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Beyond the hype – How higher education stakeholders view the benefits and concerns of generative AI for teaching, research, and administration

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ABSTRACT

Generative AI (GAI) is rapidly reshaping higher education, introducing both transformative opportunities and significant challenges across teaching, research, and administration. While GAI offers potential benefits, such as enhanced productivity, personalized learning, and automation of routine tasks, it also raises concerns about academic integrity, ethical governance, and organizational readiness. Understanding how stakeholders perceive these changes is essential for developing strategies that balance innovation with responsibility.

This study explores stakeholder perceptions of GAI through a SWOT analysis of 167 contributions collected via Padlet during webinars at two Swedish universities, attended by 152 higher education personnel. Thematic analysis revealed a nuanced landscape of views: strengths include capabilities for content creation, translation, and transcription, which can streamline workflows and support collaborations; weaknesses include inaccuracies, lack of system transparency, and user dependency, highlighting risks of misinformation and the need for advanced skills in and knowledge about AI tools; opportunities include supportive roles, outsourcing repetitive tasks, and partnering with AI for innovative teaching practices; while threats include destabilization of educational norms, ethical issues regarding data privacy and copyright, and organizational challenges such as workforce adaptation and brand reputation.

In addition to mapping SWOT themes, the study identifies stakeholder requests for clear institutional guidelines, targeted professional development, and allocation of time and resources to facilitate responsible adoption of generative AI. These insights inform the development of a novel Balanced Scorecard (BSC) framework, translating study findings into actionable strategies across four perspectives: student or customer, internal business, innovation and learning, and financial. By bridging stakeholder perceptions with strategic planning, this study contributes a practical roadmap for higher education institutions seeking to harness the benefits of GAI while mitigating associated risks. The proposed framework underscores the importance of aligning technological integration with ethical, pedagogical, and organizational considerations to ensure long-term value and trust in academia.

1. Introduction

In the current hype, Generative AI (GAI) has initiated a worldwide debate on challenges and opportunities in many different areas. One of the areas with many studies and vivid discussions is higher education [1–3]. Moreover, artificial intelligence in education (AIED) has established itself as an emerging research field with a rapidly increasing number of publications [4]. Some challenges that have been frequently reported in AIED studies are 1) The impact on course activities and assessment [5,6], 2) Ethical aspects such as integrity and accountability [7], and 3) The lack of guidelines and policy documents [7,8], which also relates to the need for professional development and upskilling among educators and other professionals [9,10].

On the other hand, there are research reporting on the potential benefits of 1) Personal tutoring [11,12], 2) AI-supported teachers [13–15]) and 3) Automated administration [16], for example by utilizing student data in interactive learning logs [17]. Altogether, these challenges and opportunities involve several stakeholders such as teachers, students, administrators, policy makers, and AIED researchers. To get a better understanding of the different potentials of GAI for the

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various stakeholders, two webinars were given with a mix of all the mentioned stakeholders, except for students. After mini-lectures and group discussions in the video conference system Zoom, data were collected with the use of discussion surveys in the Padlet tool (padlet.com). Data collection and analysis were supported by the SWOT (strengths, weaknesses, opportunities, and threats) framework, which is presented in more detail in the Extended background section.

Previous SWOT analysis of GAI in education, such as Choi et al. [18] and Farrokhnia et al. [19], have mainly focused on single AI tools, such as ChatGPT. Further, few previous studies have examined how teachers, administrators, and researchers collectively perceive GAI and its strengths, weaknesses, opportunities, and threats. This gap underscores the need for a broader, multi-stakeholder analysis, which this study addresses. This article adds new knowledge by analyzing original data (constituting 167 stakeholder contributions from two universities), rather than triangulating previous findings in existing research. The study also proposes a Balanced Scorecard strategy, informed by the multi-stakeholder perspective, which has not been presented in prior research. A more detailed overview of prior research and frameworks is provided in the Extended background section.

This study has the aim of exploring the perceived strengths, weaknesses, opportunities, and threats of using GAI in the higher education context, based on perspectives from teachers, researchers, and administrators. The overall research question that guided this study was:

> What strengths, weaknesses, opportunities, and threats do teachers, researchers, and administrators perceive in the use of generative AI for teaching, research, and administration in higher education?

While prior studies have explored the impact of GAI on teaching and learning in higher education, few studies have systematically mapped multistakeholder perspectives into a strategic framework. This study addresses that gap with a SWOT analysis to qualitatively explore this new and challenging area in higher education. In addition to providing an empirical mapping of stakeholder perceptions, this study makes a novel contribution by integrating SWOT analysis with a Balanced Scorecard framework. This combination enables a shift from descriptive analysis to strategy-oriented insights, offering a structured approach for translating perceptions into institutional actions.

2. Extended background

This section presents an extended background for previous research and frameworks used in this study. In the first sub-heading, previous research related to generative AI in higher education is presented. The second sub-heading introduces the SWOT framework and the Balanced Scorecard tool, which are applied in the method section and the discussion section.

2.1. GAI in higher education

The rapid development in the field of GAI in recent years has affected many areas, including education, introducing new opportunities and challenges in AIED. New tools and techniques have enabled the opportunities of personalized learning to support teachers to handle tedious routines have increased. At the same time, the ubiquity of GAI bots has created challenges, such as students taking shortcuts, and discussions on metacognitive laziness have dominated the debate [20] GAI has become a transformative force in higher education, influencing teaching, learning, research, and administrative work. As pointed out by Pons, GAI tools are now at the fingertips of teachers and students creating a mix of opportunities and challenges. Recent studies have emphasized that, regardless of whether the current surge in AI development will be followed by another AI winter or not, the impact on academia will persist [21,2]. This influence on higher education is multifaced, presenting both opportunities and challenges that institutions must navigate.

2.1.1. Pedagogical opportunities and challenges

GAI offers opportunities for content creation and language support, enabling educators and students to generate text, images, and translations [22–25], and providing the possibility to support students with visual impairment [26], and neurodivergent learners [27]. These capabilities can enhance productivity and creativity in teaching and learning, especially if UX design of GAI tools is considered [28]. However, concerns remain about the reliability of AI-generated content, with frequently discussed issues such as hallucinations and fabricated references [5,29]. Such inaccuracies raise questions about accountability and trust in educational context [30,31].

