **72 sessions (48%)**, the chatbot provided a learning resource to the student, thereby supporting their learning process with relevant and targeted materials. Additionally, in **11 sessions (7.38%)**, the chatbot posed questions to test the student's knowledge.

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It is important to note that the chatbot only initiates knowledge-check questions when explicitly requested by the student. This design choice may help explain the relatively low number of sessions in which the chatbot tested the user's understanding.



■ Training Programme Use Case

The training programme use case was the first to have the chatbot installed. Each partner was responsible for gathering the content for their respective modules, making the chatbot’s development a truly collaborative effort.

Being the first use case with the chatbot installed had both advantages and challenges, as it served as a testing ground for improving the early versions of the chatbot. For example, in the initial stages, the chatbot was perceived as somewhat intrusive by users until adjustments were made to make it less invasive.

The chatbot was first installed in the Training Programme on **January 13, 2025**, and was later made publicly available on another Moodle instance on **April 9**, also with the chatbot enabled.

In total, 187 users have accessed the Training Programme, of which 112 (approximately **60%**) interacted with the chatbot at least once.

Some examples of messages users sent to the chatbot include:

Hi, do you know in what section i am right now?
Why is the 6.th module so long?
Ba al dakizu euskaraz hitz egiten?
Okay, what is the content seccion in module 7?
What is the complete content pdf from the 7th module?
What are your functionalities?
I HAVE SOME QUESTIONS ABOUT MATERIALS FROM MODULE 7
LIST ME ALL THE MATERIALS FROM MODULE 7
WHAT IS THIS "GUIDED ACTIVITY" FROM module 7

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What should I consider to apply AI to education?
Cual es la manera mas eficiente de aplicar IA al aprendizaje, respuestas cortas
respuestas mas cortas por favor
I want a knowledge test
lisp or LISP?
What you have to say about this module?
What does AI means?
list the modules of the training program
test my knowledge

As you can see, it is common for students to use the chatbot as an assistant **not only to gain knowledge related to the course content**—its primary function—but **also to better understand the structure of the course itself**.

Additionally, students have used the chatbot to clarify subject-related doubts.

In fact, some students attempted to use the chatbot to obtain direct answers to course questions by copying and pasting them. Fortunately, anticipating this type of behaviour, the chatbot was designed not to simply provide solutions. Instead, it encourages active learning by guiding students with reflective questions, helping them arrive at the answers on their own.

Check this conversation example:

Chatbot: Hello! I am here to assist you with your studies. Feel free to ask any questions or request a knowledge test.
Student: hello
Chatbot: Hello! How can I assist you today with your studies on Artificial Intelligence? Would you like to ask a question or perhaps try answering a quiz question?
Student: Which is a key benefit of using AI to enhance teaching? Question 1Answer a. AI makes decisions about students without teacher involvement. b. AI eliminates the need for teaching altogether. c. AI replaces all traditional teaching methods.

Chatbot: To determine the key benefit of using AI to enhance teaching, let's analyze the options you've been given.

Which of these statements aligns with the idea that AI can create customized learning experiences for students? Think about how AI's ability to analyze individual performance and preferences might relate to one of the answer choices.

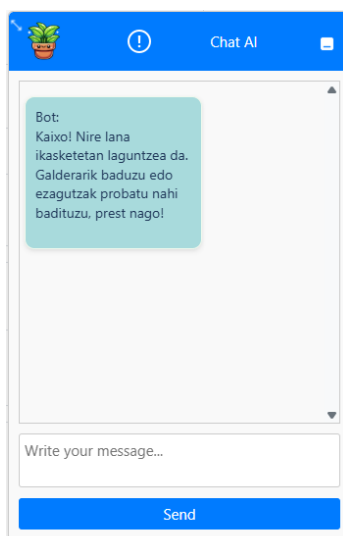
Considering this, which option do you think best represents this benefit?

