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Expectations for the Use of Generative Artificial Intelligence in Higher Education: A Research on the Perceptions of Tourism Faculty Students [1]

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A b s t r a c t

The study aims to explore the transformative potential of generative artificial intelligence within higher education, particularly in the tourism sector, and investigate students' perspectives. This involved conducting focus group discussions with nine tourism management students who had attended four training seminars and possessed basic knowledge of the subject. The outcomes of these discussions, covering students' views on the impact of generative artificial intelligence on academic performance, critical thinking, and research skills, its contribution to post-graduation capabilities, and potential challenges, were subjected to content analysis. Among the primary research findings was that students perceive generative artificial intelligence as an auxiliary tool to enhance their learning experiences, academic performances, and future employability. Consequently, the study proposed recommendations to higher education institutions and educators, contributing both literature and practical insights for a generative artificial intelligence centric approach.

Yaratıcı Yapay Zekanın Yükseköğretimde Kullanımına İlişkin Beklentiler: Turizm Fakültesi Öğrencilerinin Algıları Üzerine Bir Araştırma

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Ö z e t

Bu araştırmada yaratıcı yapay zekanın turizm alanı başta olmak üzere yükseköğretimde dönüştürücü potansiyelinin kullanımına ilişkin öğrencilerin bakış açılarının ortaya konması amaçlanmıştır. Bu kapsamda dijital dönüşüm ve yapay zekâ uygulamaları hakkında dört eğitim seminerine katılmış, konuyla ilgili temel bilgiye sahip turizm işletmeciliği bölümünden dokuz öğrenci ile odak grup görüşmesi gerçekleştirilmiştir. Öğrencilerin yaratıcı yapay zekanın akademik performanslarına, eleştirel düşünme ve araştırma becerilerine etkisi, mezuniyet sonrası yeteneklerine katkısı ve muhtemel zorluklar ile ilgili görüşleri içerik analizine tabi tutulmuştur. Öğrenciler yaratıcı yapay zekanın öğrenim deneyimlerini, akademik performanslarını ve gelecekte işe alım ve performanslarını geliştirmek için çeşitli açılardan bir fırsat oluşturacak yardımcı araç olarak görmeleri temel araştırma bulguları arasında yer almaktadır. Bu kapsamda eğitim kalitesinin geliştirilmesi için alanyazına ve uygulamaya yönelik yükseköğretim kurumlarına ve eğiticilere yaratıcı yapay zeka merkezli bir çerçeve sunulmuştur.

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INTRODUCTION

The world is rapidly transitioning into a digitalized and technology-driven landscape. The advent of Generative Artificial Intelligence (GenAI) is bringing about significant changes across various sectors, including tourism education. Despite occasional GenAI tools generating erroneous, harmful, or biased content, completely disregarding these tools appears unsustainable due to their numerous advantages. GenAI encompasses advanced technologies, from providing personalized learning experiences to enhancing content creation processes and facilitating interactive simulations. These capabilities are valuable for educators and students in higher education, fostering engagement and skill development through experiential learning applications.

In this context, the study aims to examine the importance and transformative potential of GenAI in the education sector, specifically focusing on tourism management. It seeks to explore university students' perspectives and examine how these perspectives shape their contributions to the tourism industry and post-graduation experiences. Understanding students' perceptions of the intrinsic value embedded within the curriculum is crucial for developing and implementing effective educational programs. Existing literature has shown limited studies examining the viewpoints of university academic staff (Çetin & Aktaş, 2021; Kaplan-Rakowski et al., 2023; Ruiz-Rojas, 2023) and university students (Kelly et al., 2023; Țală et al., 2024) regarding the use of GenAI in education, often presenting results through quantitative analysis methods or literature review. Therefore, given the growing prevalence of GenAI applications in the education sector, especially in tourism, it is vital to articulate potential perspectives and mitigate any concerns in shaping the educational landscape.