2.1.2. Ethical and policy considerations

The integration of GAI in higher education also introduces ethical challenges, including accountability, human oversight, transparency, integrity, security, and inclusiveness [32,7,33–36]. While some universities have implemented policies for AI-use, others remain silent. Overly restrictive policies may also discourage legitimate educational use of GAI tools, when students are afraid of using them. These tensions underscore the need for clear guidelines and governance frameworks regarding AI ethics and sustainability [37–39].

2.1.3. Institutional and organizational implications

Beyond teaching and learning, GAI has implications for administrative efficiency and organizational strategy. Tools can automate routine tasks, such as scheduling and responding to inquiries, potentially reducing workloads [16,13–15]. At the same time, stakeholders express concerns about workforce changes and job displacement [40]. While these issues extend beyond teaching and learning, they directly affect institutional planning and resource allocation, making them relevant to higher education leadership.

2.1.4. Emerging practices and future skills

Innovative uses of GAI, such as ‘study buddies’, illustrate GAI’s potential to support personalized and experiential learning [41] and placing more emphasis on creativity [42]. If students develop proficiency in GAI tools during their studies, these skills may become valuable in future professional contexts [6]. However, realizing these benefits requires rethinking assessment practices and investing in faculty upskilling [9,10].

2.1.5. Link to current study

Taken together, these opportunities and challenges highlight a critical need for systematic analyses of multistakeholder perspectives on GAI in higher education. While prior research has examined specific tools or isolated issues, few studies have mapped the perceived strengths, weaknesses, opportunities, and threats of GAI across multiple stakeholder groups in higher education. Addressing this gap, the present study applies a SWOT framework to explore these perceptions and proposes a Balanced Scorecard approach to inform institutional strategy (see Discussion section).

While previous SWOT analyses of generative AI in education exist, such as Choi et al. [18] and Farrokhnia et al. [19], this study differs in three significant ways. Firstly, previous studies have focused on specific contexts, for example Choi et al. [18] on instructional design and Farrokhnia et al. [19] on ChatGPT, whereas this study adopts a broader lens, examining generative AI across teaching, research, and administration from a multi-stakeholder perspective (including higher education teachers, researchers, and administrative personnel). Secondly, unlike the previous Choi et al. [18] and Farrokhnia et al. [19], which are primarily conceptual or literature-based, this study is grounded in original empirical data collected from 167 stakeholder contributions during webinars at two different universities. Thirdly, this study extends beyond descriptive SWOT categorization by operationalizing findings into a Balanced Scorecard (BSC) framework, providing actionable strategies for institutional planning. This integration of empirical

multi-stakeholder insights with strategic mapping represents a novel contribution not addressed in prior research.

2.2. SWOT and balanced scorecard

The SWOT framework, an acronym for Strengths, Weaknesses, Opportunities, and Threats (Fig. 1), has long been used to inform strategic decision-making in organizational contexts, including higher education [43,44]. The origins of SWOT are often traced to early strategic planning models, such as SOFT (Safeguarding the satisfactory, Opening the opportunities, Fixing the faults, and Thwarting the threats) by Robert F. Stewart and colleagues in the 1960s [21]. SWOT is typically visualized as a two-by-two matrix, distinguishing internal factors (strengths and weaknesses) from external factors (opportunities and threats). This structured approach enables researchers and practitioners to organize qualitative insights into actionable categories, making it particularly suitable for analyzing stakeholder perceptions gathered through discussion-based surveys.

Despite its popularity, SWOT has been criticized for being overly descriptive and lacking mechanisms for translating findings into strategy [44,21]. To address these limitations, complementary models are often recommended. One such is the Balanced Scorecard (BSC), introduced by Kaplan and Norton [45] and widely adopted for performance management and strategic planning [46,47]. BSC emphasizes four interrelated perspectives (customer, internal business, innovation and learning, and financial), providing a holistic view of organizational performances beyond financial metrics [47]. By linking objectives, measures, and strategies across these perspectives, BSC helps institutions operationalize insights derived from frameworks like SWOT.

In the context of this study, SWOT was chosen because it offers a clear structure for categorizing diverse stakeholder opinions on generative AI into strengths, weaknesses, opportunities, and threats. These categories align with the research question, which seeks to understand different stakeholders' perceptions on the use of generative AI in higher education teaching, learning, research, and administration. However, identifying themes alone is insufficient for guiding institutional actions. Therefore, the Balanced Scorecard was incorporated to translate SWOT findings into strategic objectives that higher education institutions can implement. This combination ensures that the analysis moves beyond description to inform practical strategies for GAI integration, addressing both immediate concerns and long-term organizational goals.

3. Method

This study was carried out as a SWOT analysis, with data gathered from webinars given in the Zoom video conferencing system. A SWOT analysis is seen as a concrete and straightforward method for organizations and companies to understand its current position and make informed strategic decisions in relation to a new technology or product. In the rapidly emerging field of GAI, SWOT analyses, combined with other methods, have been an analytical method both for studies in academia [48] and in the industry. The SWOT framework depicted in Fig. 1 was used for filtering results from an initially deductive thematic analysis aligned to the main SWOT process of identifying strengths, weaknesses, opportunities, and threats.

Themes and patterns in the four main categories were later passed on to an inductive analysis where emerging themes from the findings were aggregated to themes. The Balanced Scorecard (BSC) has been used as inspiration for combining the results from the deductive-inductive analysis into a comprehensive picture of the studied topic. The results from this process are discussed and presented in the discussion section of this article.

3.1. Research context

The study was conducted in the context of two online seminars (webinars) via the virtual conference tool Zoom, facilitated by the authors. The webinars were offered at two different universities in the middle part of Sweden during the spring semester of 2024 with the aim of providing professional development for higher education personnel in the field of GAI. Both webinars were offered after communication with the universities and receiving invitations resulting in a total of 152 higher education personnel that attended the webinars. The authors have not asked for or received any economic compensation for facilitating the webinars.

