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Bringing Certainty to AI Integration: A Case Study in Norwegian University Admissions

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Abstract

With the advancement of machine learning (ML) and artificial intelligence (AI) products, such technologies are increasingly being explored for novel applications in various contexts. The Norwegian Ministry of Digitalization is leading an initiative to promote the safe and legal use of AI in the public sector. As part of a broader initiative to modernize and enhance Norwegian university admissions services, an AI/ML team of five part-time student employees was established to explore AI possibilities within this context. The team operates under the Norwegian Agency for Shared Services in Education and Research (Sikt), which oversees the technical renewal of student administrative and admission services in the Norwegian education sector. This paper draws on the experiences and findings of the team since they began their exploration in Summer 2023, highlighting the challenges and opportunities associated with AI in the Norwegian education context. The multidisciplinary team, comprising both designers and developers, provided diverse perspectives on AI integration.

The main findings indicate that the lack of organizational structures and implementation plans for AI integration is primarily due to prioritization challenges. Effective cross-disciplinary collaboration proved essential—both between developers and designers to ensure that user needs are met, and between project teams and managers to ensure alignment with organizational strategies. The study recommends teams to utilize proof-of-concept methods as a strategy to establish structures facilitating documentation of learnings and recognize AI development as an emergent process. By addressing these challenges, the Norwegian public sector can better leverage AI to enhance educational services, ensuring both innovation and compliance with legal and regulatory frameworks.

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1 Introduction

With the onset of machine learning (ML) and artificial intelligence (AI) products, such technologies are increasingly being explored for novel uses in diverse contexts. The Norwegian Ministry of Digitalization is spearheading a program to increase the safe and legal use of such technology in the Norwegian public sector. In the context of a larger initiative to modernize and improve the Norwegian University admissions services, an AI/ML team consisting of 5 part time student employees was established to explore the possibilities of AI for this context. The team is located at the Norwegian Agency for Shared Services in Education and Research (Sikt) which is responsible for the technical implementation of renewing student administrative and admission services in the Norwegian education sector. This paper draws on the experience and findings of the team since they started exploring the use of AI in Summer 2023. The paper discusses challenges and opportunities with the use of AI in the context of Norwegian higher education. The team was multidisciplinary consisting of both designers and developers providing different angles on AI.

The main findings indicate that the lack of organizational structures and implementation plans for AI integration stems from prioritization challenges. Additionally, cross-disciplinary collaboration is crucial – firstly between developers and designers to ensure user needs are met when new technology is introduced, secondly between project teams and the managers to ensure alignment with organizational strategies. The study recognizes that AI development is an emergent process, and that management needs to put structures in place to better mitigate deployment issues and facilitate learning within the project portfolio at large. The findings suggest the use of a proof-of-concept method as a strategy deployed by the AI/ML team to negotiate a closer connection to the rest of the project portfolio, while also disseminating learning in the organization.

2 Theory

Developing software within large-scale sociotechnical information infrastructure (Hanseth and Lyytinen, 2010) requires navigating complex governance and architectural structures (Hanseth and Modol, 2021). Such infrastructures both enable and limit project deployment success. National governance, like Norway's AI program, must align with sector-specific governance, including the project portfolio for renewing the university admissions service in Norway. Conflicts in strategic goals can lead to project failures due to unclear value or inability to handle infrastructure complexities.

Conflicting priorities, driven by user and client expectations, are integral to project portfolio management (Martinsuo, 2013). In the higher education context, a joint council of universities and government agencies sets priorities affecting Sikt’s project portfolio. This includes renewing the university admissions service and related architecture projects. The AI project at Sikt must align with these priorities and negotiate (Martinsuo, 2013) its place in the larger project portfolio. Thus, managing the project portfolio involves aligning different digital (innovation) projects (Barthel and Hess, 2020) with various strategies, effectively prioritizing stable admissions systems over AI exploration. This aligns with Hanseth and Modol’s (2021) notion of the tension between change and stability in an information infrastructure architecture and governance. The AI project represents an architectural change needing to be built on top of stabile architectural and governance structures for higher education admission.

