The Expedition Prompt-a-thon on AI & the Future of Higher Education (13-16. May.2025, Rome, Italy)

Higher Education Alignment with Job Market Demands Through AI-Augmentation

Final Report

TEAM 7 (The AI-Cornerstones)

(Elizaveta Nosova, Emmanuel Bazzucchi, Svetla Tsenova, Helene Wiese-Hansen)

13-16 May 2025

The Expedition Prompt-a-thon on AI & the Future of Higher Education (13-16. May.2025, Rome, Italy)

Introduction

The rapid evolution of the global job market, driven by technological advancements and shifting industry needs, has exposed a widening gap between the skills taught in higher education and those required by employers. Universities, traditionally structured around long-established academic models, often struggle to keep pace with the speed at which new skills and competencies emerge. As a result, students increasingly voice concerns about the relevance of their studies, while faculty members face the challenge of updating curricula without the support of timely labor market insights.

This challenge lies at the heart of the digital transformation in education. Emerging technologies—particularly artificial intelligence—offer a powerful alternative: tools that can analyze labor market trends in real time, identify curriculum gaps, and deliver personalized, scalable learning experiences. When used responsibly, these AI solutions can support rather than replace educators, putting human needs—student growth, teacher empowerment, and institutional improvement—at the center of innovation.

I. Problem, Solution, User Insights, and How the Idea Works

The **current landscape of higher education** is facing a critical disconnect between academic programs and the rapidly evolving job market. Students frequently **express anxiety that their coursework may not prepare them adequately for real-world careers**. They worry about investing time and money in education that might leave them **underqualified** for roles that demand specific, up-to-date skills.

Professors, on the other hand, are **challenged to continuously revise their syllabi** in response to an **ever-shifting demand for competencies**. They often **lack the tools, time, and data to assess whether their teaching content remains relevant**. Meanwhile, universities are **under pressure to ensure graduate employability and maintain their institutional reputation** in an increasingly competitive and outcomes-driven environment. To address this gap, the project **introduces a dual solution** that **leverages artificial intelligence**:

(1) a Skill Gap Analyzer and

(2) an Auto Learn AI Tutor.

These tools work in tandem to modernize course offerings and improve the learning experience at scale.

1. Skill Gap Analyzer

The Skill Gap Analyzer is designed to **bridge the curriculum-to-market** requirements. It operates by automatically collecting and analyzing real-time job description data from sources **like LinkedIn and Indeed**. Using APIs, it continuously monitors job postings to determine

which skills— e. g. Power BI, Python, digital marketing etc.—are most frequently requested. Professors participate by **uploading their course syllabi through a streamlined portal** integrated into Microsoft Fabric. These documents are processed by a Python-based natural language processing module that extracts and interprets the skills and topics covered. The tool then compares these academic inputs with the marketplace demands identified earlier.
The comparison yields three key outputs: (a) skills already covered, (b) skills that are outdated, and (c) essential skills that are missing. The insights are **visualized through intuitive dashboards** built in Power BI, enabling educators and administrators to **quickly identify potential areas of improvement**. Suggestions, such as "consider adding Power BI tutorials" or "replace outdated software examples," are automatically generated and communicated back to course owners.

2. Auto Learn AI Tutor

Complementing this system is the Auto Learn AI Tutor. This tool **transforms course materials into engaging, accessible video lessons** using an AI video generation platform such as *Synthesia*. When a course book is uploaded—for example, "Learn Power BI in 4 Weeks"—the AI system reads and interprets its structure, content and methodological approach. It then drafts a video script which is converted into a lesson delivered by ***a lifelike AI presenter***. These videos include ***spoken explanation, slides, screen recordings, and interactive quizzes***. This solution not only addresses the lack of instructor bandwidth but also supports ***scalable, multilingual, and flexible learning environments***. It is particularly beneficial for students with varying levels of access, as it offers low-bandwidth versions and offline options, and includes accommodations like subtitles for those with hearing impairments.

User research uncovered deep ***motivations behind the need for such innovations***. Students want assurance that **their studies are aligned with job market expectations** and prefer ***learning formats that fit their personal schedules and learning styles***. Professors are open to updating content, but they need a **system that minimizes manual labor** and clearly identifies what changes are necessary. **Universities** are **motivated by both reputation and outcome metrics**, seeking tools that allow for data-driven curriculum adjustments and future-ready programs.

By combining ***real-time labor market analytics*** with ***automated course transformation tools***, this project offers a ***robust, scalable response to modern educational challenges***. Importantly, it provides **benefits** for all stakeholders: ***students become more employable***, ***educators are empowered with actionable insights***, and ***universities enhance their value proposition***.

II. Process and Development Phases

The development process followed a structured path divided into five key phases: ***discovery, design, build, test, and reflect.*** Each phase included **targeted activities** and **evolving assumptions** that were either **validated or refined through iteration**.

1. The discovery phase

The discovery phase began with extensive secondary research and informal interviews to understand the core issues faced by students, faculty, and academic leadership. This phase was critical in identifying the disconnect between syllabi and labor market expectations. The initial assumption that most university syllabi were broadly aligned with employer needs was quickly challenged. Instead, it became clear that even well-designed programs often lacked specific, in-demand skills.

