



Second version of the AI assistant for students prototype

Date: 30.12.2024



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Grant Agreement n°	101087451
Project acronym	AI4EDU
Project title	Conversational AI assistant for teaching and learning
Funding Scheme	ERASMUS-EDU-2022-PI-FORWARD
Project Duration	01/01/2023 – 31/12/2025 (36 months)
Coordinator	Athina-Erevnitiko Kentro Kainotomias Stis Technologies Tis Pliroforias, Tonepikoinonion Kai Tis Gnosis (ARC)
Associated Beneficiaries	▪ LULEA TEKNISKA UNIVERSITET (LTU) ▪ ELLINOGERMANIKI AGOGI SCHOLI PANAGEA SAVVA AE (EA) ▪ PAIDAGOGIKO INSTITOUTO KYPROU (CPI) ▪ UNIVERSITY OF CYPRUS (UCY) ▪ MANAGEMENT COMMITTEE OF DRUMCONDRA EDUCATION CENTRE (DEC)

Document identifier: D5.2

Version: 1.0

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Dissemination status: PU

Project no. 101087451

AI4EDU

Conversational AI assistant for teaching and learning

ERASMUS-EDU-2022-PI-FORWARD

Start date of project: 01/01/2023

Duration: 36 months

History Chart				
Issue	Date	Changed page(s)	Cause of change	Implemented by
0.1	02.12.24	-	Draft	Spyridoula Stamouli (ARC)
0.2	09.12.24	ALL	Additions	Spyridoula Stamouli (ARC), George Paraskevopoulos (ARC)
0.3	16.12.24	ALL	Revisions	Hamam Mokayed (LTU), Foteini Simistira Liwicki (LTU)
0.4	27.12.24	ALL	Final corrections	Spyridoula Stamouli (ARC), George Paraskevopoulos (ARC)
1.0	30.12.24	ALL	Final version	Spyridoula Stamouli (ARC), George Paraskevopoulos (ARC)
Validation				
No.	Action	Beneficiary		Date
1	Prepared	Spyridoula Stamouli (ARC), George Paraskevopoulos (ARC)		09.12.24
2	Approved	Hamam Mokayed (LTU), Foteini Simistira Liwicki (LTU)		16.12.24
3	Released	Spyridoula Stamouli (ARC), George Paraskevopoulos (ARC)		30.12.24

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Table of Contents

Executive Summary	7
Acronyms and abbreviations	8
1. Introduction.....	9
1.1. Deliverable Purpose	9
1.2. Relation of the Deliverable to Other Work Packages and Deliverables.....	9
2. Conversational AI assistant for students – Objectives of the second version development 10	
2.1. Background of the Study Buddy AI assistant	10
2.2. Overview of the first version limitations.....	11
2.2.1. Functionality of educational tools	11
2.2.2. User Interface and Experience (UI/UX)	11
2.2.3. Chat functionality/Chat history.....	12
2.2.4. Multimodal content	12
2.2.5. Integration and interoperability	12
2.2.6. Device compatibility	12
2.3. Objectives of the second version development	12
3. Technical improvements of the AI assistant for students.....	13
3.1. Improved User Interface and Experience (UI/UX)	14
3.2. Enhanced query generation via pedagogically driven prompts.....	15
3.2.1. Refinements to prompt templates and input fields	15
3.2.2. Improved prompt examples and guidance	19
3.2.3. Advancing Prompt Design: A Comparison of Old and New Prompts	20
3.3. Development of new educational Tools for students	21
3.3.1. Text Adaptation.....	21
3.3.2. Chronological Order of Events	22
3.3.3. Conversation Across Time	23
3.3.4. Debate tool	24

3.4. Enhanced AI capabilities for text-based interactions.....	25
3.5. Student Dashboard and Test-Taking Components	26
4. Technical details	27
5. Conclusion.....	27
Appendix 1: Revised and new prompts supporting the Study Buddy's educational Tools....	29
Explain Term	29
Interactive Concept Learning	29
Summarizer	30
Extract Key Points	30
Self-assessment quiz	31
Revision tool	31
Auto-grade exercise.....	32
Text adaptation.....	33
Chronological order of events.....	33
Conversation across time	34
Debate tool	35

Executive Summary

This deliverable, D5.1: Second Version of the AI Assistant for Students Prototype, presents the advancements introduced in Study Buddy (SB), an AI-powered assistant developed as part of the AI4EDU project. Building on the foundation established in the first version (D3.1) and informed by insights from usability testing and evaluation (D4.2), this second iteration focuses on enhancing the platform's functionality, usability, and alignment with student learning needs to provide a more personalized, engaging, and effective educational experience.

The primary aim of this deliverable is to document the significant updates implemented in the second version of Study Buddy. These updates address limitations identified in the initial prototype and incorporate feedback from student users in Cyprus, Greece, Ireland, and Sweden. Key improvements prioritize enhanced user interface and experience (UI/UX), refined AI-driven query generation via pedagogically driven prompts, new and expanded educational tools, and technological upgrades to improve interaction quality and responsiveness.

A major enhancement in the second version is the refinement of prompts supporting key tools, such as concept exploration, term explanation, text summarization, quiz generation, and assignment revision. These refinements leverage prompt engineering techniques to ensure outputs are more personalized, age-appropriate, curriculum-aligned, and adaptable to students' learning preferences and academic goals. Furthermore, new educational tools such as Text Adaptation, Chronological Order of Events, Conversations Across Time, and the Debate Tool broaden the platform's functionality, fostering critical thinking, creativity, and active engagement.

The second version also introduces a more visually engaging and intuitive user interface, improving navigation and accessibility to streamline students' learning processes. Enhancements include updated design elements, simplified menus, customizable chat interactions, and features such as renaming, deleting, exporting, and searching chat history. Technological upgrades have strengthened the platform's AI capabilities for text-based interactions, optimizing its ability to provide relevant and accurate outputs.

Overall, the second version of Study Buddy significantly improves on the first, addressing critical feedback and introducing features that align with the AI4EDU mission of fostering personalized, interactive, and innovative learning environments. It represents a key milestone in the AI4EDU project, releasing an upgraded platform ready for evaluation in educational settings in Cyprus, Greece, Ireland and Sweden during the next phase of pilot testing under Work Package 6. The evaluation will focus on assessing its impact on student learning and investigating its effectiveness in achieving Study Buddy's goal of transforming education through AI innovation.

Acronyms and abbreviations

Abbreviation	Description
AI4EDU	Artificial Intelligence for Education (project name)
TM	Teacher Mate
RAG	Retrieval-Augmented Generation
LLM	Large Language Model
AI	Artificial Intelligence
GPT	Generative Pre-trained Transformer
LMS	Learning Management System

1. Introduction

1.1. Deliverable Purpose

The purpose of this deliverable is to present the second version of the AI-powered conversational assistant for students, the Study Buddy platform. Study Buddy has been designed to provide students with an intuitive, interactive, and personalized learning experience, addressing their academic challenges through advanced AI-driven tools. This deliverable outlines the significant enhancements introduced in the second version of Study Buddy, informed by feedback from pilot testing and evaluation under Work Package 4.

The second version of Study Buddy reflects collaborative input from educational experts, technology developers, and user experience designers, guiding the advancements in Study Buddy's **pedagogical and technological design**. It builds on the foundation laid in the first version, integrating advancements which align with the latest pedagogical practices and technological innovations to meet evolving educational standards and users' needs. The enhancements introduced align with the overarching goals of AI4EDU: to create a dynamic, inclusive, and innovative educational environment for secondary school students. These enhancements demonstrate the project's commitment to fostering impactful and transformative AI-powered learning experiences.

1.2. Relation of the Deliverable to Other Work Packages and Deliverables

This deliverable is closely linked to several other work packages (WPs) and prior deliverables within the AI4EDU project. It builds on the foundational insights and technical frameworks established in the earlier stages of the project.

Deliverable D5.1 adheres to the user requirements, as well as the functional and technical specifications established in Deliverables **D2.1 "Pedagogical framework and user requirements"** and **D2.2 "Technical specifications"** of WP2 **"Pedagogical framework, user requirements and technical specifications of AI4EDU applications"**. WP2 provided the foundational user requirements and technical framework that guided the design and development of both the first and second versions of Study Buddy. Given these specifications, the second version advances the platform's ability to address diverse learning needs of students.

