Fontys

› FOR SOCIETY

FONTYS UNIVERSITY OF APPLIED SCIENCES

ICT

VINO AI for Students

Functional Requirements

Names: Zeb Kuyper

Margarita Fedulova

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1 CONTENTS

2 INTRODUCTION

2.1 Purpose of the document

This document will define the requirements for the initial 3 steps of VINO AI, a tool designed to guide students through their projects in the environment of Open Learning. It will break down large, complex problems—such as OL projects—into smaller steps, reducing the load and stress levels in students.

With this prototype, we intend to validate the concept behind VINO AI and build a foundation on which the further development will be based. Functional Requirements Document will help up us define a starting point,

2.2 Context

In this semester, we will create a Proof of Concept: functional **GUI-based prototype of the first 3 steps**, that later can be translated into a functional chatbot interface. The essential features that must be covered are: file upload, natural language processing, analysis and ‘’Planner”. This strong foundation is the basis for future iterations, for step 6 and beyond.

2.3 Problem Statement

The questions we are trying to answer with this document are the following:

- What is the essential functionality of the GUI chatbot prototype for VINO AI?
- What is the importance of non-functional requirements, how do we prioritize it?
- How do we know when a requirement has been satisfied and how do we measure success of it?
- VINO AI and LLMs in general are largely based on handling data, what do we need to consider and keep mind during our development process?

3 FUNCTIONAL REQUIREMENTS

	Requirement	SP	Acceptance Criteria
FR-01	GUI-based	3	1. Chatbot must be accessed and communicated with through a chat GUI.
FR-02	Text Input and Output	2	1. Users shall send messages to the Chatbot. 2. Chatbot must can send messages to the Users.
FR-03	Input Processing	2	1. Chatbot shall parse user text input to extract relevant information (e.g., keywords, intent) needed for the current scenario step.
FR-04	Follows a pre-defined scenario	3	1. Chatbot must guide the user through the defined Step 1, Step 2, and Step 3. 2. Chatbot must prompt the user for specific information relevant to each step in the pre-defined order. 3. Chatbot must have consistent responses with the current step in the defined scenario.
FR-05	File Upload	3	1. Users must upload their files by specifying the path to them. 2. Must support .txt, .pdf, .sql, .xlsx, .docx 3. Chatbot must confirm successful file reception or provides a clear error message.
FR-06	File Content Processing	2	1. System must access the content of the uploaded file for processing. 2. System must extract text content from the uploaded file.
FR-07	Analysis	4	1. Based on user input and/or file content, the chatbot provides specific guidance/output relevant to completing the current step in the scenario (e.g. identifies potential project goals, suggests next actions).
FR-08	Planner	6	1. A planner must be created by the end of Step 3, based on the context of the conversation.

4 NON-FUNCTIONAL REQUIREMENTS

4.1 MoSCoW

Must Have	Should Have	Could Have	Won't Have
Essential for scope	May be needed	Nice to have for scope	Not in scope

4.2 NFR Table

Category	ID	Requirement Description	Context / Justification (VINO AI)	Potential Metrics / Examples
Usability	USAB-01	Intuitive and easy-to-learn interface for students.	Student audience with potentially varying tech skills.	Qualitative feedback, task completion time.
	USAB-02	AI responses presented clearly and understandably.	Core AI interaction feature.	User comprehension testing.
	USAB-03	Consistent UI/UX across different application modules.	Multiple features (Q&A, Files, Planner).	UI style guide adherence.
	USAB-04	Provide clear feedback for user actions (uploads, saves, errors).	Improves user experience and reduces confusion.	Presence of feedback messages/indicators.
	USAB-05	Comply with web accessibility standards (e.g., WCAG 2.1 Level AA).	Inclusive design for all students; potential HBO requirement.	WCAG compliance report.
Performance	PERF-01	AI Q&A responses within acceptable timeframe (e.g., < 5s average).	Core user interaction; prevents user frustration.	Avg/Max response time under defined load.
	PERF-02	Planner modifications via prompt reflected quickly (e.g., < 3s).	Core planner interaction feature.	UI update latency.
	PERF-03	General UI interactions (load history, list files) are responsive (e.g., < 2s).	Basic usability expectation.	Page/component load times.
	PERF-04	Efficient file upload/download speeds.	File management feature.	Throughput (e.g., MB/sec) on test network.