LITERATURE REVIEW

Generative Artificial Intelligence (GenAI)

GenAI refers to the subset of artificial intelligence (AI) technologies that can produce new content, solutions, or data that resemble human-like outputs (Shah, 2024). GenAI enables users to input diverse prompts, facilitating the creation of novel content encompassing text, images, videos, sounds, code, 3D designs, and various media formats (Staff, 2024). GenAI can autonomously generate content that exhibits similar characteristics, demonstrating its content creation proficiency across multiple modalities (University of Michigan, 2024). While traditional AI focuses on making decisions based on existing information, GenAI takes it a step further by creating new content, from images to texts to codes and beyond (Shah, 2024), “learning” and training on documents and artifacts available online (Staff, 2024).

GenAI's roots go back to the concept of machine learning. IT pioneers such as Alan Turing and John McCarthy played a vital role in laying the foundations of GenAI by proposing the first computational models based on the idea that machines could one day mimic human intelligence (Roman, 2023). AI emerged in 1956 by John McCarthy in a workshop that convened researchers from diverse scientific disciplines (Toloka Team, 2023). One of the first primitive generative artificial intelligences is ELIZA. Created by Joseph Weizenbaum in the 1960s, ELIZA is a text chat bot that can communicate with people, considered one of the first examples of Natural Language Processing (NLP) (Toloka Team, 2023). Machine learning came into its

own during the 1990s and 2000s, gaining prominence alongside the proliferation of advanced hardware and the widespread availability of digital data (Marr, 2023).

The current creative capabilities of Generative AI stem from a specialized neural network known as the Generative Adversarial Network (GAN), which was introduced by Ian Goodfellow and collaborators in 2014 (Marr, 2023). GANs have revolutionized image generation by combining two competing neural networks (a generator and a discriminator) into the architecture to improve the quality of the generated data (Roman, 2023). During that period, several other methods like variational autoencoders and diffusion models also emerged, significantly enhancing the image generation process (Toloka Team, 2023).

Using these models, realistic images and conversations can be created by converting raw data into a compact representation and then converting it back to its original form (Krüger, 2023). The transformer architecture model is a significant contributor to GenAI. This is a deep neural network algorithm that was recently introduced in 2017 (Toloka Team, 2023). The development of Generative AI has witnessed several significant milestones and breakthroughs (Marr, 2023):

- WaveNet (2016): Developed by Google DeepMind, Wawanet operates as an advanced deep neural network specifically designed for producing unprocessed data (Google DeepMind, 2024). WaveNet can produce realistic-sounding human speech (Marr, 2023).
- Progressive GAN's (2017): Progressive Growing GAN also known as ProGAN introduced by NVIDIA (Shakhadri, 2021) i*s "an extension to the GAN training process that allows for the stable training of generator models that can output large high-quality images"* (Brownlee, 2019). With the help of Progressive GANs generator models can learn with a solidity which in turn allows them to generate large-high-quality images (Jhamtani, 2022).
- GPT-2 and GPT-3 (2019, 2020): GPT models have provided a significant leap forward in the field of GenAI for text. OpenAI's second transformer-based language model, GPT-2 is engineered with a specific focus on predicting and generating the subsequent sequence of text after a given sentence. As an open-source model, it remains unaudited and has been trained using over 1.5 billion parameters. In contrast, GPT-3 stands as the third iteration of OpenAI's GPT model series, surpassing its predecessor by training on a massive dataset of 175 billion parameters. This represents a significant leap forward in terms of model complexity and capabilities (Schulze, 2024).
- DALL-E (2022): OpenAI has publicly released DALL-E, *"a deep learning model that can generate digital images from natural language prompts"* (Marr, 2023).
- ChatGPT (2022): ChatGPT is a sibling model to InstructGPT, which is designed to comprehend prompts and deliver detailed responses based on instructions (Open AI, 2022).
- GPT-4 (2023): OpenAI's latest model, GPT-4, is *"a large multimodal model (LMM) that is capable of parsing image inputs as well as text*" (Schulze, 2024).