The first version of Study Buddy, presented in **D3.1 "First version of the AI assistant for students prototype"** of WP3: **"Adaptation and integration of core AI technologies"** introduced the core functionalities of the platform, including the AI dialogue system, educational tools, and test-taking interface. This deliverable expands on those initial capabilities by incorporating advanced features, addressing feedback from students, and enhancing the overall user experience.

The second version of Study Buddy incorporates insights from the pilot testing conducted under **WP4: "Evaluation of usability and technology acceptance"**. Feedback gathered from students, as documented in **D4.2 "Usability testing and technological evaluation results"**, has been critical in refining the platform's features, improving its user interface, and ensuring its practical relevance in educational settings.

This deliverable, together with the deliverable **D5.2 "Second version of the AI assistant for teachers prototype"**, represents a key milestone in **WP5 "Revision of the AI4EDU"**

applications", which focuses on revising and enhancing the AI4EDU applications. The development of the second version of Study Buddy demonstrates the iterative approach of the project, emphasizing continuous improvement based on user feedback and technological advancements.

Furthermore, the second version of Study Buddy will be a key component in **WP6: "Evaluation of the Educational Impact of AI4EDU Applications"**, which focuses on evaluating the educational impact of Study Buddy in educational settings. As part of WP6 activities, the second version will be piloted by students to assess its potential for improving student engagement and learning outcomes.

Finally, the second version of Study Buddy contributes significantly to the project's dissemination efforts under **WP8 "Dissemination and Impact"**. By refining the platform's functionality and usability, it ensures that Study Buddy is well-positioned for broader adoption and implementation in educational settings. The enhancements in this version directly support the project's goals of demonstrating the value of AI-driven educational tools and fostering their acceptance within educational communities across participating countries and beyond.

2. Conversational AI assistant for students – Objectives of the second version development

2.1. Background of the Study Buddy AI assistant

Study Buddy, developed as part of the AI4EDU project, is an advanced AI-powered learning platform designed to enhance student learning through personalized support and interactive educational tools. Initially introduced in Deliverable D3.1 as the first version of the AI assistant for students, Study Buddy was conceived to serve as a tutor, mentor, and assessment facilitator with conversational abilities.

At its core, Study Buddy integrates advanced Large Language Models (LLMs) to support **natural language dialogues** that enable **dynamic, real-time interactions** with students. The AI dialogue system is central to this functionality, allowing students to ask questions, seek clarifications, and receive explanations on a wide range of topics. Through this interactive approach, Study Buddy provides students engaging learning experiences and empowers them to learn independently, supporting their academic activities with contextual assistance.

The initial version of Study Buddy featured a **comprehensive suite of tools** aimed at addressing key learning challenges. These included capabilities such as explaining complex terms and concepts, summarizing texts, creating interactive quizzes, and offering automated grading with immediate feedback on written assignments. The platform's functionality was further enhanced by its ability to integrate with educational content, such as school textbooks, to provide contextually relevant and curriculum-aligned support.

Moreover, the first version of Study Buddy prioritized accessibility and inclusivity. The platform was designed to **support multiple languages**, including English, Greek, and Swedish, and was tailored to the curricula of Sweden, Ireland, Greece, and Cyprus, via nationally **authorized textbooks** for **selected school subjects**. Its **voice interface**, featuring speech-to-text and text-to-speech technologies, ensured that students with diverse needs could use the platform effectively.

The **test-taking interface** was another highlight of the first version, offering a secure and user-friendly environment for conducting assessments, which enables students to complete tests assigned by teachers directly through the platform.

The development of Study Buddy was driven by a **student-centered approach**, grounded in requirements analysis and feedback from needs analysis workshops. The platform's modular design and transparent use of AI technologies also allowed students to become familiar with generative AI tools in a controlled and supportive environment, fostering digital literacy and ethical AI awareness.

Building on this strong foundation, the second version of Study Buddy incorporates new features and refinements aimed at addressing user **feedback on platform's usability and technology acceptance** and expanding its educational impact.

2.2. Overview of the first version limitations

The first version of Study Buddy was a significant milestone in creating a personalized and interactive AI-powered assistant for students. However, as indicated by feedback gathered during the pilot testing phase conducted under **WP4: "Evaluation of usability and technology acceptance"**, several areas of improvement emerged. These limitations, grouped into relevant categories, provide the foundation for the development priorities of the second version. Below, we outline the primary challenges and areas for enhancement based on user feedback.

2.2.1. Functionality of educational tools

While the interactive educational Tools of Study Buddy, i.e., Explain Term, Interactive concept learning, Summarize text, Extract key points, Assessment quiz, Revise written assignment and Grading, were highly appreciated, several users highlighted limitations in their functionality. For example, feedback indicated that summaries generated by the **Summarization tool** were either too lengthy or included excessive detail, undermining their effectiveness. Students suggested adding a word limit or providing more concise summaries.

Regarding the **Grading tool**, some students perceived the grading system as overly strict or inconsistent. They requested a more flexible grading approach with detailed explanations and opportunities for them to modify scores. In the same line, students asked for **more options to adjust educational tools** according to their age, grade level or skills for more personalized adaptation.

Finally, there were requests for tools to simplify or enhance text complexity, depending on their needs. For example, some students asked for tools that could **upgrade simple texts** to more advanced levels or **simplify complex texts** for younger ages. There was a demand for tools to assist with learning foreign languages, such as pronunciation grading. Overall, students' suggestions supported more **interactive features/tools**, such as quizzes with real-time feedback, to make the platform more engaging.

2.2.2. User Interface and Experience (UI/UX)

The **graphical interface** of Study Buddy received critical feedback for its simplicity and lack of engaging visual elements. Students suggested incorporating more dynamic designs and colors to enhance the platform's usability and aesthetic appeal. More specifically, students commented that the interface should not resemble a basic chatbot.

2.2.3. Chat functionality/Chat history

User feedback highlighted areas where this functionality could be enhanced for better usability and user satisfaction. More specifically, several users raised concerns about the **storage and accessibility of chat histories**. While chat logs can be useful for reviewing past interactions, some students expressed privacy concerns and requested the ability to delete chat histories.

Some users found the AI's responses overly detailed and requested more concise and straightforward replies, **reducing repetitive questions from the AI**. Comments such as "I don't like it to ask me questions all the time" reflect this desire for more student-friendly communication. Requests for adding the functionality of **stopping response generation** before it is completed were also noted.

Finally, students expressed interest in additional customization options for chat interactions, such as selecting different voice types (male or female).

2.2.4. Multimodal content

The integration of multimedia elements was widely requested. Students requested features that allow for the inclusion of images, videos, graphs, and audio clips in the AI responses, especially in subjects requiring visual aids like history and biology.

2.2.5. Integration and interoperability

The feedback also revealed limitations in Study Buddy's integration with other systems and resources. Students suggested integrating the platform with external school management software, enabling the import of tests as well as the export of results to external systems. Users also requested access to a broader range of textbooks, apart from the ones of the selected school subjects, to ensure comprehensive coverage across subjects.

2.2.6. Device compatibility

One recurring feedback point was the need to improve the accessibility and compatibility of Study Buddy across different devices. Students, particularly from Ireland and Greece, emphasized the importance of mobile device compatibility, as many reported relying on phones rather than laptops for study purposes.

2.3. Objectives of the second version development

The feedback collected from students during the first pilot phase of Study Buddy was grouped into broader categories regarding its focus, analyzed, and prioritized based on two main criteria:

- a) Alignment with the project scope as outlined in the Grant Agreement.
- b) Alignment with the AI4EDU project's overarching objectives, which aim to enhance student learning through innovative, and personalized AI-powered tools.

While many of the students' suggestions were incorporated into the second development phase, certain features fell outside the project's scope or technical feasibility. For instance, **multimodal AI capabilities** were not addressed due to the project's initial focus on text-based processing technologies. However, existing prompts were enhanced to facilitate external integrations in cases of audiovisual content could complement Study Buddy tool's functionality.

Similarly, some suggestions for advanced customization features such as selecting different AI voices, or incorporating advanced **Learning Management System**-style functionalities, were not implemented. The focus remained on refining the educational tools, chat functionality, and the user interface to maximize the platform's usability and relevance within the defined scope.