The AI project is innovative within Sikt's portfolio, and digital innovation projects are a "high uncertainty activity" (Aubert et al., 2015, p. 257). This aligns with Barthel and Hess' (2020) view on digitalization as an emergent process where challenges and opportunities of technology emerge through digital innovation projects. Handling these challenges through project portfolio management one can better utilize existing resources and ensure tighter cooperation between projects which are aligned or ensuring ownership of findings in the project portfolio as a whole. This involves assessing project fit within strategic goals and determining when it's mature enough for prioritization. AI in education is new, posing challenges like data sharing and the quality of the machine learning model, alongside governance issues such as GDPR. This paper explores how a proof-of-concept approach (Goldsby et al., 2017) provides a strategy for teams to iteratively improve their alignment with the strategic goals of a project portfolio. In the higher education context, proof of concepts serve as design activities that iteratively engage both technical and non-technical stakeholders to assess a product's feasibility, desirability, and viability. These activities demonstrate that the product can be developed within technical constraints, meets the needs of customers—such as admissions staff in our case—and represents a financially sound option. By responding to these three core issues the proof-of-concept method provides a better position to negotiate (Martinsuo, 2013) a closer alignment and prioritization with the deployment timeline.

Even if not deployed, proofs-of-concepts can succeed by providing learning opportunities for the project portfolio. Facilitating such learning is crucial for long-term AI success. Experiences such as the AI project at Sikt may help management identify risks with AI implementation, a key focus for project portfolio managers.

3 Methods

The analysis is based on work conducted over a two-year period, beginning in June 2023. The study uses available documentation from methods like user-centric design, agile development and research & development methods conducted in weekly one day sprints. This includes proof-of-concepts that were presented to the project portfolio management.

4 Findings

4.1 Prioritizing between multiple strategies

Our findings suggest the deployment of the AI project was affected by prioritization between two strategies. First, the modernization of the Norwegian University admissions services and second, implementing AI tools into Norwegian public services. The latter strategy lacked a structured implementation plan, making it less actionable. The AI project poses solutions to one of the core stressors to the admissions service – manually categorizing large amounts of documents. Regardless, the project portfolio managers needed to prioritize a stable admission service as it is legal and architectural foundation for the project portfolio. Without an application service to build on, one cannot use AI. Furthermore, as there were no legal and technical structures for AI implementation, the organization prioritized service stability and modernization over the suggested AI innovations. This suggests public organizations naturally prioritize building stable and reliable services over implementing AI tools with uncertain outcomes.

4.2 Cooperation

The successful development of an AI product necessitates robust collaboration between developers, who possess the requisite technical expertise, and designers, who ensure that user needs are addressed throughout the process. Additionally, close cooperation with leadership is essential to ensure that the product aligns with organizational and governmental strategies. Furthermore, the deployed technology must conform to the existing architectural frameworks delineated in the project portfolio, such as programming languages and deployment environments.

One significant discovery was the gap in legal foundations for data utilization, particularly within the context of university admissions where AI and ML intersect with GDPR regulations. The team invested considerable time in exploring these challenges, especially those related to training AI models. Legal experts encountered difficulties in making informed recommendations and updating privacy policies due to semantic barriers that impeded their understanding of AI's technical aspects. Conversely, technical teams struggled to grasp the ramifications of legal language, complicating their adherence to regulations. This highlighted the importance of strong collaboration between legal and technical teams to ensure compliance and clarity.

4.3 Deployment issues

A principal challenge in the project was the absence of a structured plan or guidelines for integrating AI products into the admissions service information infrastructure. The team lacked established guidelines for implementing a developed AI tool into production, leading to difficulties in defining integration steps. This necessitated the team's engagement with various internal teams and leaders to identify potential integration methods. One outcome was the decision to develop an API endpoint, enabling other teams to utilize the AI functionality.

The absence of an implementation plan significantly hindered the ability to test the quality of the AI tool. The team's limited involvement in the project portfolio prioritization process led to reluctance in integrating their work. The team needed portfolio managers to take a proactive role in assisting the team with testing and developing a comprehensive plan. This limited involvement severely restricted the team's capacity to effectively test and evaluate the product. Although strong collaboration with other teams and leaders was essential, it proved challenging due to ongoing reorganizations and the primary focus on developing a stable admissions service for the higher education sector.