Consequently, GenAI utilizes patterns and relationships found in content datasets created by humans to learn patterns and use them to generate new content. Key concepts include deep learning, neural networks, natural language processing, computer vision, cognitive computing, and machine learning (Codiste, 2024). Therefore, GenAI differs from AI technologies that use machine learning algorithms and make predictions based on past behaviors (Law, 2024). This difference, coupled with changing student demographics and concurrent technological advancements, including GenAI, will likely impact students' modes of thinking and competencies.

Use of GenAI in Higher Education

Integrating GENAI technologies introduces a plethora of innovative tools and applications, poised to revolutionize established teaching and learning methodologies within higher education. AI showcases a diverse range of potential in educational contexts, from boosting productivity and creative processes to optimizing learning outcomes. It also facilitates personalized instruction, provides immediate feedback mechanisms, and augments student engagement levels, painting a promising future for education (Adiguzel et al., 2023). GenAI technologies have the unique ability to create novel content, generate creative solutions, and support the creative processes in education. Generative artificial intelligence finds its place in many areas of higher education. AI-generated online courses, AI-driven virtual labs, AI-enhanced creative projects and AI-generated speech recognition systems are the usage areas attract particular attention.

GenAI algorithms can create customized online courses tailored to students' interests, learning styles, and proficiency levels. These AI-generated courses can include interactive multimedia content, personalized assessments, and adaptive feedback mechanisms to support individualized learning paths (Schroeder et al., 2022). Moreover, GenAI appears to be able to reduce instructors' workload by offering a promising solution for the rapid creation of large-scale learning content (Denny et al., 2023). Nevertheless, the process of developing and managing extensive sets of learning materials can be a challenging task. One potential approach to alleviate the workload involved in creating learning resource pools is through learner sourcing, a method that involves students in the collaborative generation and organization of their own educational materials (Kim, 2015). On the other hand, AI-supported student management systems constantly monitor students' academic performance and provide personalized feedback. These systems help identify students' weaknesses and strengths and provide teachers with an important resource in creating student support programs (Iqbal et al., 2020).

One practical application of GenAI in higher education is its use in AI-driven virtual labs. vision and GenAI artificial intelligence are used for effective training by increasing the availability of big data and create operationally real-time smart machines and predictable models (Kakani et al., 2020). GenAI-powered virtual laboratories simulate real-world experiments and scientific procedures, offering students the opportunity to practice hands-on skills in a virtual environment. These virtual labs provide a safe, cost-effective, and scalable alternative to traditional laboratory settings, enabling students to engage in experiential learning from anywhere (Marescotti et al., 2022).

GenAI tools can also assist students in generating creative projects, such as artwork, music compositions, and storytelling. For example, AI-powered creative platforms can provide design suggestions, generate musical arrangements, or offer plot ideas to inspire and guide students in their creative endeavors (Chen & Ibrahim, 2023). Another use of GenAI is AI-supported speech recognition systems which help students improve their language skills by analyzing their speech. These apps provide students with instant feedback and increase communication skills while supporting the language learning process (Chen et al., 2022).

Benefits and Challenges of GenAI Integration

Leveraging GenAI within higher education yields a multitude of advantages. including enhanced creativity, personalized learning experiences, and improved student engagement. GenAI technologies can inspire innovation, support creative expression, and facilitate the development of critical thinking and problem-solving skills among students. However, challenges such as algorithm biases, data privacy concerns, and the need for digital literacy must be addressed to ensure the ethical and responsible use of GenAI in educational settings.

One of the primary benefits of GenAI integration in higher education is its potential to enhance pedagogical expertise and teaching proficiency through fostering inspiration and encouraging introspective growth (Jaiswal & Arun, 2021). In recent years, GenAI-powered tools have shifted their focus towards assisting teachers by analyzing student data to determine effective teaching methods and automating administrative tasks (Chaudhry & Kazim, 2022). Another benefit of GenAI integration for teachers is streamline and automate time-consuming tasks, such as grading assignments. By utilizing GenAI algorithms, institutions can automate the grading process for essays, multiple-choice questions, and other types of assignments, allowing instructors to focus on providing personalized feedback and mentoring to students. In addition to saving educators time, this approach ensures students receive instant feedback and gain valuable insights into their performance (Durall & Kapros, 2020).