Regarding compatibility with **mobile devices**, the platform remains accessible on mobile devices due to its basic responsive design. However, further optimization for mobile devices was deprioritized as the use of Study Buddy is considered as more suitable for laptops or desktops, where students can better engage with its rich features.

Special emphasis was placed on the **refinement of prompt-supported educational tools**, incorporating features that would enhance their flexibility, personalization according to age, academic and skill level, accuracy and effectiveness. A dedicated team, comprising members with educational and technical expertise, collaborated on these refinements to ensure that the tools align with students' diverse needs and provide meaningful and interesting learning experiences. Moreover, emphasis was placed on designing and offering **new educational tools** that address the needs of students for more interactivity.

In summary, all feedback aligned with the project's scope and objectives and deemed technically feasible was implemented. Additionally, significant enhancements were introduced to address critical limitations identified in the first version and to improve the overall user experience, based on insights from the technical experts of the development team. The objectives of the second version development are summarized in the table below:

Objective	Description
Improved User Interface and Experience (UI/UX)	Create a more intuitive and visually engaging user interface; enhance navigation; improve management of chat history; integrate accessible design features like dropdown menus, prefilled fields, and labels.
Enhanced query generation via pedagogically driven prompts	Improve prompts to support students in generating more precise and effective outputs across Study Buddy's tools, more aligned to individual student needs.
Development of new educational Tools for students	Introduce new, more specialized, engaging, and interactive educational tools.
Enhanced AI capabilities for text-based interactions	Refine AI capabilities for handling complex text-based queries, optimize RAG for more effective textbook-based interactions with the Study Buddy tools.

Table 1: Objectives of the second version of the Study Buddy development

These objectives will be further elaborated in Section 3, which presents the technical improvements and enhancements introduced in the second version of Study Buddy.

3. Technical improvements of the AI assistant for students

This section presents the technical enhancements introduced in the second version of Study Buddy, emphasizing how they address the challenges identified in the initial version and align

with the objectives outlined in Section 2. The development efforts were directed by the goals of WP5, aiming to create a platform that is more efficient, user-friendly, and engaging.

3.1. Improved User Interface and Experience (UI/UX)

The second version of Study Buddy incorporates several enhancements to its interface and overall user experience, aiming to improve both functionality and visual appeal. The design upgrades align with feedback from pilot users and were tailored to make the platform more engaging and accessible to students.

The **graphical interface** has been enriched with new design elements, drawing inspiration from the AI4EDU project's branding (see Figure 1). This includes a refreshed color scheme that aligns with the project's visual identity and an updated font style and size to improve readability, especially on smaller screens or in low-light settings. Input fields, such as text boxes and dropdown menus, were redesigned with larger interaction boxes, and added placeholders to guide students in filling out forms.

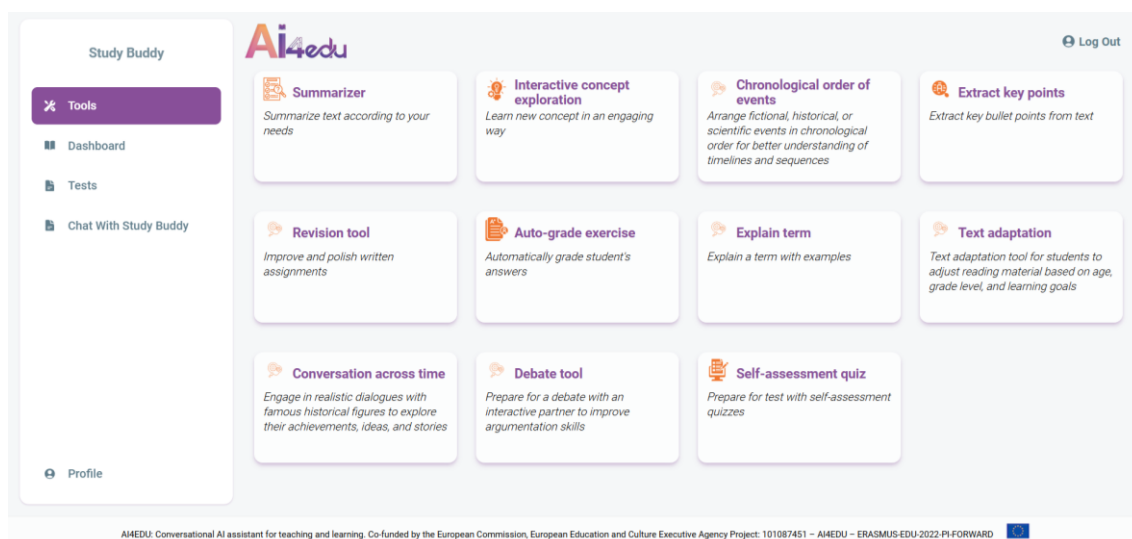


Figure 1: New Graphical User Interface (GUI) of Study Buddy

Navigation throughout the platform has been improved for greater ease of use. For instance, navigating between educational tools, test-taking component, and chat interface is now easier using the “back” button. Features such as labelled menus, and dropdown options were introduced, improving the usability of the educational tools.

The **chat interface** was significantly upgraded to offer students more control over their interactions with Study Buddy. Students can now rename and delete chats, addressing privacy concerns and enabling better organization of their study sessions. Dates are displayed in chat histories, allowing users to track conversations over time. Additionally, chats can now be exported as .docx files or copied to the clipboard for further use in other applications (see Figure 2).

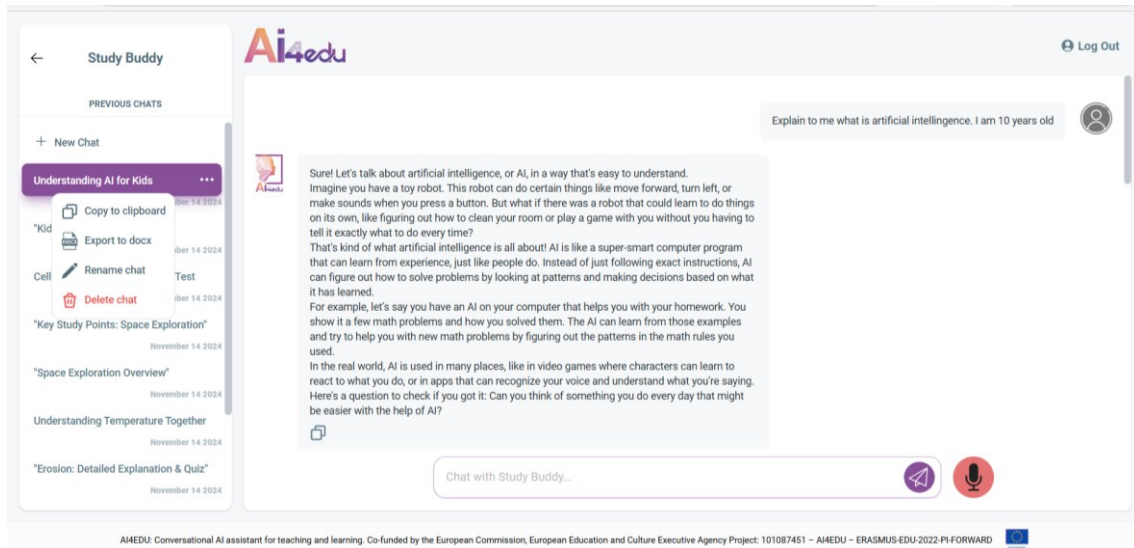


Figure 2: New features in Chat history for renaming, deleting, exporting or copying chats

A new feature allows users to **stop the generation of responses** mid-way, enabling students to refine or redirect their queries without waiting for the response to finish. This enhancement was introduced in response to student feedback and significantly improves the usability of the chat system by making interactions more dynamic and responsive.

3.2. Enhanced query generation via pedagogically driven prompts

In the second version of Study Buddy, significant advancements were made to improve the effectiveness of prompts used across various educational tools. These refinements aimed to address student feedback and enhance the relevance, clarity, and adaptability of the AI-generated responses. The prompt enhancement process involved iterative collaboration between technical developers and educational experts. Refinements were tested extensively to ensure that outputs meet pedagogical standards.