4.4 Proximity to development is essential

One of the main challenges for the AI/ML team was the lack of structures for integrating their work into the broader information infrastructure. Despite developing functional tools, the team was not included in testing environments or deployment discussions. This limited their ability to validate models in real contexts. Our findings suggest success depends on the team’s proximity to product development.

As a response, the management decided to include the AI/ML team in the project portfolio backlog from January 2025. This structural change aimed to make AI work visible and testable, helping the organization understand how these tools could integrate with the admissions architecture. Such inclusion also enabled stronger collaboration with other teams, supporting real deployment rather than isolated innovation.

The use of a proof-of-concept approach inspired by entrepreneurial and design methods helped in facilitating the conversations with management and other teams. By creating concrete prototypes (exemplified in Figure 1), visual designs, and live demonstrations, they were able to communicate the potential value of their solutions more effectively to stakeholders, including project managers and leadership. This concrete method of showcasing feasibility helped establish credibility and opened doors for integration discussions—even before full deployment structures were in place.

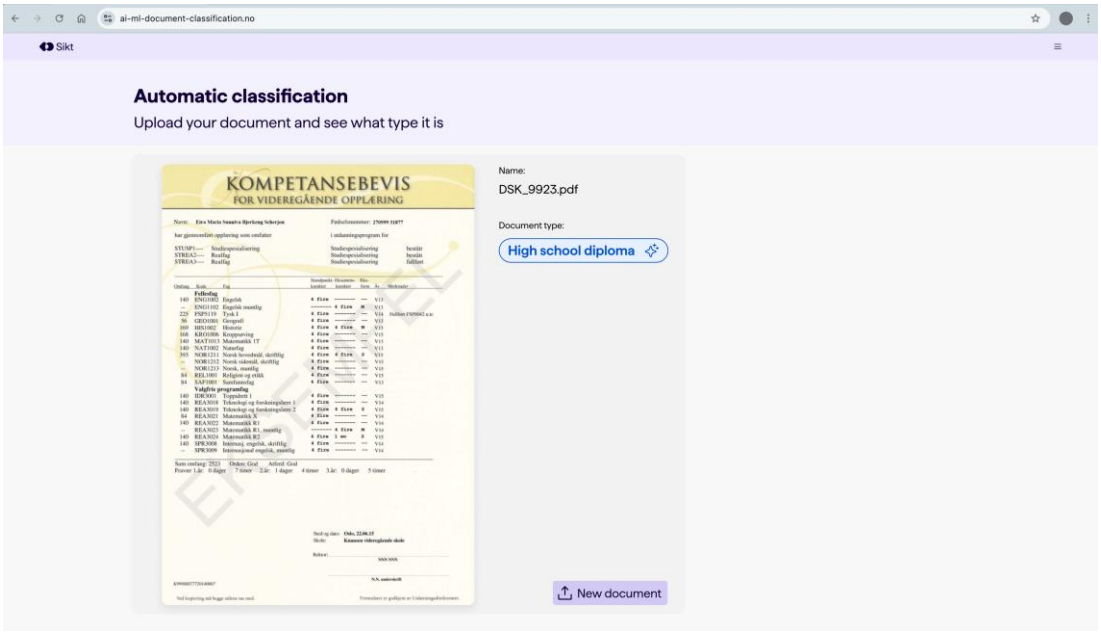

Figure 1: A screenshot of a functional **Proof of concept**

4.5 Communicating value through design fostered shared learning

The team worked actively to share their learnings and insights with the broader organization. Navigating GDPR and the its intersection with technology, required the team to learn new skills across disciplines. The proof-of-concept approach made learning from the development process visible (as shown in figure 2). This was done through live demos, visual design, and functional prototypes, which eased communication with portfolio managers, legal experts, and non-technical stakeholders. This helped bridge understanding between developers, designers, and the wider organization, and allowed stakeholders without technical backgrounds to assess feasibility, viability, and desirability of proposed AI tools. In this way, the proof-of-concept work not only facilitated implementation—it also ensured that insights from the AI/ML exploration could be understood, owned, and built upon by the broader project portfolio.