Furthermore, GenAI can also be used to create personalized learning experiences for students. By analyzing student data, AI algorithms can generate customized learning materials and resources tailored to the individual needs of each student (UNESCO, 2019). This personalized approach can help students learn more efficiently and effectively, improving their overall academic performance and satisfaction. GenAI can use its extensive knowledge base and natural language processing capabilities to actively engage students in conversation and at the same time provide them with rapid feedback. Therefore, students have the freedom to advance through the material at their preferred pace, employing strategies that align best with their individual learning styles (Chang & Kidman, 2023).

In addition to its benefits, GenAI integration in higher education also presents several challenges and ethical considerations. One of the main concerns is the potential user privacy and data security issues (Jia et al., 2021). Another concern is the bias and discrimination that can be embedded in AI algorithms. If not properly trained and monitored, GenAI systems can perpetuate existing biases and inequalities, particularly in areas such as grading and student evaluation. Institutions must be vigilant in ensuring that AI algorithms are fair and transparent, and that they do not perpetuate systemic biases (Kizilcec & Lee, 2022). Despite concerns about how GenAI technologies could compromise academic integrity, the lack of knowledge about

these tools makes it difficult to incorporate them into educational settings. It is crucial for academic institutions to acknowledge this technology as a valuable resource for both research and teaching (Adiguzel et al., 2023).

Despite these challenges, the benefits of GenAI integration in higher education are vast and promising. By leveraging the power of AI algorithms, institutions can enhance the learning experience for students, streamline administrative processes, and unlock new opportunities for innovation and creativity. However, it is crucial for institutions to approach GenAI integration with caution and mindfulness, considering the ethical considerations and potential challenges that come with this technology. Therefore, the study aims to examine the importance and transformative potential of GenAI in the education sector, specifically focusing on tourism management students.

METHOD

In the study, a focus group interview, one of the qualitative data collection methods, was used for the research purpose. Focus group discussion is *"a carefully planned discussion in an environment where individuals can express their thoughts freely*" (Krueger, 1994). According to another definition, a focus group interview is a series of discussions in line with a specific plan in which participants can freely express their ideas on a specific topic in a constructive environment (Kruger & Casey, 2000: 4-5). The purpose of focus group discussions is to reveal different opinions about a topic. Focus group discussions are suitable for exploratory studies in a new field because live and collaborative communication can reveal individual and generally more cognitive, spontaneous, expressive, and emotional ideas than interviews (Ersin & Bayyurt, 2017). In addition, the group dynamics provided by focus group interviews help create a rich data set by determining the scope and depth of the answers given to the questions (Yıldırım & Şimşek, 2016: 157).

Prior to the research, a written application was made to the DEU Scientific Research and Publications Ethics Committee (DEÜ BAYEK) regarding the focus group interview, and ethics committee approval was received. Criterion sampling, one of the purposeful sampling methods, was used to select the students participating in the focus group interviews. Research participants were selected among the students of Dokuz Eylül University (DEU) Faculty of Tourism, Department of Tourism Management. The criterion used to determine the participants was that they received four digital transformation and artificial intelligence applications trainings to master the subject. Participants were selected from among the students who attended the following four trainings held on different dates: (1) Digitalization and Customer Security in Hotel Businesses, (Presented by: IT Manager), 7 November 2023, (2) Digital Transformation in Hotel Businesses, (Presented by: Customer Success Specialist), 19 December 2023, (3) Artificial Intelligence and Business: Past, Present and Future, (Presented by: Informatics Seminars Expert), 19 March 2024, (4) Artificial Intelligence and the Future in Unmanned Enterprises, (Presented by: Project Mechanical Design Engineer & Software Specialist). April 15, 2024.