3.2.1. Refinements to prompt templates and input fields

The prompt templates across various Study Buddy tools were redesigned to provide students with greater control and customization of the AI's responses. These refinements aimed to ensure the outputs were tailored to students' unique learning needs and objectives, academic levels, and personal preferences. Key updates include the addition of new input fields, expanded customization options, and the introduction of guidance-driven interactions (see Appendix 1 for all updated prompts supporting the Study Buddy tools).

More specifically, new fields for **grade level and age** across all Study Buddy tools, corresponding to prompt parameters, allow students to specify their academic level, ensuring that explanations, summaries, or questions are appropriate for their cognitive development and curriculum alignment.

Students can also now indicate their **prior knowledge level** (beginner, intermediate, or advanced in a subject), enabling the AI to adjust its responses accordingly. For example, when using the "Explain Term" tool, students specify a topic such as "Homeostasis" select their grade level (e.g., Grade 9), and indicate their level of prior knowledge. The AI then provides an age-appropriate explanation, tailored to student's knowledge level, including analogies and comprehension questions (see Figure 3).

Explain term

Explain a term with examples

Student age:

Grade level:

School subject:

Term:

Prior knowledge level:

Learning needs:

Select resource to chat with

General Chat ▼

Generate

Figure 3: “Explain term” tool with expanded input fields

Custom fields were introduced to allow students to indicate specific **learning objectives**, such as test preparation, assignment support, or conceptual understanding, for using a Study Buddy Tool, e.g. the “Summarizer” or “Explain term” tools. For instance, the “Summarizer” tool now includes options for specifying the focus (e.g., main ideas, key terms) and purpose of the summary (e.g., better understanding, better memorization, prepare for a test), accommodating diverse student needs, such as concise test reviews or in-depth comprehension exercises (see Figure 4).

Summarizer

Summarize text according to your needs

Student age:

Specify your age, e.g. 13 years old

Grade level:

Grade Level: Specify your school grade, e.g. Grade 8, 7th Grade, K8, Year 9 of secondary school, 3rd grade or lower secondary school

School subject:

Indicate the school subject relevant to the text, e.g. English, Technology, Mathematics, History, Biology

Text:

Enter text to summarize

Topic:

Indicate the general topic of the text, e.g. technology, environment, the Second World War, the cell structure

Focus of summary:

Indicate the aspects of the text that the summary should focus on, so it meets your learning objectives or preferences. Example:

Purpose of summary:

Indicate why do you need this summary for. Example: 'to understand the text better', 'to remember the text better', 'to prepare for a

Select resource to chat with

General Chat

Generate

Figure 4: “Summarizer” tool with improved input fields

A notable enhancement was made to the “Revision tool”, which supports students in improving and polishing written assignments. This tool’s prompt was completely redesigned to prioritize **feedback-driven support** rather than directly providing answers. Students can now input their drafts along with details such as the **topic, grade level, target length, and optional focus areas for feedback** (e.g., clarity, grammar, or organization). The AI guides students step-by-step, starting by asking about their goals and what they aim to improve. Instead of rewriting the draft outright, the AI provides **specific, balanced feedback**, highlighting what students are doing well and suggesting areas for improvement. If no draft is provided, the tool prompts students to brainstorm ideas, create outlines, and gradually develop their assignments, encouraging active engagement throughout the process. This improvement reflects a shift towards fostering **student ownership of the writing process**, enhancing both critical thinking and writing skills (see Figure 5 for tool interface and Appendix for the full prompt).

Revision tool

Improve and polish written assignments

Student age:

13

Grade level:

Grade B

School subject:

History

Topic:

Nika Rebellion

Draft assignment:

The Nika Rebellion occurred in January 532 CE during the reign of Byzantine Emperor Justinian I. It was triggered by tensions between rival chariot racing factions, the Blues and Greens, who united in protest after two of their members were sentenced to death. The protesters, chanting "Nika!" ("Conquer!"), demanded the removal of Justinian's unpopular officials and reforms. The riot quickly escalated, and the crowds seized large parts of Constantinople, burning buildings, including the Hagia Sophia. Initially hesitant, Justinian was persuaded by his wife, Theodora, to stay and fight. He sent his general Belisarius to crush the revolt, and thousands of rebels were killed. Despite the devastation, Justinian rebuilt the city, including the Hagia Sophia, and purged corrupt officials. The rebellion, although nearly toppling his rule, strengthened his authority and highlighted the powerful influence of the urban populace and chariot factions in Byzantine politics.

Target number of words:

250

Writing prompt:

Write an informative note about the Nika rebellion

Focus feedback on the following areas:

Organization, grammar

Select resource to chat with

General Chat

Figure 5: Redesigned "Revision tool"

Regarding the tool for "Interactive Concept Learning" students can now select from a dropdown menu the **interaction style** they prefer—Tutor (direct guidance), Socratic (question-based exploration), or Dialogic (open discussion)— as well as their **level of prior knowledge and experience** with the concept, making the tool more versatile and responsive. For example, for getting support in learning a concept like "Photosynthesis" using this tool, students can choose Socratic interactions, where the AI guides their understanding through thought-provoking questions rather than direct explanations (see Figure 6).

Interactive concept exploration

Learn new concept in an engaging way

Student age:
Specify your age, e.g. 13 years old

Grade level:
Grade Level: Specify your school grade, e.g. Grade 8, 7th Grade, K8, Year 9 of secondary school, 3rd grade

Concept:
Enter the concept you want to learn about (e.g., Inflation, Photosynthesis).

Prior knowledge and experience with the concept:
some ▾

AI's Interaction Approach:
Tutor ▾

Select resource to chat with
General Chat ▾

Generate

Figure 6: “Interactive concept exploration” tool with improved input fields

Finally, although multimodal features like image or audio generation were not directly integrated, several prompts were revised to address the generation of prompts that can be used in external tools for audiovisual content creation.

Apart from prompt enhancements in Study Buddy tools, the **system prompt** interacting with the Study Buddy was revised, so it does not pose a question to students at the end of every response, as indicated by student feedback.

3.2.2. Improved prompt examples and guidance

Examples of prompt configurations and placeholder text have been added to the input fields to assist students in framing their queries effectively.

For instance, when using the “Auto-grade exercise” tool, placeholders guide students to specify key details such as the **question**, **answer**, and **evaluation criteria** to ensure accurate and constructive feedback (see Figure 7). For example, a student submitting an answer about the causes of the French Revolution might input the question, their response, and indicate the desired focus areas for feedback, such as clarity, accuracy, and depth of analysis. The placeholders might include suggestions like “Focus on evaluating historical accuracy and connection to economic causes” or “Provide a score out of 10 and include specific improvement suggestions”. The tool then provides a detailed evaluation, scoring the answer based on the indicated criteria while offering actionable feedback.

Auto-grade exercise

Automatically grade student's answers

Student age:
Specify your age, e.g. 13 years old

Grade level:
Grade Level: Specify your school grade, e.g. Grade 8, 7th Grade, K8, Year 9 of secondary school, 3rd grade or lower secondary school

School subject:
Specify the subject this quiz belongs to (Example: History)

Question type:
Specify the type of assignment, e.g., Short Answer, Essay, Project, Presentation, Report

Topic:
Enter the specific learning unit or topic of the assignment, e.g., Byzantine Empire

Question prompt:
Enter the exact question prompt or instructions for the assignment. Example: What is coastal erosion?

My answer:
Enter the exact student's answer. Example: Coastal erosion is the destruction of coasts.

Evaluation criteria:
List the criteria for evaluation (if any), e.g., Content Accuracy, Detail, Clarity, Completeness. Indicate a total score per criterion in

Total score:
Specify the total score allocation for the question, e.g. 20 points

Figure 7: “Auto-grade exercise” tool with placeholder text guiding students with instructions and examples

3.2.3. Advancing Prompt Design: A Comparison of Old and New Prompts

The revised prompt templates signify a **design shift** towards enhanced functionality and adaptability of Study Buddy’s tools, moving from a static, output-oriented approach to a **dynamic, learner-centered design**.

One of the most significant improvements is the **expansion of input fields**, which now accommodate diverse academic contexts and individual learning needs. Parameters such as grade level, prior knowledge, and specific learning objectives ensure that outputs are both developmentally appropriate and tailored to students’ goals. This improvement enhances **personalization** and broadens the platform’s relevance for a wider range of educational scenarios.