The first webinar was offered at a smaller university in the middle part of Sweden in February 2024 and was open to all personnel. The webinar was attended by a total of about 120 participants (2 facilitators, 1 invited speaker/participant from the university, 80 virtual participants, and about 37 physical participants attending via joint conference

SWOT Model	Helpful to achieve objectives	Harmful to achieve objectives
Internal	**S**trengths	**W**eaknesses
External	**O**pportunities	**T**hreats

Fig. 1. The SWOT analysis framework.

call). Among the participants were researchers, teaching personnel, personnel from administration and support, doctoral students, and management personnel. The number of participants decreased to about 103 participants (2 facilitators, 1 invited speaker/participant, 63 virtual participants, and about 37 physical participants.

The second webinar was offered at a larger university in the middle part of Sweden in May 2024 and was open for all personnel (and management) in administration and support at that university. The webinar was attended by a total of 34 participants (2 facilitators, and 32 virtual participants). The number of participants decreased to 27 participants (2 facilitators, and 25 virtual participants) during the webinar, due to participants leaving the webinar early.

The webinars had pre-decided content and followed a similar structure:

1) Welcome and short introduction of webinar and facilitators
2) General introduction to generative AI
3) Group discussions in breakout rooms (virtual discussion rooms)
4) Presentation and examples of specific generative AI tools
5) Group discussions in breakout rooms
6) Personal experiences and/or reflections
7) Group discussions in breakout rooms
8) Concluding summary and floor open to questions and comments

3.2. Data collection

Data for the study were collected through a joint discussion survey in Padlet (padlet.com). Padlet is an online communication platform where users can share virtual noticeboards with each other. The Padlets used for this study were structured with categories from the SWOT framework and an additional category for other comments. The exact formulations in the Padlet categories were: “Strengths (internal)”, “Weaknesses (internal)”, “Opportunities (external)”, “Threats (external)”, and “Other comments and questions”. Authors' instructions before the group discussions were to discuss the SWOT categories, but that the participants could comment on other related topics. The Padlets were also set to be anonymous, which means that not even the authors of this article can identify who wrote what in the Padlets. The use of anonymous Padlet data represents a methodological trade-off. On the one hand, anonymity encourages open and honest contributions, reducing risk for social pressure and enabling participation from a broader range of stakeholders. On the other hand, it limits the ability to link responses to participant roles, conduct follow-up inquires, or perform subgroup analyses. The trade-off was considered appropriate given the exploratory aim of capturing a wide range of perceptions. Participants were instructed to write and discuss with each other in the Padlets as part of the group discussions during the webinars. The Padlets were also left open after webinars if participants wished to continue the discussion.

At the beginning of each webinar, the facilitators (authors) informed the participants that the Padlets were set to be anonymous and that the content would be used for research. Participants that did not want to participate in this research were instructed to not write in the Padlets, but that they were still welcome to participate in all other parts of the webinar. Because the seminars were online and the Padlets were anonymous, participants could attend the webinars (and group discussions) if they wanted to, with low risk of others knowing that they did not participate in the data collection (Padlets) for the study.

The collected data in the two Padlets consist of a total of 167 posts from the participants, covering all SWOT categories. 26 of the posts were published under strengths, 33 of the posts were published under weaknesses, 28 of the posts were published under opportunities, 44 of the posts were published under threats, and 36 of the posts were published under other comments (Table 1).

The rationale for selecting Padlet for data collection over other alternatives, such as interviews or NVivo-based focus groups, was that it enabled real-time anonymous contributions from a large and diverse group of participants during webinars, which would have been difficult to achieve through, for example, interviews or focus groups given the scale and resources needed. The exploratory aim of mapping stakeholder perceptions into the SWOT framework required breadth rather than depth, making Padlet an efficient and contextually appropriate tool.

Table 1
Summary of collected posts in the two Padlets.

	Strengths	Weaknesses	Opportunities	Threats	Other
Webinar 1	15	21	23	24	33
Webinar 2	11	12	5	20	3
Total	26	33	28	44	36

3.3. Data analysis

Data analysis was conducted as a theoretical (deductive-inductive) thematic analysis, following the six-phase structure outlined by Braun and Clarke [49]: 1) familiarizing yourself with your data, 2) generating initial codes, 3) searching for themes, 4) reviewing themes, 5) defining and naming themes, and 6) producing the report. Before conducting the analysis, a categorization matrix was developed in a spreadsheet document using the SWOT framework as a basis, containing the categories: strengths, weaknesses, opportunities, and threats. Inclusion of data for the analysis was determined by the relevance to the SWOT categories, while exclusion was based on data being off-topic, duplicate, or non-informative. Duplicates and near-duplicates were identified through the manual coding process. No exact duplicates were identified, while near-duplicates (posts expressing similar ideas) were organized in the same theme, if otherwise deemed relevant for inclusion. Data that were considered relevant but did not fit specifically in one of the SWOT categories, were instead placed in a category named ‘other’. To reduce conceptual redundancy, data were categorized deductively according to SWOT definitions: internal limitations were coded as weaknesses, while external risks and consequences were coded as threats. During the inductive phase, codes were reviewed and consolidated to ensure clear boundaries between categories.

Initial coding was conducted using a descriptive coding approach, inspired by Saldaña (2013, p.87–91), where each Padlet post was summarized in the spreadsheet document. This approach was chosen because it provides a straightforward way to capture participants’ perceptions in an exploratory study. The descriptive codes were organized deductively into the SWOT categories (strengths, weaknesses, opportunities, and threats) and then grouped inductively into broader themes, following Braun and Clarke’s [49] six-phase thematic analysis framework. This combination ensured both systematic categorization and flexibility for emerging patterns.

A detailed description of the steps in the analysis is provided below:

1) Reading and re-reading of collected data in the Padlets to facilitate data familiarization.
2) Collected data are moved from the Padlets to the spreadsheet document and ordered in the pre-decided (deductive) categories of ‘strengths’, ‘weaknesses’, ‘opportunities’, ‘threats’, and ‘other’ to generate initial codes. During this step, data are also checked for relevance and potential duplicates.
3) Extracts, codes, from the Padlets are re-organized within the SWOT categories in search of potential themes (inductive), which resulted in 41 identified themes within the SWOT categories and 5 in ‘other’.
4) The initial themes are then reviewed for creating a coherent understanding of the data set as a whole, which resulted in grouping the initial themes to 15 bigger themes (14 SWOT + 1 Other).
5) Themes are named and defined based on incorporated codes and common determinators, with the aim of creating short and salient names (the ‘Other’ theme is re-named to ‘Requests‘).

