VINO AI - An Empirical study of the potential of VINO AI in Open Learning-based curriculum

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Abstract

In an era marked by increasing data complexity and information overload, the need for tools that simplify problem-solving has become critical. Heuristics, a commonly employed yet often unrecognized problem-solving approach, provides a foundation for addressing these challenges. The **Vertical Integrative Narrative Overview (VINO)** AI companion leverages a heuristic-based framework, the Universal Matrix, to organize and simplify complex processes. By combining AI, human intuition, and visual problem-solving, VINO AI aims to enhance decision-making and learning outcomes.

This study evaluates the potential of VINO AI within open-learning environments, particularly at Fontys University of Applied Sciences in the bachelor's and masters in ICT, where students are encouraged to take a self-directed approach to education. Through a survey of 36 students out of 100+, the study explores learning preferences, problem-solving strategies, and attitudes toward AI tools. Key findings include a strong preference for kinesthetic and interactive learning methods, significant struggles with navigating and synthesizing large volumes of information, and a positive yet cautious outlook on AI tool adoption.

The study highlights opportunities for VINO AI to fill critical gaps in open learning, such as simplifying information-heavy tasks, offering structured workflows, and providing hands-on, engaging learning experiences. However, challenges such as trust, privacy concerns, and transparency must be addressed to achieve widespread adoption. The findings suggest a strong market opportunity for heuristic-based AI tools like VINO AI to transform the educational landscape by aligning with student needs and overcoming limitations in current solutions.

Introduction

In an age where data illiteracy is becoming more prevalent, steps must be taken to ensure people have the tools to slow down this trend. One such tool is heuristics, which most people use daily but have no clue of its existence. To put it in simpler terms, one solves a problem with heuristics by making a fast approximated decision based on a simpler form of a problem (less detailed form). The **V**ertical **I**ntegrative **N**arrative **O**verview (VINO) AI companion combines AI, human intuition, and creative problem-solving methods by utilizing a system called The Universal Matrix.

The Universal Matrix is a visual, heuristic-based framework that simplifies the organization and understanding of complex processes. It comprises a sequence of 12 shapes, each representing a stage of development. Starting with a single dot, it expands through intersections and lines following specific rules. By employing these shapes, the Universal Matrix facilitates intuitive problem-solving and decision-making, helping users navigate complex information in a structured, accessible manner [1].

In conducting market research for VINO AI, it was concluded that it could have a relatively high chance of success in the AI educational support market based on the estimated CAGR (Compound Annual Growth Rate) of the market. One particular use case that can be studied is the application of VINO AI in an Open-learning-based curriculum.

In an open-learning-based curriculum, educators transition from traditional instructors to facilitators or coaches. They support students in identifying learning objectives and guide them through various resources, including Open Educational Resources (OERs), online courses, and community or professional projects. The emphasis is on self-directed learning, where students, in collaboration with mentors or advisors, take responsibility for shaping their curriculum [2].

VINO AI's ability to simplify complex concepts and visually organize knowledge makes it a perfect companion for open learners who want to excel in self-paced exploration. However, the aforementioned hypothesis is based on intuition and expectation and is not rooted in rigorous proofs or observations. This paper aims to prove or disprove the potential of VINO AI in an open-learning-based curriculum by attempting to model user behavior.

Methodology

This study aims to model the complex decision-making patterns of typical open-learning students. To formalize this model, a dataset is required. The target groups of this study are both first-year and experienced students currently enrolled in an open-learning-based curriculum at Fontys University of Applied Sciences. Quantitative data will be collected through online surveys distributed to a large sample of these students. The goal is to create a comprehensive model of student behavior in open-learning environments, which will guide the development and implementation of VINO AI as an effective learning companion.

A survey is used to gather data on the various experiences of the potential users. This method (surveys) allows the efficient collection of structured data from numerous participants. To ensure a thorough understanding of user behavioral patterns, the survey will contain closed-ended questions for quantitative analysis and open-ended questions for qualitative insights. This approach will yield both statistical data on student behaviors and actionable insights for VINO AI's further development.

Survey Design

The survey will be designed to cover several key areas:

- The learning process
  - Preferred learning styles (visual, auditory, kinesthetic, read/write)
  - Experience with different learning styles
  - Potential Struggles in Open Learning
  - Perception of heuristic-based problem-solving methods
- Current problem-solving strategies in open-learning environments
  - Frequency of encountering complex problems
  - Preferred methods for breaking down complex tasks
  - Use of external resources for problem-solving
- Familiarity with and attitudes toward AI tools in education
  - Experience with existing AI educational tools
  - Perceived benefits and drawbacks of AI in learning
  - Willingness to adopt new AI-based learning tools

A copy of the survey distributed can be found in the attachments.