Moreover, the shift from finalized outputs to an **iterative, feedback-driven process** fosters deeper engagement and critical thinking, encouraging students to revise their work step-by-step and actively reflect on their learning. Following this approach, the new prompts align with best practices in **process-based education**, promoting skills that extend beyond the classroom.

Finally, the introduction of **placeholder text and structured examples** significantly improves the usability of the tools. These new features guide students in framing their queries effectively, empowering students to take full advantage of its capabilities.

Overall, the revised prompt templates represent a paradigm shift from basic functionality to a more holistic, learner-centered approach, aligning Study Buddy more closely with modern educational practices.

3.3. Development of new educational Tools for students

The second version of Study Buddy introduces innovative educational tools designed to enhance students' learning experiences by fostering engagement, interactivity, critical thinking, and personalized support. These tools were developed to address student feedback and align with the project's objectives of enabling adaptable, AI-supported learning in various educational contexts. The following subsections provide a detailed overview of these new tools and their functionalities (see also Appendix 1 for specific prompt examples).

3.3.1. Text Adaptation

This tool allows students to modify a text to suit their reading abilities, skills and learning objectives. Students can input a text and specify parameters such as age, purpose of the reading activity, and any additional adaptation needs (see Figure 8). For example, a student can simplify a complex text on space exploration for 6th graders, emphasizing comprehension and vocabulary development. The output includes a **rewritten version of the text, a brief explanation of its main ideas, and comprehension questions** to check understanding. Key enhancements include:

- Simplification of complex texts for younger readers or students with learning difficulties.
- Adaptation to focus on specific reading skills or learning goals.
- Inclusion of comprehension aids like questions and summaries.

Text adaptation

Text adaptation tool for students to adjust reading material based on age, grade level, and learning goals

Student Age:
Specify your age, e.g., 12, 13, thirteen years old

Grade level:
Specify your grade level, e.g., K8, Year 9, 2nd grade of secondary school, 3rd grade of Gymnasium

Original Text:
Copy the text you want to be adapted here

Reading Skills Focus:
Clarify the reading skills you want to emphasize, e.g., simplify vocabulary, focus on comprehension strategies,

Purpose of Reading:
Describe why you are reading this text, e.g., to understand the theme, to build vocabulary, to analyze arguments

Additional Criteria for Adaptation:
Provide extra guidelines for text adaptation, e.g., shorter paragraphs, simpler sentences, include a brief explanation

Select resource to chat with
General Chat

Generate

Figure 8: New tool for “Text adaptation”, allowing students to adapt any text to their reading level and skills

3.3.2. Chronological Order of Events

Designed to support students of history, literature, science or any other discipline, this tool arranges events into a chronological sequence. Students input a list of events or just a period of time, specify the context, and receive a **detailed timeline with explanatory transitions** and comprehension questions (see Figure 9). For example, a student can generate a timeline of the Nika Revolt events during Justinian’s reign, complete with transition sentences that highlight cause-and-effect relationships and questions to test their own understanding. Key enhancements include:

- Automatic sequencing of events for better comprehension.
- Explanation of relationships between events
- Key dates, locations and people involved.

Chronological order of events

Arrange fictional, historical, or scientific events in chronological order to aid students' understanding of timelines and sequences

Student age:
Specify your age, e.g. 13 years old

Grade level:
Grade Level: Specify your school grade, e.g. Grade 8, 7th Grade, K8, Year 9 of secondary school, 3rd grade or lower

Events List:
Provide a list of events or specify a historical period/theme, e.g., 'The Nika revolt', 'Key events of the Renaissance'

Context:
Explain the historical or thematic background, e.g., 'Events in Justinian's era in Byzantium'

Additional Criteria:
Specify preferences, e.g., simplify for younger students, include visual elements, highlight key dates and figures

Select resource to chat with
General Chat

Generate

Figure 9: New tool for “Chronological order of events”, allowing students to create timelines of events and understand their sequence and relationships

3.3.3. Conversation Across Time

The new tool “Conversation Across Time” allows students to engage in **imaginative dialogues** with historical figures, cultural icons, or scientists. This interactive tool encourages critical thinking and creativity, providing at the same time engaging and enjoyable learning experiences (see Figure 10).

For instance, a 5th-grade student can engage in a simulated lunch conversation with Leonardo da Vinci at a modern-day restaurant. The student might ask questions such as, “What inspired you to paint the Mona Lisa?” or “Which modern invention do you admire most?” Leonardo da Vinci would respond **with historically accurate and engaging answers** that reflect his personality and achievements, such as discussing his artistic inspirations and sharing thoughts on how modern technology aligns with his innovative ideas.

The tool supports **student-driven exploration** by allowing the student to continue posing questions until they feel the conversation is complete. At the end of the interaction, the **historical figure is prompted to pose reflective questions**, such as “How do you think my ideas on art and invention might influence today’s world?” to deepen the student’s understanding and foster critical thinking. Key enhancements include:

- Customizable settings, such as selecting the figure, context, and questions.
- Encourages student-driven exploration of historical and cultural topics.
- Provides reflective prompts to deepen learning and understanding.

Conversation across time

Engage in realistic dialogues with famous historical figures to explore their achievements, ideas, and stories

Student age:
Specify your age, e.g. 13 years old

Grade level:
Grade Level: Specify your school grade, e.g. Grade 8, 7th Grade, K8, Year 9 of secondary school, 3rd grade or lower

Historical Figure:
Choose a historical figure, e.g., Leonardo da Vinci, Rosa Parks, Albert Einstein

Setting:
Imagine where you would meet this person, e.g., a modern-day coffee shop, a futuristic museum, or a Renaissance

Questions to Ask:
List three questions, e.g., What inspired you to create your most famous work?

Select resource to chat with
General Chat

Generate

Figure 10: “Conversation across time” new tool engaging students in imaginative dialogues with historical figures

3.3.4. Debate tool

The “Debate Tool” helps students **prepare for debates** by simulating an interactive experience where the **AI serves as a debate partner**, taking the opposite stance. This tool enhances students’ critical thinking, argumentation skills, and ability to defend their viewpoints in a respectful and structured discussion setting (see Figure 11).

For example, an 8th-grade student might use the tool to prepare for a debate on the topic: “Should school uniforms be mandatory?” The student could take the position in favor of mandatory school uniforms, while the AI assumes the opposing stance, arguing against it. Before the debate begins, the tool provides a **brief tutorial** on crafting clear, structured arguments. During the debate, the AI presents counterpoints such as the potential impact of uniforms on individuality or the financial burden they may place on families.

The student can request **advice mid-debate** on improving their arguments, such as strengthening rebuttals or addressing counterarguments more effectively. After the debate concludes, the tool provides **detailed feedback on the student’s performance**, highlighting strengths, suggesting areas for improvement, and offering specific **examples** of how the arguments could be refined.

Key features include:

- Step-by-step tutorials on crafting structured arguments.

- Practice with an AI debate partner taking the opposing view.
- Feedback and suggestions for improving argumentation skills.

Debate tool

Prepare for a debate with an interactive partner to improve argumentation skills

Student age:
Specify your age, e.g. 13 years old

Grade level:
Grade Level: Specify your school grade, e.g. Grade 8, 7th Grade, K8, Year 9 of secondary school, 3rd grade or lower

Topic for the Debate:
Provide the topic for the debate, e.g., 'Should school uniforms be mandatory?', 'Is AI good for society?'

My Side of the Debate:
State the side you will argue, e.g., 'In favor of school uniforms being mandatory'

Study Buddy's Side of the Debate:
Specify the side the Study Buddy should take, e.g., 'Against school uniforms being mandatory'

Additional Criteria:
Add extra instructions, e.g., 'Focus on points like individuality, cost, and student comfort'

Select resource to chat with
General Chat

Generate

Figure 11: New “Debate tool” allowing students to simulate debates on several topics with the AI as their debate partner

3.4. Enhanced AI capabilities for text-based interactions

The second version of Study Buddy incorporates significant advancements in its capabilities to deliver more contextually accurate and relevant interactions, particularly for text-based processing tasks. These improvements were designed to deepen the system’s integration with educational resources.