	PERF-05	Support N concurrent users without significant performance degradation.	Expected student usage.	Define N; measure response times at N users.
Reliability	REL-01	High system availability during peak hours (e.g., 99.5% uptime).	Students need access when studying.	Uptime monitoring reports.
	REL-02	Accurate and consistent saving/updating of planner data.	Core planner functionality; data integrity.	Data validation tests.
	REL-03	Reliable file storage, retrieval, and deletion without corruption.	Core file management; data integrity.	File integrity checks, successful operation %.
	REL-04	Regular backups of user data to prevent data loss.	Protects user work and history.	Define RPO/RTO; successful backup logs.
Security	SEC-01	Secure user authentication and password hashing (modern algorithm).	Protects user accounts.	Use of Argon2/bcrypt; penetration testing.
	SEC-02	Proper authorization - users access only their own data.	Protects user privacy and data integrity.	Access control tests; code reviews.
	SEC-03	Encrypted data transmission (HTTPS).	Protects data in transit.	HTTPS enforced site-wide.
	SEC-04	Secure storage for uploaded files (encryption at rest recommended).	Protects potentially sensitive student work.	Storage configuration review.
	SEC-05	Scan uploaded files for malware.	Protects system and other users.	Integration with scanning service.
	SEC-06	Protection against common web vulnerabilities (e.g., OWASP Top 10).	Basic application security hygiene.	Security scans; penetration testing.
Legal/Compliance	COMP-01	Strict GDPR (AVG) compliance.	Mandatory legal requirement in the Netherlands.	Privacy policy, consent mechanisms, DPIA if needed.
	COMP-02	Ethical AI principles applied (fairness, transparency, bias mitigation).	Responsible AI development; aligns with educational values.	Bias testing; explainability features.
	COMP-03	Respect copyright (knowledge base, user uploads).	Legal compliance.	License checks; content sourcing policies.
Maintainability	MAINT-01	Modular architecture for easier updates.	Supports future development and evolution of VINO AI.	Architectural review.
	MAINT-02	Adherence to coding standards and sufficient documentation.	Facilitates team collaboration and onboarding.	Code reviews; documentation coverage.

	MAINT-03	Adequate logging for monitoring and debugging.	Operational necessity.	Log content review.
Scalability	SCAL-01	Architecture supports growth in user numbers.	Future-proofing the application.	Stress testing; architectural review.
	SCAL-02	System handles increasing data volumes (files, history).	Future-proofing the application.	Storage monitoring; DB scaling strategy.
	SCAL-03	AI components can scale with increased processing load.	Core AI functionality needs to keep up with usage.	Load testing AI endpoints.
Accuracy (AI)	ACC-01	AI Q&A responses achieve target relevance/accuracy.	Core value proposition of AI assistance.	Define metrics; evaluation datasets/methods.
	ACC-02	AI feedback on documents meets defined quality standards.	Value proposition of document feedback feature.	Define metrics; evaluation rubrics.
	ACC-03	AI understanding of planner modification prompts meets target success rate.	Usability of planner modification feature.	Test cases with various prompts; success rate.

5 DATA REQUIREMENTS

5.1 General Data Principles

GPDR Compliance, AI Act Compliance, Data Security, Data Minimization, Ethical Use and User Control & Transparency are all relevant principles **to consider** when building the VINO AI application to an extent, and the foundational implementations **should prepare** to comply with these requirements. A first look at the requirements are as follows.

5.1.1 GDPR Compliance

All data handling must strictly adhere to GDPR. Things like lawful basis for processing (asking for explicit for usage of student data), clear purpose limitation, ensuring data subject rights. (access, rectification, erasure, portability). There are general things to keep in mind for architecture and data handling that might affect development of VINO AI. (European Commission, n.d.) This scope is mainly for our stakeholder, as it's a startup requirement, but it **could affect** our development process.

5.1.2 AI Act Compliance

The **European Parliament** laid down harmonised rules on Artificial Intelligence which will apply from 2 August 2026. Ensuring that if applicable, a custom model VINO AI, complies with this.