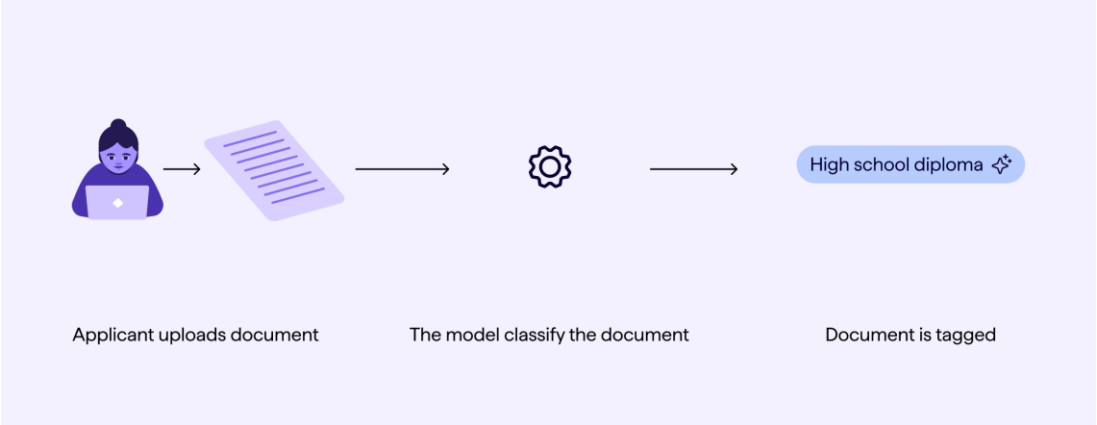

Figure 2: Example of a presentation slide to explain how the model works to better engage in with business developers and education sector representatives without technical expertise.

5 Discussion

Our findings contribute to the existing literature by confirming that project portfolios exist in the context of multiple strategies (Martinsuo, 2013, Barthel and Hess, 2020). This leads to inherent tensions between achieving goals set at various levels of government, as observed in our study. Specifically, the alignment of national programs like Norway's AI program with sector-specific governance, such as the project portfolio for renewing the university admissions service, often results in conflicts that can impede project success. Even if AI has clear benefits with regards to easing the burden of admission officers, there is still a need to prioritize delivering a stable architecture for admission services to the universities. This underpins the tension between stability and change in matters of governance and architecture explored by Hanseth and Modol (2021).

Therefore, managing digitalization is inherently challenging due to it being an emergent process (Barthel and Hess, 2020), as confirmed by our findings. Even when the potential of AI projects is recognized, the substantial resources required can conflict with the needs of project owners. In our case, the council of universities and government agencies needs to prioritize stable and functional architecture first. This aligns with Hanseth and Lyytinen (2010), who discuss the enabling and limiting factors of complex infrastructures. Effective project portfolio management must balance these resource demands to ensure successful implementation and integration of innovative projects. It raises questions such as when an AI-project should be included in the deployment backlog.

Our findings indicate a pressing need to alter larger organizational structures to better align with strategic goals. This resonates with the literature on project portfolio management, where aligning projects with various strategies is essential for prioritization and success (Aubert et al., 2015). The lack of structured integration plans for AI tools within the project highlights the need for strategic adjustments to support better alignment and facilitate smoother deployment processes.

Digitalization is an emergent process where it is vital to continuously realign and renegotiate a project’s role within the project portfolio (Martinsuo, 2013). Management must address this dynamic nature. In our study, management responded to the AI team's initial inability to deploy their technologies

by facilitating closer collaboration with deployment teams. This adaptive approach to emerging issues of project and team organization, and the realignment of cooperation mechanisms, is an essential aspect of digitalization and a key factor in successful project implementation. Utilizing a proof-of-concept method throughout development (Goldsby et al., 2017), the AI/ML team gradually demonstrated how their developed concepts could be integrated into the project portfolio. This approach not only showcased the practical applications of their designs but also made communication with non-technologists, such as business developers and sector specialists, more effective. Through a design process the team was able to highlight the strengths of their designs, facilitating clearer communication and fostering greater collaboration and support from the project portfolio, particularly with management.