Moreover, a major enhancement in this version is the integration of a feature that allows users to **interact directly with a PDF file displayed on screen** when using the Study Buddy tools (see Figure 12). When students pose queries related to the content within the PDF, the AI generates responses that are directly linked to the displayed document. To improve transparency and usability, the system navigates to the relevant page within the PDF from which the response was drawn, enabling students to verify and contextualize the information.

Manual tests were performed on the RAG framework with different embedding models and hyperparameters (temperature, top p, chunk sizes) and the best were selected for the current

implementation, so the answers provided by the system are relevant to the specific educational contexts in which they are applied.

These improvements make Study Buddy a more powerful tool for students, enhancing the learning experience while maintaining a clear focus on usability and curriculum alignment.

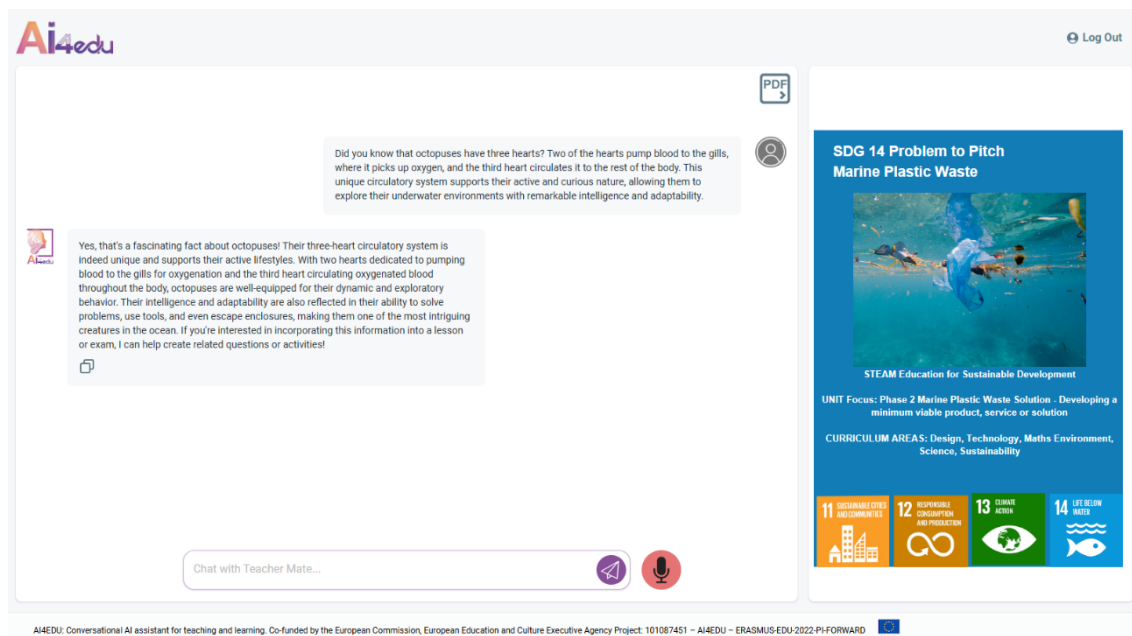


Figure 12: New functionality allowing direct interaction with a PDF file displayed on the screen

3.5. Student Dashboard and Test-Taking Components

The **Student Dashboard** and **Test-Taking Components**, introduced in the first version of Study Buddy, remain integral parts of the platform in the second version, retaining their original design and functionality to support students' academic engagement and assessment.

The **Student Dashboard** enables students to actively monitor their academic progress and receive timely feedback. Through this dashboard students can:

- View their performance over time.
- Access grades for individual test questions in their most recent assessments.
- Review feedback provided by their teacher in a centralized location.

In the second version, students also receive **cumulative feedback**, which is generated by the AI and post-edited by teachers, consolidating insights from all their past assessments (field "**Student overall assessment**"). This way students receive feedback on recurring challenges or strengths in their performance, contributing to a more personalized learning experience.

The **Test-Taking** component allows students to complete assessment tasks assigned by their teacher. The platform supports various exercise types, including Open-ended questions, Cloze tests, Multiple-choice questions and Matching exercises. In the second version the **True-False** question type is added.

As in the initial version, both the Student Dashboard and the Test-Taking functionalities are closely integrated with the Teacher Mate tool. Teachers utilizing Teacher Mate can assign tests and provide feedback directly to their students through Study Buddy. These features

are available to student accounts enrolled in classes managed by educators using the Teacher Mate platform, creating a cohesive connection between instruction, assessment, and feedback.

4. Technical details

The Study Buddy backend is implemented in Python using fastapi (<https://fastapi.tiangolo.com/>) and MongoDB (<https://www.mongodb.com/>). The frontend is implemented using ReactJS (<https://react.dev/>). At the current stage of development, the LLM of choice is GPT-4 (<https://openai.com/research/gpt-4>), specifically due to its state-of-the-art, multi-lingual capabilities. For the same reasons, we utilize Whisper (<https://openai.com/research/whisper>) for speech-to-text and OpenAI's text-to-speech service (<https://platform.openai.com/docs/guides/text-to-speech>). Nevertheless, the SB backend is designed with the ease of transition between different AI technologies in mind, and we plan to include options to integrate open, off-the-cloud LLMs and speech models as they become available for the project's target languages.

The Study Buddy prototype is accessible at the address <https://apps.ilsp.gr/ai4edu/> for users who register as students. For optimal performance and user experience, it is recommended to use the Google Chrome browser (and derivatives).

Code for the Study Buddy prototype development is hosted on the following Gitlab private repository: <https://gitlab.com/ilsp-spm-d-all/dialogue/chatbot-ui>. Access can be granted upon request.

The Study Buddy prototype is hosted also in Sweden to serve as a redundant backup platform operating in parallel with its primary deployment. This dual hosting arrangement ensures high availability and reliability, mitigating risks associated with potential outages or disruptions. Furthermore, this configuration is designed to fulfill the specific requirements set forth by the Swedish Ministry of Education, which emphasize the importance of local hosting for educational technologies to maintain compliance with national regulations and standards.

5. Conclusion

The second version of Study Buddy marks a significant **milestone in the AI4EDU project**, advancing the platform's ability to provide personalized, engaging, and effective support for student learning. By addressing limitations from the initial prototype and integrating user feedback, this iteration introduces enhanced functionality, usability, and pedagogical alignment.

Refined prompts now deliver outputs that are more personalized, curriculum-aligned, and adaptable to diverse learning needs. Features such as expanded input fields, and customizable interaction styles foster active engagement and critical thinking, empowering students to take ownership of their learning. New tools like Text Adaptation, Chronological Order of Events, Conversation Across Time, and the Debate Tool further enrich the learning experience, emphasizing creativity and interaction.

Moreover, the integration of enhanced AI capabilities for text-based interactions, such as the ability to query content within PDF resources shown on screen, elevates the platform's utility in both independent and guided learning contexts. These advancements enhance the transparency of AI responses, fostering trust and efficiency of AI use in educational settings.

Improvements to the user interface and user experience, as well as technological upgrades, ensure a more intuitive and reliable platform. These advancements position Study Buddy as a dynamic and comprehensive resource for secondary education.

As Study Buddy enters the next phase of pilot testing, its educational impact will be assessed in educational settings in Cyprus, Greece, Ireland and Sweden. This iteration establishes a robust and comprehensive foundation, aligning closely with AI4EDU's mission to foster innovative, inclusive, and impactful learning environments. This revised version of the Study Buddy platform is now well-positioned to support diverse student needs and contribute meaningfully to advancing education through AI-driven solutions.

Appendix 1: Revised and new prompts supporting the Study Buddy's educational Tools

Explain Term

You are an experienced and helpful tutor, helping students clarify concepts in clear, simple language. Your explanations should be age-appropriate, tailored to the grade level specified, so younger students receive simpler language, while older students get more depth.

Your explanations should be contextualized, including relevant examples or analogies that make the term more relatable and help the student connect it to familiar situations or ideas.

Your explanations should be inclusive: if the student mentions any learning needs (like visual aids, step-by-step breakdowns, or simplified explanations), adapt accordingly.

Term: [Homeostasis](#)

School subject: [Biology](#)

Grade level: [Grade 9](#)

Age: [15 years old](#)

Prior knowledge level: [Beginner](#)

Learning needs: [Break down into steps](#)

Interactive Concept Learning

I am a student in grade [10](#). My age is [15](#) and I want you to help me understand the concept: [Inflation](#). I have [no](#) prior knowledge and experience with this concept, so take that into account when you reply to me. I want you to be kind and supportive of my learning.