6) And lastly, the report of the analysis is structured in the results section according to the categories in the SWOT framework and concluded with a separate sub-heading for 'other' themes, which was re-named to 'Requests' in the previous phase.

For transparency, the coding is summarized in Fig. 2, which visualizes the qualitative reduction process in a hierarchical diagram.

Following the thematic analysis, identified SWOT themes were also systematically mapped to the four perspectives of a Balanced Scorecard (BSC) to inform strategic recommendations of GAI in higher education, using the following decision rules:

Customer perspective: themes directly affecting students' learning experience, outcomes, or interaction with teaching

Internal Business perspective: themes influencing intuitional processes, workflows, or operational practices

Innovation and Learning perspective: themes related to pedagogical development, staff competencies, and knowledge creation

Financial perspective: themes with implications for resource allocation, costs, or organizational sustainability

In cases where a theme could relate to multiple perspectives, it was assigned to the perspective representing its most immediate or dominant impact. The transition process is described in more detail as part of the Discussion section.

Regarding reliability and validity of the study, reliability was supported by using a structured Padlet design aligned with the SWOT framework and standardized instructions during the webinars. Data were analyzed using an established six-phase structure for thematic analysis, which were also documented in a spreadsheet document for transparency and consistency. Validity was addressed by aligning data collection and analysis with established frameworks, such as SWOT and BSC, and by aggregating codes into conceptually coherent themes. The aim was to capture diverse stakeholder perceptions rather than claim statistical generalization.

4. Results

Results from the analysis are presented below in sub-headings associated with categories in the SWOT framework. The section is concluded with a sub-heading for the 'other' themes that were identified in the analysis. All these themes covered requests about the future from the participants and therefore, the sub-heading has been named 'Requests'. A summary of the results is provided in Table 2 below. Presented extracts from the collected data have been translated to English and, to some extent, been rewritten for readability. The underlying meaning of the extracts has not been changed.

4.1. Strengths

Four main themes were identified in relation to the SWOT category of Strengths. These were: 'Creating', 'Compiling', 'Translating', and 'Transcribing'. In the theme of 'Creating', participants described that they perceived the ability of generative AI to create text and images as a strength with the system. They further highlighted that GAI's ability to generate content can provide support and inspiration to their own work. It was further noted that GAI can help participants save time in their work by making them more efficient: "Effective, timesaving, language support, source of inspiration".

In the theme of 'Compiling', participants highlighted the strength of

Table 2
Summary of identified themes.

Strengths	Weaknesses	Requests
Creating	Truth	Guidelines
Compiling	System	Time and resources
Translating	User	Upskilling
Transcribing		Coordinators
Opportunities	**Threats**	
Supporting	Destabilization	
Outsourcing	Education	
Partnering	Organization	
	Ethics	

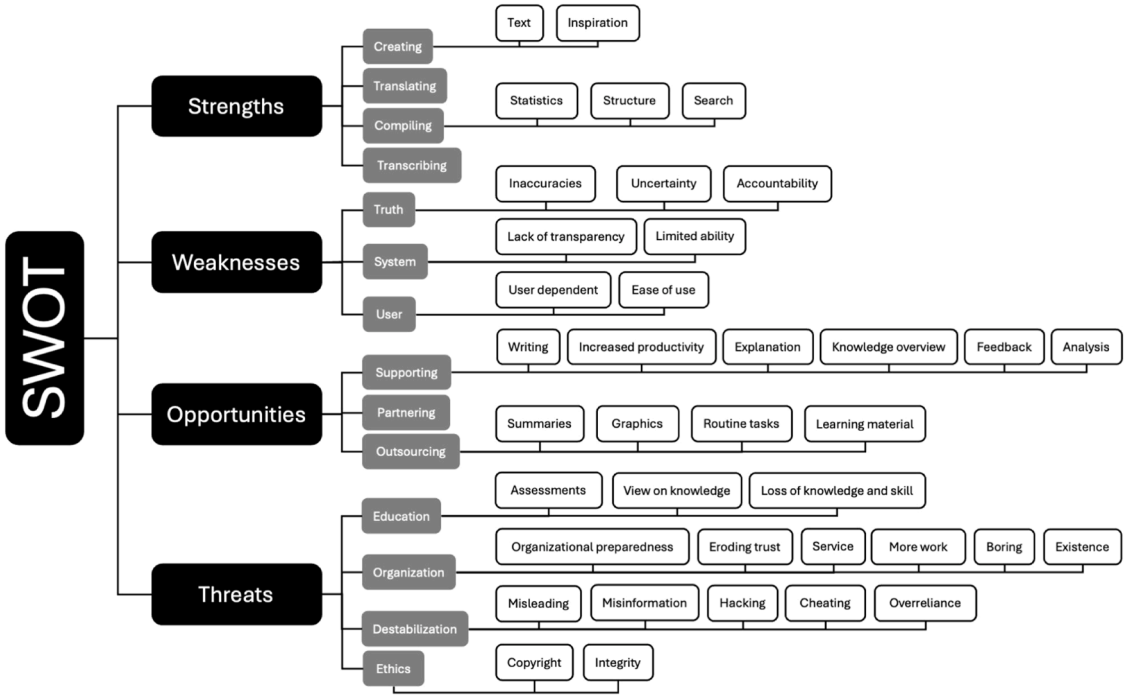

Fig. 2. Hierarchical representation of the coding process.

GAI to compile large amounts of data to provide statistics. One of the answers in the collected data describes the strength of GAI "[t]o structure data from surveys and articles for a literature review". Answers in the collected data also indicated that participants use GAI to search for references and technical information, which should be discussed further considering GAI's ability to 'hallucinate'.

The theme of 'Translating' highlights the strength of GAI to translate, mainly text, to different languages. Participants described that they use GAI to translate their texts into different languages. Some of the tools mentioned were ChatGPT and DeepL. Participants further mentioned that they perceived GAI tools to provide accurate results when used for translating and, that they are efficient and save time: "Using as a tool for translation and proofreading, a much more efficient and accurate result".