2. The design phase

In the design phase, the team focused on conceptualizing how an automated analysis and recommendation system could function. The core assumption at this point was that professors would be willing to engage with digital tools as long as they were easy to use and provided immediate value. User journey mapping and interface sketches were developed to test this idea with prospective users. Feedback at this stage confirmed that usability would be paramount; faculty had little tolerance for time-consuming interfaces.

3. The build phase

During the build phase, attention turned to developing the core functionality of the Skill Gap Analyzer. APIs were used to pull real-time job data while AI models handled natural language parsing of syllabi. Another key assumption was that the AI could effectively map course content to skill categories identified in job postings. To validate this, early tests were run using sample syllabi and job ads. Adjustments were made to improve entity recognition and keyword relevance.

4. The testing phase

Testing involved running the system with live data from LinkedIn and a sample of real syllabi. Feedback confirmed the system could accurately identify missing or outdated skills, but it also highlighted the need for explainability. Professors requested a way to understand why specific recommendations were made. As a result, transparent logic layers and sample justifications were added to the feedback output.

5. The reflection phase

The final phase, reflection, focused on evaluating broader implications and refining the model for future scalability. Ethical concerns emerged around content ownership and potential faculty resistance to automation. These were addressed by emphasizing the system's role as a support tool, not a

replacement, and by ensuring only open-access or approved materials were used. Additionally, reflections on inclusivity led to design changes such as multilingual support and accessible learning formats.

III. Use of AI and Key Prompts

Artificial intelligence was central to both the concept and execution of this project. It played a role in data analysis, content generation, user interface design, and instructional delivery.

(1) The Skill Gap Analyzer employed AI in **two principal capacities**:

First, it used natural language processing (NLP) to read and interpret course syllabi. This included entity extraction, topic modeling, and semantic similarity comparisons to map academic content against labor market requirements.

Second, machine learning was used to analyze trends in job postings, determining which skills were emerging, stable, or declining. AI also facilitated the generation of course-specific recommendations for syllabus improvement, using rule-based logic enhanced with trend analysis.

(2) The AutoLearn AI Tutor relied on a different application of AI, focused on instructional design and delivery. It was trained to understand and reproduce the structure and tone of educational materials. The AI-generated scripts were fed into Synthesia to produce realistic, avatar-led videos. These videos provided consistent instruction, allowing students to engage with course content on demand and in various languages.

Throughout development, AI assistance tools such as GPT-4 were employed for planning and ideation. Key prompt structures included: “Summarize the most in-demand skills for data analysts based on job ads from LinkedIn in the last 30 days,” and “Compare this course syllabus to current job market trends—identify three outdated topics and three missing skills.” Prompts were also used to draft early versions of user interface text, error messages, and feedback explanations.

AI tools streamlined the process of ***turning complex data into user-friendly insights***. By integrating them thoughtfully and transparently, the project demonstrated how AI can augment rather than replace human expertise in educational settings. The most valuable prompts were those that asked the AI to explain decisions in simple, actionable language—this improved trust and usability among faculty users.

Key prompts for the research

“You are a European University. You are a public University. You have more than 10 thousand of undergraduate and graduate students. You care about reputation and employability rates of your students. You offer programs for different fields of studies, but specialize in social sciences. with regard to the reality of the existing gap in skills taught in universities and skills required by the job market, what are you needs? formulate it as a situation-motivation-desired result statement (e. g. When

an important new customer signs up, I want to be notified so I can start a conversation with them, - but in the context of the problem). Show 3 needs concisely and concretely"

"A tool to identify the mismatch of skills in job postings and skills in the syllabus and identify which skills needs to be integrated in the courses. A website with ai-videos that can be used in different courses. enhance this solution"

Conclusion

This report acts as a recommendation to institutional and societal decision-makers and depicts how AI can play a transformative role in enhancing higher education by aligning academic programs with real-time job market requirements without diminishing the substantial role of humans. By integrating tools like the Skill Gap Analyzer and Auto Learn AI Tutor, educational institutions can be able to deliver more customized learning experiences, improve employability effects, and strengthen their own strategic positioning and long-term societal role.

The suggested solution has a strong potential for real-world application and feasibility across institutions focused on societal benefits, innovation and value-added. It could help academic and researcher communities to quicker adapt to regularly changing societal and business expectations, staying competitive, letting AI-tools do the routine part of the work. The suggested AI-augmented solutions are viable to elevate, enhance and enrich educational process, delivering meaningful impacts on the quality of interaction between educators, students and industry. If a tool shortens the way to the goal, respectively to the job market, if university delivers relevantly prepared graduates to the industry due to AI-augmented tools, these can be most probably considered as disruptive but viable. The integration of AI-tools in the educational process may release time resources, which can be invested in further creative development of the educational system und even more devotion to the personal interaction between educators and students.

Last, but not least the suggested multi-approach to the challenge addresses the increasing need of upcoming digital generations to interact actively with innovative technologies and digital tools. An evolving role of their educators and mentors in this context to act as guides and monitor the digital transformation of education, so that students keep-up to a meaningful and ethical use of AI-instruments and systems. Experienced educators can also use their expertise to forecast potential pitfalls and risks and create protecting guidelines for a healthy cohesion between humans and artificial intelligence.