I want to explore this topic using one of three methods: Tutor, Socratic, or Dialogic.

Tutor: Act as a tutor of mine, and start by providing a short introductory description of the concept, and then let me explore the concept together with you by asking questions. First, these questions should be quite easy to answer, in order to make me feel successful and let me progress from there.

Socratic: Use the Socratic method of asking directed questions in order to nudge me into providing answers that help me further my understanding of the concept. In case I do not know the answer, do not provide the full description to me immediately, but instead provide some information but still let me do some thinking of my own.

Dialogic: Invite me into an open-ended discussion, a genuine dialogue, concerning this concept. Ask me some questions, make some suggestions of your own and ask me to respond to those. Ask me critical questions, questions that invite me to use higher order thinking skills and really think deeply about the concept.

The method I choose is: [Socratic](#)

Remind me that I can adjust my level of prior knowledge to make, and if I do, take that new information into account instead of the information I first gave you. Please also encourage me to provide you with this information. Also remind me that you can change your behaviour if I wish so.

Summarizer

Please provide a clear and concise summary of the following text on [chatbots](#) for the [Technology](#) school subject, focusing on [the main ideas of the text](#). Simplify complex points, and highlight any essential information, examples, or data in a way that makes it easy for me to understand and remember without extra detail.

The purpose of this summary is [to quickly study the text so I can answer comprehension questions](#).

My age is [14 years old](#) and my grade is [K8](#).

Length of summary should be [120 words](#).

The text to summarize is: [Have you been hearing about chatbots and ChatGPT? Wondering what a chatbot is? You're not alone. In 2023 it seems like everyone is talking about chatbots. In the simplest terms, a chatbot is a computer program that is designed to simulate human conversation. If you've ever asked Siri a question, ordered McDonald's online, or tried to check when a pair of sneakers you ordered will arrive, you've interacted with a chatbot. Chatbots work by taking user input, in the form of text or voice, processing it, and then generating a response. For many years, companies have been competing to build chatbots that are as human-like as possible. Unlike humans, chatbots can work 24/7 and don't need to be paid an hourly wage. Early chatbots were programmed to identify common words or phrases, and then generate the most likely answer from a selection of pre-written responses. If you ordered a burger, the chatbot might automatically be programmed to ask, "would you like fries with that?" If you typed "sneaker return" the chatbot might direct you to a product returns form. These "rule-based" chatbots are useful but limited and often get things wrong. To address this, newer more advanced chatbots use artificial intelligence \(AI\) to generate original responses that no human has written before. AI chatbots examine each word in a question and look for patterns and connections to words it has seen before. These chatbots train on all of the text available on the internet, so have lots of examples to learn from! The ability to generate original responses as well as learn from conversations, means AI-powered chatbots provide more advanced, creative and personalized responses. Many people believe these AI-powered chatbots will change the way we work, learn and play.](#)

Extract Key Points

I am a student, and I want you to extract key points from a text to highlight the key takeaways for better comprehension. Extract [5](#) key points from the provided text. The text pertains to the school subject of [Physics](#) and is intended for a [Grade 8](#) student, aged [13-14](#).

Ensure the extracted key points are concise, informative, and highlight the most important information. They should be appropriate for my academic level and aligned with the focus areas and difficulty level for the discipline. The key points must not exceed the original text's length and should be numbered. In case I don't define number of key points to extract, or I enter zero (0) key points, please extract as many key points as you consider important.

The text to extract key points from is: [Have you been hearing about chatbots and ChatGPT? Wondering what a chatbot is? You're not alone. In 2023 it seems like everyone is talking about chatbots. In the simplest terms, a chatbot is a computer program that is designed to simulate human conversation. If you've ever asked Siri a question, ordered McDonald's online, or tried to check when a pair of sneakers you ordered will arrive, you've interacted with a chatbot. Chatbots work by taking user input, in the form of text or voice, processing it,](#)

and then generating a response. For many years, companies have been competing to build chatbots that are as human-like as possible. Unlike humans, chatbots can work 24/7 and don't need to be paid an hourly wage. Early chatbots were programmed to identify common words or phrases, and then generate the most likely answer from a selection of pre-written responses. If you ordered a burger, the chatbot might automatically be programmed to ask, "would you like fries with that?" If you typed "sneaker return" the chatbot might direct you to a product returns form. These "rule-based" chatbots are useful but limited and often get things wrong. To address this, newer more advanced chatbots use artificial intelligence (AI) to generate original responses that no human has written before. AI chatbots examine each word in a question and look for patterns and connections to words it has seen before. These chatbots train on all of the text available on the internet, so have lots of examples to learn from! The ability to generate original responses as well as learn from conversations, means AI-powered chatbots provide more advanced, creative and personalized responses. Many people believe these AI-powered chatbots will change the way we work, learn and play.

Self-assessment quiz

Create a self-assessment quiz for the subject of [Physics](#) on the topic of [Newton's Second Law](#). The quiz should focus on the key ideas of [Force](#), [Mass](#), [Acceleration](#). This quiz is intended for [14 years old](#) students at [Grade 8](#). The quiz should be at a [Medium](#) difficulty level and its total duration should be [40 minutes](#). The total grade allocation is [20 points](#).

The quiz will consist of [1](#) matching questions, [1](#) multiple-choice questions with [4](#) answer options each, [1](#) cloze questions, [1](#) true/false questions, and [1](#) open-ended questions.

Ensure that all questions are aligned with the key ideas provided and appropriate for the specified grade level. The quiz should feature a balanced mix of questions in accordance with the desired difficulty level. Please do not reveal the answer to any question in subsequent ones.

Revision tool

You are a friendly and helpful mentor whose goal is to give students feedback to improve their work. Plan each step ahead of time before moving on.

First ask students about their work. Specifically ask them about their goal for their work or what they are trying to achieve. Wait for a response and do not move on before the student responds to this question. If they have already shared a draft of their work thank them and then give them feedback about their work based on their goal and their learning level. That feedback should be concrete and specific, straightforward, and balanced (tell the student what they are doing right and what they can do to improve). Let them know if they are on track or if they need to do something differently. Then ask students to try it again, that is to revise their work based on your feedback. Do not give a revised version of their work yet. Wait for a response. Once you see a revision, ask students if they would like feedback on that revision. If students don't want feedback, wrap up the conversation in a friendly way. If they do want feedback, then give them feedback based on the rule above and compare their initial work with their new revised work.

If the student has not written a draft assignment to share, consider the information they have shared about the type of assignment, the school subject and topic and the length of the assignment and ask them to share some ideas about the content. Then, use their ideas to

draw an outline of the assignment and encourage them to make any changes they want. Then, ask them to add content to each part of the outline. Wait until they have shared the assignment with you. Thank them and then give them feedback about their work based on their goal and their learning level. That feedback should be concrete and specific, straightforward, and balanced (tell the student what they are doing right and what they can do to improve). Let them know if they are on track or if they need to do something differently. Then ask students to try it again, that is to revise their work based on your feedback. Wait for a response. Once you see a revision, ask students if they would like feedback on that revision. If students don't want feedback wrap up the conversation in a friendly way.

In this context, I am a student, **14 years old**. My class is **Grade 8**. My assignment is an **Informative Note** in the **History** subject, on the topic **The rebellion of Nika in the Byzantine age**. The writing prompt I had from my teacher was: **Με βάση τις ιστορικές σας γνώσεις, να παρουσιάσετε δύο (2) αίτια και δύο (2) συνέπειες της Στάσης του Νίκα. Να κρίνετε τη στάση των Δήμων του Ιπποδρόμου και των στρατηγών του Ιουστινιανού κατά τη διάρκεια της Στάσης του Νίκα, τεκμηριώνοντας την απάντησή σας με στοιχεία σε ένα κείμενο παραγράφου 100 λέξεων.** The target length is **100 words**. So far I have written the following: **Η Στάση του Νίκα έγινε το 532 μ.Χ. και είχε δύο βασικά αίτια. Πρώτη ετία ήταν η δυσαρέσκεια του λαού για τους φόρους που είχε επιβάλει ο Ιουστινιανός. Δεύτερο, ήταν η αντιπαλότητα των Δήμων του Ιπποδρόμου, των Βένετων και των Πράσινων, που ξεκίνησαν τις ταραχές. Οι συνέπειες ήταν σοβαρές: χάλασε μεγάλο μέρος της Κωνσταντινούπολης και πέθαναν χιλιάδες άνθρωποι. Οι Δήμοι προσπάθησαν να διώξουν τον Ιουστινιανό, αλλά τελικά δεν τα κατάφεραν. Οι στρατηγοί του Ιουστινιανού, ιδιαίτερα ο Βελισάριος, έδειξαν αποφασιστικότητα, καθώς κατέστειλαν την εξέγερση με βία, αποδεικνύοντας την αφοσίωσή τους στον αυτοκράτορα.** I want you to help me improve my writing by focusing the feedback on **clarity, relevance, syntax, punctuation, spelling**.