Another strength with GAI was the theme of 'Transcribing'. It was described by participants that they use GAI to transcribe audio to text and that they perceived it also as a strength for students, who can use it to take quicker notes during lectures: "Students can use speech to text to put together notes from lectures faster". GAI for transcribing was described as saving time for both teachers and students in higher education.

4.2. Weaknesses

Three main themes were identified in relation to the SWOT categories of Weaknesses. These were: 'Truth', 'System', and 'User'. In the theme of 'Truth', participants described that they perceived GAI's inaccuracies in generated content to be a weakness. Hallucinations, errors in translations, made up references, and wrong page numbers in books and articles were mentioned as examples. Participants highlighted that these inaccuracies in generated content make users uncertain of what they can trust in generated content: "One doesn't know if everything is correct; if one does not review carefully enough, the result of the underlying material can be incorrect". It was further suggested that clearer accountability needs to be developed for when GAI is used, for example in data analysis.

Participants further highlighted the weaknesses of GAI as a system (the theme of 'System'). It is noted that many GAI tools have a lack of transparency in their models and that information is hidden from the users, for example, information about training data. GAI was compared to a 'black box' and participants discussed the effect this has on trust in the systems as well as potential legal consequences. Participants further noted that GAI is lacking in comparison to humans in many regards, such as reasoning, information retrieval in narrow fields, and educational role playing: "Difficult to use for information retrieval (especially regarding certain subjects), there is a need for more specialized AI systems within different subjects".

In the theme of 'User', participants described the weakness of GAI being dependent on users' knowledge. It is noted that GAI can be an efficient and time-saving tool to use, but only if used for a topic where the user already has extensive knowledge. User knowledge is needed since the ability to retrieve the correct and desired information from the system is dependent on knowledge about the domain asked about, for fact checking, and the concepts used in the domain, which are needed to formulate efficient prompts. Participants further described that they perceived some weaknesses in the ease of use of GAI systems. For example, that it is difficult to know how to ask questions to GAI and that answers may change dependent on how the question is formulated, and that the system's chat-like interface can be difficult when the user has follow-up questions: "Difficult to use AI if you have follow-up questions".

4.3. Opportunities

The opportunities category encompasses three main themes that were identified in the analysis. These are: 'Supporting', 'Outsourcing', and 'Partnering'. In the theme of 'Supporting', participants described that they perceived GAI's supportive abilities, such as writing, productivity, and analysis as opportunities. It is highlighted that GAI can support users to understand complex information, for example through overviews, simplifications, and visualizations, and that it therefore can act as an extra teacher for students: "An extra teacher in the room for students (sounding board)".

In the theme of 'Outsourcing', participants described the possibility of GAI taking over some tasks that humans normally do, and by that save time. This could encompass routine tasks, such as answering frequently asked questions, providing time slots for student meetings, and some administrative tasks: "Manage repetitive tasks, such as common questions, routine matters". But it could also include more complex and creative tasks. For example, GAI could provide summaries of texts to shorter paragraphs or abstracts, which is something that higher education personnel often do in the role as teachers or researchers. GAI can further provide graphics for abstracts, presentation slides, and learning exercises for education, according to the participants.

Another highlighted opportunity with GAI, according to the participants, was for humans and AI to partner up (theme 'Partnering'). Participants described that GAI provided them with suggestions that they then can discuss with the system as a collaborator or partner. The opportunity of using GAI in education as a discussion or training partner was also highlighted by the participants. GAI can, for example, take the role of someone that the students will encounter in their future profession and through role playing provide learning experiences. Further, some participants in the collected material compared GAI in education to the introduction of the calculator, and that we today have moved beyond the discission of calculators as a tool for cheating. To use GAI efficiently "you need to know the subject, what questions to ask, and how to identify inaccuracies".

4.4. Threats

The category of threats encompasses four main themes. These are: 'Destabilization', 'Education', 'Organization', and 'Ethics'. In the theme of 'Destabilization', participants described that they perceived GAI's ability to generate misleading information, false information, and support unauthorized access to technology and software through hacking threats. It was also noted that the use of GAI could make cheating more widespread, since it is often unclear what is considered cheating when it comes to GAI, and the traditional tools for plagiarism check cannot detect use of generative AI. Overreliance, as a consequence of extensive use of GAI, was also highlighted as a potential threat of the technology. The risk of humans becoming passive and losing their own creativity, learning, and critical thinking: "Convenience, risk of relying too much on AI, being sloppy with the review".

In the theme of 'Education', participants described that GAI can be a potential threat to education by disrupting assessments and the view on knowledge, if these practices and views are not rethought and updated. It was further described that some knowledge and skills may be more under threat than others due to GAI in education. For example, will the perceived value of being a skillful writer change when GAI can generate texts? "It also makes one wonder, what kind of knowledge we should/will examine/value in the future?" Participants noted that it will be important with rules and guidelines to protect skills and knowledge that we value in education.

The theme of 'Organization' highlights the perceived threats that GAI brings to an organizational level. Participants described that the introduction of GAI can be a threat to human jobs, both that AI can make some jobs obsolete but also that personnel that do not keep up with technology development may be replaced. It is further noted that some jobs could become more boring for humans with AI, that we may get more work to do instead of less, and that organizations may lose human contact if more work is being conducted by machines. To some extent, these threats are dependent on organizational preparedness. Participants further described that GAI could be a threat towards public trust

and potentially harm organizations' brands, depending on how these organizations handle the introduction of GAI: "Risk of damaging [institution name] brand, if the service is perceived as more impersonal".

The last theme in the Threat category is 'Ethics'. Participants described concerns related to copyright when using generative AI. For example, what information is being used for training the models, do they have consent from the authors or artists, and so on. Participants also raised concerns for their own use of GAI related to copyright. What happens to the information provided to the GAI tool when prompting? Who owns that information? Related to this, participants highlighted the threats to personal integrity when using GAI tools. What information can and should higher education personnel share with AI tools? Can researchers and teachers trust the companies behind GAI tools to safeguard research data, student data, and other types of information? "Ethical perspectives are important to solve before actively using AI in research and education. Who owns the data?"