You might find that AI's role in personalizing learning materials is quite significant.

Feel free to share your thoughts!

■ IMH Use Case

IMH, an educational center in the Basque Country (Spain) and a partner in this project, selected its Statistics subject in **Basque** as the use case for the chatbot. The chatbot was launched on **January 29, 2025**, and has remained active until today. Out of 17 students enrolled in the course, 16 have interacted with the chatbot, resulting in an engagement rate of **nearly 100%**.



■ CENFIM Use Case

CENFIM (Vocational Training Centre for the Metallurgical and Metalworking Industry), based in **Portugal**, installed the chatbot in two identical Moodle courses. To this analysis, these two courses will be treated and analysed as a single unit. The course content is in **Portuguese**.

Before deploying the chatbot to their students, CENFIM conducted testing in a separate test course—an approach aligned with best practices. Finally, the chatbot was installed the **19th February 2025**.

Only 9 students accessed the course in Moodle, and 8 of them interacted with the chatbot—representing nearly all participants. Although the number of active users in this case is limited, it is worth noting that each student was highly engaged. In fact, this use case recorded the **highest number of messages sent to the chatbot**, demonstrating strong and consistent interaction from the participants.

■ **UBREMEN Use Case**

The **University of Bremen**, also a partner in this European project, developed its own use case by integrating the chatbot into a course delivered in **German**. This case presented several challenges. The university was initially using a different learning platform and had to migrate to Moodle to ensure compatibility with the chatbot. Additionally, the course content was particularly extensive and divided across multiple modules, making the content collection process more time-consuming and complex.

The chatbot was installed on **March 3rd, 2025**. Out of 51 enrolled students, **47 interacted with the chatbot**, resulting in a strong participation rate of **92%**.

■ **SCSKZ Use Case**

This use case was implemented in the IMH Moodle platform, as SCSZK uses a different LMS. As a result, various technical issues arose, and although the course was ready by April 8th, students were not able to access it until May 5th.

The data shows that a total of 6 students interacted with the chatbot, out of 8 students who accessed the course

5 Technical issues and lessons learned

During the implementation phase, several technical challenges emerged, primarily related to **Moodle version compatibility** and the **rapid evolution of generative AI technologies**.

Moodle Version Compatibility

Not all partners were using Moodle version 4.5, which the chatbot plugin was initially designed to support. For instance:

- **CENFIM** was operating on Moodle version **3.9** and had to perform a **full upgrade to 4.5** in order to ensure compatibility with the plugin.
- **The University of Bremen** was using Moodle version **4.4**. Given its proximity to 4.5, only **minor plugin adjustments** were needed to enable functionality, avoiding a full upgrade.

These differences required tailored technical solutions depending on the partner's existing infrastructure, highlighting the need for **flexible and adaptable plugin development**.

Rapid Evolution of Generative AI

The pace of development in generative AI is exceptionally fast. New frameworks and techniques are introduced almost monthly, each promising improved performance or efficiency. As a result, some of the technologies and strategies used during the initial development of the chatbot have already become outdated. If the system were to be built again today, it would likely rely on **different methods, tools, and architectures**, reflecting the most recent advancements in the field.

This highlights the importance of **modular, updatable system design** and maintaining agility in AI development to accommodate continuous innovation.

6 Technical improvements

Analyzing the results and insights from the chatbot data suggests that several technical and design strategy changes could positively enhance the learning experience for users. The following improvements have been identified:

- **Enable structural course queries:** Allow the chatbot to respond to questions related to the structure of the course, as students frequently seek this type of guidance.
- **Boost the Knowledge Reinforcer functionality:** Redesign the chatbot to ask knowledge-check questions more proactively, rather than waiting for students to request them explicitly. This could encourage deeper engagement and reflection.
- **Context-aware interaction:** Enable the chatbot to detect the page the user is currently viewing, so it can better understand context-specific references such as “here” or “this page.”