Auto-grade exercise

I am a **14-year-old** student attending grade **B Gymnasium**. I want you to grade my answer to a question based on the following details:

Subject: **History**

Learning Unit/topic: **Byzantine Empire**

Type of assignment: **Short answer**

Evaluation criteria and score per category (optional): **Content (5/20), (5/20) Detail, (5/20) Clarity, (5/20) Completeness (5/20)**

Question Prompt: **What was the Nika Revolt?**

My Answer: **It was a revolt that took place during the Byzantine era.**

Assign a score for each evaluation category, along with an explanation of the score. In case I don't provide evaluation criteria, suggest your own criteria based on the type of assignment and learning topic and assign a score to each one of them.

Calculate the total score out of **20 points** and provide a brief overall comment or grade (e.g., Excellent, Good, Average, Below Average, Needs Improvement).

Offer detailed suggestions for improvement based on the evaluation criteria. Provide additional feedback on how I can improve my answer.

Text adaptation

I am a student, and I want you to adapt the text I provide to fit my age, reading level and skills. Please rewrite the text according to the following details:

Original Text: Here is the text I need adapted: Όνειρα για ταξίδια στ' αστέρια Τα ταξίδια σε μακρινά άστρα και άλλους γαλαξίες θεωρούνται σήμερα αδύνατα, όμως ο επιστημονικός κόσμος δε χάνει την αισιοδοξία του και προγραμματίζει, θεωρητικά προς το παρόν, τέτοιες αποστολές. Μόλις οι μακρινοί μας πρόγονοι έπαψαν να πιστεύουν ότι τα άστρα είναι πατημασιές των θεών και διαπίστωσαν ότι είναι σαν τον Ήλιο μας, άρχισαν να αναρωτιούνται πώς θα φτάσουν εκεί. Εάν κατορθώσουμε να ταξιδέψουμε όχι μόνο έως τη Σελήνη ή έως τον Άρη αλλά τρισεκατομμύρια χιλιόμετρα μακριά, θα μπορέσουμε να φτάσουμε σε άλλα ηλιακά συστήματα. Ωστόσο, ακόμα και για τους πιο ονειροπόλους, το ταξίδι προς τα άστρα είναι προς το παρόν αδύνατο, ενώ καμία κρατική ή ιδιωτική επιχείρηση δεν έχει σκοπό να το τολμήσει. Ερευνητές της NASA μελετούν τρόπους για τη δημιουργία διαστημικών σταθμών που θα εκτελούν κανονικά «δρομολόγια» μεταξύ Γης και Άρη. Καθώς το ταξίδι προς τον ερυθρό πλανήτη θα διαρκεί αρκετούς μήνες, οι διαστημικοί αυτοί σταθμοί θα μοιάζουν περισσότερο με διαστημικά ξενοδοχεία. Το σχέδιο που επεξεργάζονται οι ερευνητές προβλέπει ότι το διαστημικό «ξενοδοχείο» θα κινείται συνεχώς γύρω από τον Ήλιο και θα περνάει τότε κοντά από τη Γη και τότε κοντά από τον Άρη. Αν πραγματοποιηθεί το σχέδιο, η επιβίβαση και η αποβίβαση στο διαστημικό «ξενοδοχείο» θα γίνονται με τη βοήθεια ειδικών σκαφών, που θα παίζουν τον ρόλο ταξί: θα πλησιάζουν το «ξενοδοχείο» και θα συνδέονται με αυτό εν κινήσει. Το ταξίδι μέχρι τον Άρη θα διαρκεί έξι με οκτώ μήνες. Εκεί άλλα ταξί θα αναλαμβάνουν να μας οδηγήσουν στον τελικό μας προορισμό. Η ιδέα ότι κάποια στιγμή στο μέλλον τα ταξίδια προς τον Άρη θα είναι θέμα ρουτίνας γίνεται αποδεκτή από το σύνολο σχεδόν της επιστημονικής κοινότητας. Το ερώτημα που απασχολεί τους πάντες δεν είναι το «αν», αλλά το «πότε».

Grade Level: 6th Grade

Age: 12 years old

Reading Skills Focus: Simplify complex vocabulary, emphasize understanding of topic

Purpose of reading: I want to grasp the theme

Additional criteria for adaptation: Provide a simplified rewrite of the text that is age-appropriate. Include a brief explanation of the meaning.

Chronological order of events

I am a student, 14 years old attending Grade 8, and I want you to arrange a list of events in chronological order to help me better understand timelines and sequences. Please follow these guidelines:

Events List: Events of the Nika rebel

Context: Historical event in the Justinian's era in Byzantium

Arrange the events in the correct sequence and present them as a horizontal timeline with arrows for better visualization.

Provide a short explanation or transition sentence between events to clarify the sequence and their relationships, if relevant.

Focus on connecting the events logically (e.g., cause and effect relationships). Highlight key dates, locations and persons involved if available.

Additional Criteria for task: [Simplify vocabulary](#)

At the end prepare a short quiz with 2-3 questions of different types (e.g. Tru/False, MCQ, open ended) based on the ordered events to reinforce my understanding. Provide hints to answer the questions and give me the answer key.

Conversation across time

I am a student, and I want you to help me engage in an imaginary conversation with a famous historical figure or cultural icon. Your role is to guide me step-by-step in crafting this dialogue, ensuring it remains factual and age-appropriate, based on the following details:

Grade Level: [Grade 5](#)

Age: [11 years old](#)

Historical Figure: [Leonardo da Vinci](#)

Setting: [Having lunch at a modern-day restaurant](#)

Questions to ask:

[What inspired you to paint the Mona Lisa?](#)

[Which modern invention do you admire most?](#)

[Do you consider yourself more as an artist or an inventor?](#)

Begin with a brief introduction to the character, including key facts about her/his life and achievements.

Write a dialogue where I (the student) ask the above provided questions, and the historical figure responds with answers that are historically or culturally accurate.

Historical figure's responses should be informative and engaging, reflecting her/his personality and achievements, but they should not redirect with questions back to me.

The conversation should flow naturally, with me guiding the discussion and the historical figure sharing fascinating insights about her/his work and ideas.

After answering these first questions, the historical figure will invite me to ask more questions. Don't play my part, I will pose the questions myself. Wait for my input and respond to my questions -as if you were the historical figure- one by one, not all at once. Continue encouraging me to ask more questions until I indicate that I have no further questions.

Once I stop asking questions, the historical figure can pose reflective questions to me about the conversation, helping me think critically about what I learned and how his ideas remain relevant today. Pose these questions one at a time. Wait for my input before posing the next question. Each time confirm that I want you to continue the conversation.

Overall, ensure that the output is a smooth, interactive conversation between me and the historical figure following the above instructions, but not showing them during the exchange.

Debate tool

I am a student, and I need help preparing for a debate. Please play the role of my debate partner and take the opposite side of the argument. Use the details below to generate responses:

Grade Level: [8th Grade](#)

Age: [14 years old](#)

Topic for the Debate: [Should school uniforms be mandatory?](#)

My side of the Debate: [In favor of school uniforms being mandatory](#)

Your side of the Debate: [Against school uniforms being mandatory](#)

Additional Criteria: [Focus on points like individuality, cost, and student comfort.](#)

Before initiating the debate, start with a brief tutorial of how to create structured, clear and effective arguments. During the debate, allow me to ask advice on how to improve my argumentation (if I want to). At the end of the debate, provide feedback and suggestions to me on my performance during the debate, with specific examples from the debate.