4.5. Requests

The last subheading covers four themes that were identified in the analysis; all of them relate to participants' requests for future higher education with generative AI. These themes are: 'Guidelines', 'Time and Resources', 'Upskilling', and 'Coordinators'. Many participants highlighted the need for guidelines regarding the use of GAI in higher education. These guidelines should include what is considered permitted and not permitted use of generative AI, but also strategies and recommendations for effective use of GAI tools. Participants also noted that a challenge for successful AI integration in higher education is a lack of time and resources, where many do not have time, or access, to learn these tools: "Time to fail! We must be given time (money) to investigate, experiment, fail, test, if we want [institution name] to be at the forefront". Lastly, participants emphasized the need for more educational investments to upskill higher education personnels' knowledge and skills in GAI; and that there should be specific personnel at institutions to coordinate this work.

5. Discussion

Findings presented here should be interpreted as context-specific insights from two Swedish universities, rather than a globally representative understanding. Future research should include diverse institutional and cultural contexts to validate and expand results discussed in this section (this is further discussed in '5.2 Limitations and future research').

Regarding the found themes on strengths ('Creating', 'Compiling', 'Translating', and 'Transcribing), creation of content has been presented as a positive game changer in other recent studies [22,24]. However, previous research has also pointed out the threat of GAI tools taking over human jobs in content creation (Humble, In press). The ability of compiling large amounts of data to provide statistics has been brought up in several studies. One example of how data could be compiled and analyzed in a useful way is by compiling student data in distance education in interactive learning logs [17]. The use of GAI for translation has been here for a while, where two frequent applications are in language teaching and language learning [23], and for overcoming language barriers in international research teams [25]. The increased quality of automated transcriptions has made this technique useful in several aspects, not least in research for transcribing recorded interviews.

The emerging themes under Weaknesses ('Truth', 'System', and 'User') are harder to find directly in related research. However, the perceived errors for Truth where hallucinations are mentioned could instead be found in studies that have brought up hallucinations [5,29] and discussed under the heading of accountability [30]. Unrealistic claims with made up, non-existing references are also one way of detecting 'AI cheating' among course participants. Participants' concerns regarding System and the GAI black box design could be found in studies that have discussed GAI transparency, or rather the general lack of transparency [32,34]. The neural networks that deep learning builds upon are by nature non-transparent and neither are any traditional algorithmic solutions, but to open the involved large language models would certainly increase transparency. The User theme finally, could be divided into the terms of usability and user-friendliness, which have been investigated in previous research on generative AI tools [28]. Usability is about the quality of information that can be retrieved, and user-friendliness comprises how easy or how difficult it is to retrieve the information. Usability seems to be quite strongly depending on the user's domain knowledge, while user-friendliness involves the concept of 'prompt engineering'.

Looking at Opportunities and the emerging theme 'Supporting', informants bring up writing support which might be the most frequent way of using GAI tools. Many studies bring up the supportive aspect and how the focus could be shifted from root learning to creativity [42], but that this would require a redesign of activities and assessment [6]. Regarding 'Outsourcing', there are studies presenting the potential for outsourcing routine tasks, such as answering frequently asked questions [14], but also routine tasks involving creativity such as lesson planning [13]. The theme of 'Partnering', expressed by the informants as discussions with the system as a collaborator or partner, have been highlighted in research with the term of 'Study buddies', which also could be tailored for the actual subject as pointed out by Edirisingha et al. [41].

Threats show the emerging sub-themes of 'Destabilization', 'Education', 'Organization', and 'Ethics', which are all important to address. 'Destabilization' might be further divided into the security threats that are aligned to the use of GAI systems [33], and the threat of students using GAI tools for cheating in the solutions of assignments. The next two themes of 'Education' and 'Organization', with the disruptive threats that were brought up, might be merged to the axial theme of something like 'The transformation of higher education due to GAI'. Something that almost all other emerging themes are related to, including the multifaceted theme of 'Ethics'. Two examples of ethical issues related to GAI are accountability [31], and personal integrity [35]. These ethical considerations were not only drawn from prior research but also emerged directly from participant responses and were coded into SWOT categories, transparency concerns under 'System' (Weaknesses) and data protection and copyright under 'Ethics' (Threats). These themes informed strategic actions in the Balanced Scorecard, such as developing institutional guidelines and appointing coordinators to ensure compliance and accountability. The transformation of higher education due to GAI would also relate to the 'Requests' themes of 'Guidelines', 'Time and resources', 'Upskilling', and 'Coordinators'. As outlined in Mozelius et al. [10], there is an urgent need for upskilling and professional development which will require time and resources and coordinators with AI knowledge. Finally, how to develop guidelines for a sustainable and ethical use of GAI in education has been frequently discussed in research during the last years [37,38].

How should the strengths, weaknesses, opportunities, and threats of GAI towards higher education be addressed? This is of course a question that has no simple answer. However, one important early step for higher education institutions should be to formulate a strategy for the use of GAI, but also on how to measure its effects and consequences on the institution. Such a strategy could preferably be based on a Balanced Scorecard (BSC) and a SWOT analysis. Following the SWOT analysis conducted in this study, a Balanced Scorecard for GAI in higher education should include measurements based on the identified SWOT themes. Strategies within the BSC should further be mindful of the requests made by institution personnel, since they many times are the experts. Fig. 3 provides an example of a Balanced Scorecard on GAI in higher education.

In the BSC (Fig. 3), the GAI strength of Transcribing, the GAI weaknesses related to the User, the opportunity of GAI providing