Results

A total of 36 respondents participated in the survey, out of the 100+ students who are enrolled in ICT & Open Learning at Fontys University of Applied Sciences. The following provides an overview of the survey results.

Target group

From those that filled in the survey, a majority, being 60.6% of the total response, was either partially or fully specializing in the area of software engineering. With no responses from students specializing in Business & ICT.

The problems that these students constantly deal with based on their specific area of expertise within Open Learning can be classified into the following categories:

- Navigating through various solutions (information heavy).
- Lack of proper documentation for tools, frameworks etc.
- Limited support from lecturers (technically).
- Expectations from lecturers

A majority of the respondents reported issues with inadequate documentation. They often work with specific tools and frameworks that are either outdated or lack proper documentation, making their tasks unnecessarily challenging.

A recurring theme in the survey suggests that many students feel adrift, with some expressing a need for more technical experts while others simply feel they're not making tangible progress. This sentiment is further reinforced by the uncertainty surrounding evaluation metrics and a lack of constructive feedback.

When asked about the complexity of their tasks, most respondents rated it 3 on a scale of 5, with 4/5 being a close second. Notably, this group predominantly identified themselves as analytical individuals.

Learning Process

This section of the survey explored participants' preferred learning styles and their perceived impact on the learning process. Respondents were asked to share their views on the four primary learning styles—visual, auditory, kinesthetic, and read/write—in two scenarios.

Visual Based

Visual-based learning refers to taking in information through visual aids such as maps, diagrams, flowcharts, and charts. [4]

When asked about their learning efficiency with visual-based learning, a majority of respondents rated it either 3 or 4 out of 5. However, opinions on visual-based tooling were somewhat divided, with most participants giving it a 2 out of 5 likelihood of use.

Auditory Based

When asked about their learning efficiency with auditory-based learning, a majority of respondents rated it 2 out of 5. There was an even stronger trend toward a low likelihood of using auditory-based tools, with most participants giving it a 1 out of 5 rating.

Kinesthetic Based

Kinesthetic-based learning refers to taking in information through hands-on experience. [4]

When asked about their learning efficiency with kinesthetic-based learning, a majority of respondents rated it 4 out of 5, with 5 out of 5 being the next most common response. There was also a strong trend toward a high likelihood of using kinesthetic-based tools, with most participants giving it a 5 out of 5 rating.

Reading/Writing Based

Reading/writing-based learning refers to taking in information through the consumption en reproduction of text-based information. [4]

When asked about their learning efficiency with reading/writing-based learning, respondents' ratings were normally distributed around 3 out of 5. A similar normal distribution was observed for the likelihood of using reading/writing-based tools, with most participants also giving it a 3 out of 5 rating.

Problem-Solving Process

A majority of respondents reported occasional or current struggles with reading (45.7%), understanding (50%), and extracting the essence from large bodies of information (37.1%). Additionally, many **frequently** grapple with reading (28.6%) and understanding (23.5%) extensive information. Furthermore, respondents indicated occasional difficulties in finding a good starting point and structuring appropriate plans of action (51.4% for both metrics).

When questioned about their inclination to seek assistance, a significant majority admitted to struggling occasionally or frequently with seeking help. Many respondents turn to AI tools or forums for support.

Most respondents' problem-solving approaches incorporated AI components. The typical process involves a series of trial-and-error experiments—reading available documentation or forum posts—coupled with AI usage for optimizations or solutions when teachers or peers are unavailable.

Experience with AI Tooling

A majority of respondents reported either moderate or extensive experience with AI tools. The likelihood of using brand-new AI tools showed a normal distribution centered around 3 out of 5. Interestingly, about 60% stated that AI tools are beneficial but aren't necessary for their academic life. However, academically, most use AI tools, especially for complex tasks. For personal inquiries, the trend is reversed—more AI use in general, but less for complex tasks. The survey results highlight a generally positive attitude toward AI tools, with 78.8% of respondents expressing comfort in

using them and 75.8% acknowledging their positive impact on their work or lives. Additionally, 66.7% believe AI tools enhance productivity, emphasizing their practical benefits. However, there are notable challenges, particularly in trust and data privacy. Only 3% of respondents fully trust AI tools, and just 24.2% are comfortable sharing sensitive data, indicating significant reservations. While 45.5% believe AI tools have a place in academia, concerns about AI replacing human roles are minimal, with only 15.2% fearing replacement.