The Act mentions and documents subjects like high-risk AI systems, prohibited AI practices, EU database for high-risk AI systems, codes of conduct and guidelines, etc. which are fundamental for a long-term strong foundation in developing VINO AI as a whole. (TechGDPR, 2024) We will need to consider this strongly in the choosing of which AI foundation models we choose, how they interact with data and if they fit within our requirements.

A question to ask is, would our final phase VINO AI for students be a high-risk AI system? How do we take countermeasures or how do we keep that in mind?

5.1.3 Data Security

It is expected that for a user-based system that can extend to organizations, within the context of students that appropriate technical measures are taken (e.g: encryption and pseudonymization). Organizational measures (e.g access controls, policies) can also be taken into account when considering Fontys as an organization. Though this application is focused **for students in general**, we will not consider University infrastructures integration and data scopes yet.

5.1.4 Data Minimization

It's essential to the system that it shall only collect and process data that is **strictly necessary** for the specific, defined purposes (defined as functional requirements, user stories and additional use cases and test cases) of providing the VINO AI service to students.

In this context, it's of importance to be transparent about what is done with provided documents, how they're stored and processed, and how it reflects in the application. A common rationale for students and users of LLMs is that people fear what is done with their conversations, are being used as training data without consent, or things alike. (Silvania, 2024)

5.2 Data Categories & Specific Requirements

Category	Description
DBMS	1. VINO AI will use PostgreSQL for data storage. 2. Supported data types: .sql
Completeness of the knowledgebase	1. The knowledgebase must contain information about all frameworks used in Open Learning.
Project data storage	1. User project files will be stored locally on their device.
Tool dictionary	1. Dictionary within the database that contains about tools LLM will use. 2. Fields: id, name, short description, full description, keywords, URL.

6 ASSUMPTIONS AND CONSTRAINTS

Assumptions

- It's assumed that users will have **internet access** and use **modern browsers** to access the system.
- It's assumed that users will access VINO AI primarily via a browser, meaning **web-application frameworks** should be prioritized.
- It's assumed that users will primarily use VINO AI to analyze **Open Learning projects** or **their parts**, which influences the toolkit used in the initial implementation.
- It's assumed that students **do not require** a deep understanding of the Universal Matrix Framework.

Constraints

- All **technologies** and **models** used must be **open source** for **replicability** and **scalability**.
- **Efficiency** and **performance** will largely depend on the **compute power available**, whether it is locally hosted or cloud hosted.
- If it is decided to invest in a **cloud infrastructure** we will be constrained by **budget**.

7 CONCLUSION

This document establishes the functional and non-functional requirements for the initial phase (Proof of Concept focusing on the first three steps) of the VINO AI for Students application. The focus is on creating a GUI-based chatbot capable of guiding students through the defined preliminary steps of their Open Learning projects, incorporating essential features like text interaction, file handling, basic analysis, and planner generation. This aims to validate the core concept of simplifying project workflows for students. These defined requirements provide a clear scope and foundation for the development of the VINO AI prototype.

7.1 Key Takeaways and Considerations

Key non-functional requirements, prioritized using MoSCoW, have been identified to ensure usability, performance, security, and reliability. Critical attention must be paid to data handling principles --though potentially out of scope for the first phase-- particularly GDPR and AI Act compliance, alongside data security and minimization, given the nature of the application and its student user base. The constraints regarding open-source technologies and compute resources must guide implementation choices.

7.2 Next Steps

Successful implementation and testing against these must have requirements, especially the acceptance criteria, will validate the initial concept. Validation will inform future iterations and the expansion to subsequent steps and potentially a full chatbot interface.

8 BIBLIOGRAPHY

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9 VERSION CONTROL

Version	Date	Author	Change
1.0	27-03-25	Margarita	+ Created the first version of the document
1.1	31-03-25	Margarita	+ Moved to a new template + Reworked every section
1.2	04-04-25	Zeb	+ Added 1 assumption and 2 constraints + Made requirements more imperative (shall/must usage) + Added Data Requirements Section
1.3	07-04-25	Zeb	- Removed Column in F.R. Table + Added Non Functional Requirements table with MoSCow Prioritization colours + Revised some of the introduction and reformulated some questions