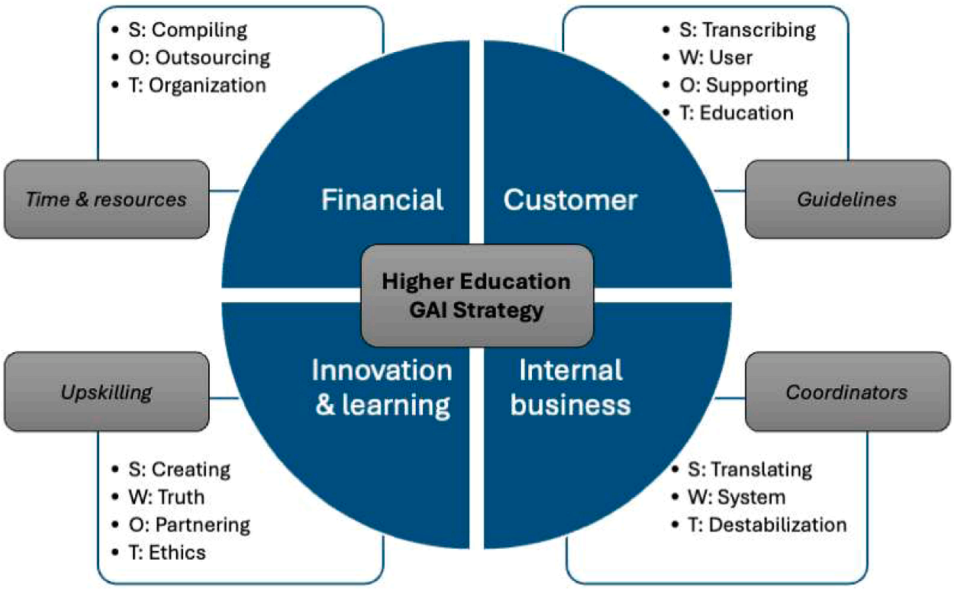

Fig. 3. Balanced scorecard for higher education GAI strategy.

Support, and its Threat towards Education have been placed within the Customer perspective since all of these have potential consequences (positive and negative) for the student and his or her learning. The chosen strategy for addressing these potential consequences and effects on students' learning is to develop and formulate Guidelines for GAI use in higher education. This strategy is based on the requests provided by the participants (higher education personnel) in the SWOT analysis. Similarly, strategies have been developed and formulated for the other perspectives within the BSC. In the Internal business perspective, the themes of Translating (Strength), System (Weakness), and Destabilization (Threat) are addressed by the strategy of appointing GAI Coordinators that can coordinate the work on GAI on an institutional level. Creating (Strength), challenges towards the concept of 'Truth' (Weakness), AI Partnering (Opportunity), and Ethical considerations (Threat) all have consequences for HE Innovation and Learning. An important strategy for maintaining innovation and learning in a time with GAI should therefore be Upskilling and reskilling of staff. And lastly, the GAI strength of Compiling, the opportunity of Outsourcing, and threats towards the Organization have been within the financial perspective since all of these could have effects (positive and negative) on higher education institutions' finical situation. As suggested by the participants in the SWOT analysis, a strategy for addressing this should consider both short-term and long-term investments of time and resources.

The transition from SWOT themes to the Balanced Scorecard (Fig. 3) was guided by the potential impact of each theme on the four BSC perspectives. For example, themes related to student learning (e.g. Transcribing, User challenges, Supporting, and Education threats) were mapped to the Customer perspective because they directly affect learner experiences. Internal Business included themes such as Translating, System weaknesses, and Destabilization, which influence institutional processes. Innovation and Learning encompass Creating, Truth, Partnering, and Ethics, as they relate to pedagogical development and staff competencies. Financial considerations include Compiling, Outsourcing, and Organizational threats, reflecting resource allocation and cost implications. This systematic mapping ensures that each BSC strategy is grounded in empirical SWOT findings. While the 15 themes identified in this study were not statistically weighted, their prioritization was addressed conceptually through mapping to the BSC perspectives. This approach emphasizes relevance, how each theme impacts customer experience, internal business processes, innovation and learning, or financial considerations, rather than numerical significance. A summary of the mapping, bridging SWOT themes to BSC perspectives, is provided in Table 3.

The Balanced Scorecard was incorporated to ensure that SWOT findings could inform actionable strategies for higher education institutions. While the research question focuses on stakeholders' perceptions, these insights have practical implications for institutional planning. The BSC framework provides a structured way to translate qualitative themes into strategic objectives across four perspectives (Customer, Internal Business, Innovation and Learning, and Financial), thus moving beyond description to guide decision-making and resource allocation. The BSC addresses the 'so what?' question by showing how institutions can act on the identified strengths, weaknesses, opportunities, and threats.

Of course, many of the identified SWOT themes discussed above can have effects and consequences regarding several of the perspectives within the Balanced Scorecard. As expressed by Perkins, Grey and Remmers [47]: the perspectives of Customer, Internal business, Innovation and Learning, and Financial should be considered. Therefore, Fig. 3 provides a simplified version of potential higher education consequences and effects from GAI strengths, weaknesses, opportunities, and threats; and how these could be addressed through strategies based on requests from HE institutions' personnel. All higher education institutions have their specific strengths, weaknesses, opportunities, and threats when it comes to generative AI, while some are the same, and a

Table 3
Mapping of SWOT themes to BSC perspectives and strategies.

SWOT Theme	BSC Perspective	Associated Strategy
Transcribing (Strength)	Customer	Develop Guidelines
User (Weakness)	Customer	Develop Guidelines
Supporting (opportunity)	Customer	Develop Guidelines
Education (Threat)	Customer	Develop Guidelines
Translating (Strength)	Internal Business	Coordinators
System (Weakness)	Internal Business	Coordinators
Destabilization (Threat)	Internal Business	Coordinators
Creating (Strengths)	Innovation and Learning	Upskilling
Truth (Weakness)	Innovation and Learning	Upskilling
Partnering (Opportunity)	Innovation and Learning	Upskilling
Ethics (Threat)	Innovation and Learning	Upskilling
Compiling (Strength)	Financial	Time and Resources
Outsourcing (Opportunity)	Financial	Time and Resources
Organization (Threat)	Financial	Time and Resources

Balanced Scorecard should be revised to fit the specific institution's needs.

Comparing the results from this study with other recent studies, it could be concluded that GAI is a concrete game changer for higher education with several serious consequences to address [50–52]. Regardless of whether the current GAI hype is a bubble that will burst, or not, the found SWOT aspects remain to be addressed. The study by Hughes et al. [51] brings up the general threat to the traditional academic role and the validity of higher education degrees. Even if this study seems to bring up more strengths and opportunities, the identified weaknesses and threats are what need to be prioritized in higher education. Another found challenge that also has been highlighted is how to develop GAI policies [50,51].

The identified urgent need for professional development in the field of GAI has also been pointed out in other studies on GAI in higher education such as Lan et al. [52] and Kong and Hu [50]. With the request of a holistic approach that combines technological and pedagogical aspects [52] and involves a tailored AI literacy framework [50]. Moreover, there are researchers reporting on the issues of 'AI workslop' and metacognitive laziness. Without addressing these challenges, the opportunities found would probably fail. and that GenAI might turn out to be a negative game changer.