Discussion

Learning Process

The survey revealed a strong preference for kinesthetic learning, with most participants rating their efficiency with hands-on methods as 4 or 5 out of 5. This suggests that tools facilitating active engagement—such as interactive simulations or coding sandboxes—would resonate well with this group. Visual-based learning also showed potential, with respondents rating their efficiency as 3 or 4 out of 5, though there was less enthusiasm for visual-based tooling. On the other hand, auditory-based learning was the least favored, with most participants giving it a low rating (1 or 2 out of 5), indicating limited utility for audio-focused tools. Reading/writing-based learning saw a more neutral response, suggesting it may complement other methods but isn't a primary preference.

These insights suggest that an AI tool designed for this audience should emphasize interactive, hands-on experiences while incorporating visual aids to enhance comprehension. Tools that rely heavily on auditory or text-based methods may struggle to gain traction unless paired with more engaging, kinesthetic features.

Problem-solving Process

The survey revealed a major issue in the problem-solving process for many students, namely the difficulty in reading and understanding large bodies of information. A significant portion of respondents reported occasional and frequent struggles with this task. This finding is further reinforced by the notable AI usage (indicating a partial dependency) within the common problem-solving methods described by participants.

Delving deeper into the survey results, it becomes evident that students face multiple challenges in their learning process:

- Information Processing:
  - 45.7% of respondents reported occasional struggles with reading large amounts of information
  - 50% faced difficulties in understanding complex information
  - 37.1% struggled with extracting the essence from extensive data
  - 28.6% frequently grappled with reading large volumes of information
  - 23.5% often found it challenging to comprehend complex information
- Task Management:
  - 51.4% of respondents occasionally struggled with finding a good starting point for their tasks
  - 51.4% reported occasional difficulties in structuring appropriate plans of action
  - A significant number of participants highlighted time management as a major issue

These findings underscore the need for tools and strategies that can assist students in efficiently processing information, initiating tasks, and managing their time effectively in an open-learning environment.

Experience with AI Tools

The survey findings suggest that while there is strong openness to AI adoption, with 78.8% expressing comfort in using them and 75.8% acknowledging their positive impact on productivity and learning. However, trust remains a significant barrier, with only 3% fully trusting AI tools and just 24.2% feeling comfortable sharing sensitive data with a normal distribution for new AI tool adoption around 3/5 likelihood of using new AI tools. While many view AI as a productivity enhancer, they also express reservations about privacy, accuracy, and over-reliance on technology. This suggests that any new AI tool must prioritize data privacy and transparency to build trust. Offering clear explanations of how the AI operates, as well as robust data protection measures, will be critical for adoption. This is further reinforced by the stronger openness to AI tool usage for academic (technical) tasks rather than personal (humanitarian) tasks.

Conclusion

With an estimated 100+ student, the 36 responses become a statistically representative sample, thus the answers are representative of this whole semester of students (based on the 30% rule for population sizes less than or equal to 1000).

The survey results highlight several critical insights into the learning and problem-solving behaviors of open-learning students at Fontys University of Applied Sciences, as well as their experiences and attitudes toward AI tools. A strong preference for kinesthetic and interactive learning underscores the importance of designing AI tools that provide hands-on, engaging experiences, supplemented by visual aids to enhance comprehension. At the same time, the clear struggle with processing and understanding large volumes of information points to a pressing need for AI tools that can simplify information-heavy tasks, structure workflows, and provide clear starting points and actionable steps.

While there is significant openness to using AI tools, trust and data privacy concerns remain a major barrier to widespread adoption. Most students see AI as a productivity enhancer for technical and academic tasks but hesitate to use it for more personal or humanitarian purposes. To address these concerns, any new AI solution must prioritize transparency, robust data privacy measures, and clear, explainable operations.

The findings suggest a strong market opportunity for AI tools like VINO AI that combine hands-on, interactive learning experiences with heuristic-based problem-solving capabilities. By addressing identified challenges—such as poor documentation, difficulty managing complex information, and limited technical support—VINO AI has the potential to bridge the gap between current student needs and existing solutions. A well-designed, trust-oriented tool could not only enhance the productivity of open-learning students but also improve their overall academic experience.

Reference

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Attachments

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