The research was announced to all first-year students and volunteers were included in the research. Information about the research was provided to the students before the interviews. Focus group discussions were held with five female and four male students aged between 18-

22 at DEU Faculty of Tourism on April 25, 2024. An interview lasting approximately 2.5 hours was held with 9 first-year Tourism Management students, accompanied by a moderator and a reporter.

Semi-structured interview questions were created based on the and in this context, eleven questions were asked to the participants. During the focus group discussions, the reporter conveyed the participants' opinions and transcribed them into a twelve-page article. In the study, content analysis, one of the data analysis methods used in qualitative research, was used to analyze the data obtained as a result of the focus group interview. According to the content analysis approach, "the collected data are conceptualized and the data are explained by logically organizing them according to these concepts. In this framework, the main purpose is to try to understand the facts in more detail by reaching themes from concepts" (Yıldırım & Şimşek, 2016, p.242).

FINDINGS AND DISCUSSION

Using GenAI Applications in Education

The participants were asked, 'How should higher education institutions use GenAI applications in education?'. They suggested prioritizing strategies that increase student participation and interest. This includes creating student-oriented, visually innovative educational content. They also believe personalized, professional content will better prepare students for the future. Similarly, Chiu (2024) views GenAI as a tool to enhance student learning and course practice, emphasizing the need for content tailored to student interests and providing experiences resembling pre-internships to familiarize students with their professions.

> "*AI is prevalent across various industries. I believe it would be more effective to identify what a student needs during their transition to professional life. For instance, consider someone studying engineering who pays attention to specific aspects when designing a building. By integrating these considerations into projects, educating students on relevant courses, increasing the credit value of those courses, and presenting other courses as complementary, students can gain deeper insights into the subject. This approach can prepare them for the future similar to a preparatory internship."* - P2

Participants highlighted the potential of AI applications, such as AI pools and personalized note uploading, to enhance students' learning experiences and improve comprehension. Similarly, Yusuf et al. (2024) identified three crucial benefits for students: rapid responsiveness, personalized learning opportunities, and streamlined access to information. Within the context of our research, one participant expressed their viewpoint as follows:

> *"The slide has basic information. However, this can sometimes be very long and complicated. These slides can be prepared using GENAI. In this way, we know the basic information, and since AI does so, we can research and read more. We are prepared for the lesson, and students will participate better. "Instead of focusing on anything else, we focus on the main goal."- P6*

Molina et al. (2022) found that meeting students' competence and autonomy needs involves creating accessible opportunities for learning new subjects and problem-solving. Overall, participants believed that AI-supported learning experiences can make students' learning more effective by personalizing it and making it more attractive by enriching the course content.

These approaches are expected to improve performance, more profound comprehension, and increased student engagement during lessons.

The Impact of GenAI Applications on Academic Performance

Participants were asked, 'What are your thoughts on the impact of GenAI applications on your academic performance?' Except for one individual, all participants expressed that personalized learning experiences through GenAI positively contributed to their academic performance. They believe that AI-supported materials will be presented more effectively, visually engaging, and facilitatively to enhance learning. Emphasis was placed on increased learning efficiency, the promotion of lasting learning through understandable content, and overall improvement in the learning experience. One international student mentioned that overcoming language barriers and learning new words easily in class could be more beneficial for foreigners:

> *'Learning new words easily in class that you did not understand before can be more beneficial to foreigners in overcoming barriers.'* – P9

Moreover, they believe that preparing different presentation techniques and course materials tailored to students' learning styles will not only enhance their learning experiences but also increase their motivation.