Exploration in digital innovation projects holds intrinsic value, yet there is a pressing need for clear strategies to ensure the dissemination of learning within the project portfolio. Our findings support the view that even if AI projects are not immediately deployed, using proof-of-concept methods can succeed by providing valuable learning opportunities (Barthel and Hess, 2020). This continuous learning process is a critical driver of digitalization and must be integrated into project management frameworks to enhance long-term success. For example, the AI team has consistently found that artificial intelligence is not always the most appropriate solution to a problem. More conventional programming and machine learning approaches often prove to be more effective, as explored by Choi et al. (2025). To ensure that AI/ML is successful in the higher education context, it is crucial to disseminate such findings in a standardized manner, owned by management, thereby ensuring learning across the project portfolio or the education sector at large.

Based on the experiences of our research, practitioners of information systems development should adopt design or startup methods such as the proof-of-concept method explored in this paper. Even in the case of complex information infrastructures the method provides clarity in stakeholder involvement which can help in deployment and learning. Further research should be made on how methods from methodologies such as Lean startup should be applied in the context of AI-development in large-scale complex information systems.

6 Conclusion

Our study highlights the critical need for robust organizational structures and clear implementation plans to integrate AI effectively within the Norwegian education sector. Prioritization challenges and the necessity of cross-disciplinary collaboration are central to this integration. Ensuring alignment between developers, designers, and management is crucial to meeting user needs and organizational strategies. By employing proof-of-concept methods as a strategy, our findings suggest AI/ML teams can ease the communication with stakeholders and more closely align their development with the project portfolio. Additionally, iterations of a proof-of-concept approach is a process and means of documenting learnings, which is essential for continuous improvement of the use of AI in other contexts. By addressing these elements, the Norwegian public sector can better harness AI's potential, fostering innovation while ensuring legal and regulatory compliance.

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Author biographies

Arman Bulak Hagelia is currently working as Team Lead for Team AI/ML and a service designer at Sikt. He holds a master's degree in Informatics: Design, Use, Interaction at the University of Oslo. His thesis explores multidisciplinary approaches to project portfolio management as a means to successful digitalization in the Norwegian higher education sector.

Eira Bjerkeng Scherjon is currently pursuing her master's degree in Interaction Design at The Oslo School of Architecture and Design. Through two full-time summer positions and ongoing part-time work, she has been part of the Team AI/ML working on AI-based document handling. She has explored the design aspect of document anonymization, synthetization, information extraction, as well as designing the frontend solution for stopping irrelevant documents uploaded with applications for higher education in Norway.

Hanbit Choi is in the final year of her bachelor's degree in software engineering at Oslo Metropolitan University. She has been working as a developer at Sikt since last summer, starting as a summer intern and later continuing as a part-time developer. During her internship, she focused on data analysis and designing optimized data structures for future use. Since last autumn, she has been part of Team AI/ML and continues to work with them. In addition to her role at Sikt, she is collaborating with Fürst on her bachelor's thesis, where she is developing a digital dictation application.

Aksel Skullerud Fosaas is currently in his last year of a bachelor's degree in Informatics at the Norwegian University of Science and Technology (NTNU) in Trondheim. He started working as a developer at Sikt for an internship last summer and has worked part time since. During the summer he worked closely with 5 other students doing data analysis and similar work with the objective of improving logging practices within Sikt's services. Following the summer, he spent his time as a part of Team AI/ML.

Zara Mudassar is in her last semester at the Oslo Metropolitan University (OsloMet), taking a master's degree in informatics with Applied Artificial Intelligence as her specialization. She has acquired significant professional experience at Sikt – the Norwegian Agency for Shared Services in Education and Research – through two full-time summer positions and ongoing part-time work throughout the year. While working at Sikt, she has been part of a student team working with document handling using AI. She, together with the team, has explored document anonymization, synthetization, information extraction, as well as classifying documents relevant to Norwegian university applications.

Sander Garland Slinning is currently pursuing a master's degree in informatics at the Norwegian University of Science and Technology (NTNU), where he also holds a bachelor's degree in the same field. He has gained valuable professional experience through his work at Sikt – the Norwegian Agency for Shared Services in Education and Research, where he worked both part-time during the semester and full-time over two summers. During his time at Sikt, Slinning contributed to the development of the new Student ID App and is now a member of Team AI/ML, where he collaborates with the team to explore automated document classification solutions for university admissions.