5.1. Conclusion

This study has explored the strengths, weaknesses, opportunities, and threats of GAI in higher education context, seeking to answer the question: What strengths, weaknesses, opportunities, and threats do teachers, researchers, and administrators perceive in the use of generative AI for teaching, research, and administration in higher education? This has been conducted through the collection of higher education personnels' opinions in Padlets during webinars on generative AI at two Swedish universities. The SWOT analysis conducted on the collected data (Fig. 2 and Table 2) provides a detailed overview of what could be considered a wide perspective of potential strengths, weaknesses, opportunities, and threats of generative AI towards higher education institutions, including the perspectives of higher education teachers, researchers, and administrative personnel. The identified strengths include: 'Creating', 'Compiling', 'Translating', and 'Transcribing'; the identified weaknesses include: 'Truth', 'System', and 'User'; the identified opportunities include: 'Supporting', 'Outsourcing', and 'Partnering'; and the identified threats include: 'Destabilization', 'Education', 'Organization', and 'Ethics'.

However, the findings of the study did not only include strengths, weaknesses, opportunities, and threats of GAI for higher education, but also requests and suggestions from higher education personnel on how to move further with generative AI in higher education institutions. These requests, together with the SWOT analysis, have been used to create a Balanced Scorecard (BSC) on generative AI in higher education (Fig. 3). This BSC provides four perspectives on GAI in higher education (Customer, Internal business, Innovation and learning, and Financial); how different strengths, weaknesses, opportunities, and threats of GAI could affect these perspectives; and which strategies that could be applied to address potential effects and consequences of generative AI. Although more personalized Balanced Scorecards and AI strategies should be developed to suit the specific needs that every higher education institution has, the BSC provided in this study could serve as something for other researchers and stakeholders to build upon.

In conclusion, this study provides both empirical insights and a strategy-oriented framework for understanding and managing the impact of generative AI in higher education. By combining multi-stakeholder perspectives with a structured SWOT-to-BSC mapping, the study offers a practical tool for institutional decision-makers to align technological adoption with pedagogical, organizational, and ethical considerations. The findings highlight not only the opportunities of generative AI, but also the need for clear guidelines, capacity building, and strategic resource allocation, making the proposed framework directly relevant for higher education institutions navigating ongoing digital transformation.

5.2. Strengths of the study

This study has several strengths. First, it is grounded in original empirical data from a relatively large and diverse group (webinars attended by 152 higher education personnel), capturing perspectives from teaching, research, and administrative roles. Second, the study combines a well-established analytical framework (SWOT) with a strategic tool (Balanced Scorecard), moving beyond descriptive categorization toward actionable strategy development. Third, the use of real-time, anonymous Padlet discussions in webinar settings enabled the collection of authentic and practice-oriented insights, enhancing the validity of the study. Fourth, the study has strong practical relevance, as it directly reflects stakeholder needs (e.g. guidelines, upskilling, and resource allocation) and translate these into concrete strategic recommendations. Together, these aspects strengthen the study's contribution as both empirically grounded and practically applicable for higher education institutions navigating generative AI adoption.

5.3. Limitations and future research

This study has several limitations that should be considered when interpreting the results. First, there are both positive and negative aspects towards applying a fully anonymous Padlet for data collection. On the positive side, it is an extra layer of protection for participants' identity that not even the authors can identify who wrote what. On the negative side, it is not possible to ask follow-up questions or to control the exact number of contributors in the Padlet. It is possible, and likely, that considerably less people than the total number of participants in the webinars contributed to the posts in the Padlets. However, it is also possible, but not that likely, that other people than the participants in the webinars contributed to the posts in the Padlets since they were 'open' (that is, accessed through a web link and no identification required).

Given the anonymous and open nature of Padlet, reliability and validity were addressed through structured design and systematic analysis but cannot be guaranteed to the same extent as controlled data collection. The anonymity of the Padlet also prevented linking responses to specific participant roles (for example, teachers, researchers, and administrators). Consequently, the analysis could not include whether different roles express different perspectives on generative AI. Future research should consider methods that allow role identification while still maintaining ethical standards, such as coded identifiers or separate role-based Padlets, to enable comparative analysis across stakeholder groups.

It should also be noted that people did leave the webinars, which could be considered a limitation of the study. There were considerably more people in the virtual webinar rooms at the beginning of the webinars, than what there were part way through the webinars. This is a quite common occurrence in virtual meetings that many people are aware of, people leave for different reasons before meetings have concluded. However, it is possible that people left the webinars because they reacted to something in the webinars, something that they did not agree with, or because they did not want to participate in the Padlets (which were not mandatory).

The Balanced Scorecard (BSC) proposed in this study is conceptual and based on qualitative SWOT themes, rather than validated quantitative indicators. Reliability coefficients, subgroup contrasts, and content-validity checks were not feasible given the anonymous and qualitative nature of the data. Future research should include these indicators and conduct statistical validation, including reliability analysis and role-based subgroup comparisons.

Lastly, the results in this study are based on limited data, therefore

thematic saturation cannot be claimed in the same way as in a large-scale qualitative study. This study was designed as an exploratory mapping of stakeholder perceptions rather than a saturation-driven study Even if not considering the limitations addressed above, findings are also based on the perceptions and experiences of higher education personnels from two Swedish universities. It can be argued that a qualitative study with limited data conducted in a specific context has limited generalizability. However, authors claim that GAI is a globally disrupting force that causes similar strengths, weaknesses, opportunities, and threats in most of the world's higher education institutions. To what degree the results are transferable to other contexts ought to be further explored in future studies.

Future research should expand the findings presented here, including more higher education personnel from more universities, also outside of Sweden. It would be interesting to use an existing university network involving higher education partners in four different continents. Finally, future research could apply methods for data collection that leave the researchers more control and insight into the data that are being collected. This could include methods such as interviews, surveys with identity codes, and document analyses (such as policy analysis).

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this article, the authors used generative AI (Microsoft Copilot with Enterprise data protection) to assist with proofreading and suggesting alternative phrasing. All AI-generated suggestions were reviewed and edited by the authors, who assume full responsibility for the final content of the publication.

CRediT authorship contribution statement

Niklas Humble: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Peter Mozelius:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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