> *"Applications or surveys can be conducted for each lesson. By gathering student opinions through surveys before the class, video or text-based learning formats can be provided, allowing students to follow the lesson from their notes."* - P4

> *"Everyone learns in different ways. For example, while you are explaining the topic, I learn visually. GenAI can facilitate my learning by showing more visuals and providing practical application opportunities."* - P8

On the other hand, one participant expressed concerns about students relying too much on GenAI, resulting in a lack of effort and critical thinking. They mentioned that this could increase or decrease depending on the student profile and interest in the course:

> *"It can speed up everything, and time is crucial nowadays, but I think it also depends on the student's readiness. They may not want to think and may not rely on artificial intelligence for work."* - P5

Chan & Hu (2023) similarly raised concerns about students potentially misusing GenAI for cheating or plagiarism, leading to the ease of academic fraud. Educational institutions have a critical responsibility to instill a strong sense of ethical awareness and responsibility in both students and educators regarding the ethical use of advanced technologies (Yusuf et al., 2024).

Perceptions of the Reliability of GenAI Applications

All participants were aware that GenAI applications could produce erroneous outputs. These errors encompass various dimensions, such as accuracy, reliability, error potential, and ethical issues. However, none of the participants expressed concerns regarding this. Among the reasons are their perception of GenAI as an auxiliary tool rather than the primary source of information and the various methods available to address these concerns, such as detailing or verifying the desired topic. One participant emphasized the importance of developing digital language and culture.

> *"Since information comes from humans, there can be coding errors. Depending on one's religion, race, or sect, that information can be considered wrong or right for everyone."* - P1

Participants expressed concerns about GenAI producing more complex and profound results in the future. Particularly in the business sector, it is emphasized that these errors can lead to serious consequences in areas such as guidance and knowledge transfer.

> *"It is not the current situation that scares me, but the future. As I enter the business sector and seek support for people's demand tendencies, I am concerned that world leaders or certain major companies might manipulate us to increase their revenue. Or, if we consult GenAI to start a business, that information will not solely belong to us, and they might implement a brilliant idea without our knowledge."* - P2

While GenAI tools attract the interest of many users, including students, there are concerns about the lack of transparency regarding the types of data collected and processed (Ray, 2023), and privacy concerns (Rodrigues, 2020; Chan & Hu, 2023; Ray, 2023; Yusuf et al., 2024). In this context, accuracy, reliability, and ethical values should be prioritized using GenAI tools.

Potential Post-Graduation Impacts of GenAI Applications

Participants were asked, 'What are your thoughts on the potential impacts of GenAI applications on your post-graduation professional life?' Six participants mentioned that learning to use GenAI applications would positively affect their future regarding internships and job opportunities. They believe that creating an international and company-specific CV and receiving language support will make it easier to access a wider range of job and internship opportunities. They also expressed that GenAI's effective presentation skills, problem-solving approach, and time and stress management capabilities will give them an advantage in the business world, as expressed in the following statements:

> *"Being more experienced and knowledgeable will help us make more accurate decisions in less time. The more time we can increase, the more we can develop ourselves in our spare time."* - P1

> *'Our future is constantly evolving with technology. The future will include artificial intelligence. For example, if we learn in school for four years, we will gain speed when we need to present compared to someone who does not know. No one wants to hire someone who takes five hours to prepare a presentation. They want to hire the person who is faster and more effective in 5 minutes.'* - P6

> *"When there is work at the hotel and you are under stress, you lose the ability to think clearly. This can provide quick support for problem-solving. It can also present things that a person cannot think of."* - P9

On the other hand, these applications are seen as significant technological assets; however, the importance of human control and effort is emphasized in this process. Two participants expressed their views regarding the need for proper and careful use as follows:

> *"People's ability to solve problems under pressure will be negatively affected. They will tend to choose easier solutions but people gain problem-solving abilities under pressure."* - P1

> *"It will be negative if I do not repeat what I have learned or if I do not establish a proper planning and control system; there will not be any benefit."* - P9

However, one participant expressed a negative view because they believed that relying too much on artificial intelligence for work would dull a person's skills.

> *"The effectiveness of artificial intelligence in the business world, coming prepared with so much information, can stifle proactive creativity."* - P8

In their study, Yilmaz and Yilmaz (2023) expressed concerns about the potential of GenAI applications to improve speed and problem-solving abilities and concerns about students becoming accustomed to comfort and, therefore, not developing themselves. Similarly, Yusuf et al. (2024), in their research on students and educators from various countries, found that the most significant concerns included the fear that excessive reliance on GenAI tools over time could hinder students' growth, skills, and intellectual development. Therefore, students need to use such tools to facilitate their work and contribute to their development without becoming overly dependent on them.

Participants were asked about their thoughts on using GenAI to prepare exam questions for assessment purposes. While participants preferred GenAI tools for the learning experience, their preference for exam questions to be prepared by an educator is an important finding. The main reasons for this preference include the educator's experience, alignment with the course content, and security concerns. Examples of participant statements are as follows:

> "*Teachers are more experienced and know better what needs to be learned, so they emphasize topics accordingly. You say, 'I will ask questions based on this.' AI can ask inclusive questions, yes, but do we need to know everything?"* - P2

> *"If teachers do not change how they teach, it would be illogical. This would be similar to having manual and automatic gears together. The education we receive would not complement each other. It will either be entirely AI-based education or vice versa. I do not think it will align with what the teacher fully explains. I do not think it will be productive."* - P3

> *"Negatively, there is information pollution on the internet. Questions being stolen due to cyber security issues could cause problems."* - P8

On the other hand, while one student mentioned the usefulness of applications in reinforcing the lesson by preparing questions using GenAI for exam preparation, another student expressed the view that it could be beneficial for assessment to be fair and for an appropriate number of questions to be prepared in line with learning outcomes.

> *"From the teacher's perspective, the positive aspect is that questions can be prepared more efficiently and in a more balanced manner. When traditional exams are not used, there can be time wastage and fair scoring may not be ensured while grading exams."* - P9

> *"As a student, I use it. I prepared questions from my perspective, thus practicing possible questions that may come. However, I believe that having the teacher prepare questions through artificial intelligence could have a negative impact."* - P4

Students generally prefer educators for exam preparation but do not see any problems with using artificial intelligence for exam evaluation. P1 indicated that the most accurate results could be obtained in a pilot trial.

The Impact of GenAI on Students' Critical Thinking and Research Skills

Participants were asked, "What is your opinion on the impact of GenAI e on students' critical thinking and research skills?" Two participants believe that providing hundreds of different sources in a short time will contribute to developing critical thinking and research skills. Alongside the findings, it is noted in the literature, especially in terms of academic writing, creativity, and creating original work, that students benefit positively from these tools (Chan & Hu, 2023; Malik et al., 2023). On the other hand, seven participants expressed potential adverse effects based on the student's profile, as indicated in the following sample statements:

> "*For students seeking to acquire knowledge, there are positive effects with deductions and rich data. However, other students may take the easy way out."* - P1
>
> *"I believe it will dull personal development. There will be ethical losses for students who accept without questioning. Those who cannot establish connections between topics will become emotionally detached after a while, I think."* - P2
>
> *"At this stage, it may push students back; they generally choose the easiest way out. They may not check the accuracy of the answers."* - P6

GenAI is seen as a tool that helps students develop critical thinking and problem-solving skills by gaining real-world experiences (Rasul, 2023: 10). In contrast to the literature, this research indicates concerns such as making students lazy, reducing creativity, weakening critical thinking, lack of connections between topics, and ethical issues. As Rudolph et al. (2023: 23) pointed out, these tools can be helpful for students in writing and conducting research, but it is possible to say that they cannot replace critical thinking and original work.

Challenges of Usage in Higher Education and Transition Process Recommendations

Significant issues, such as students struggling to change their habits, weakening communication bonds, decreasing educational quality, and increasing inequalities, are among the challenges of the transition period in higher education due to GenAI.

> *"There is a routine that everyone is accustomed to. The current generation must end. If future generations are properly educated, the transition will be easier."* - P3
>
> *"Both sides may face difficulties. Constantly seeking help can also disrupt communication bonds. For example, we work together in the library. This situation can increase dependency, and students may not be able to generate new things on their own."* - P4
>
> *"There might be an adaptation issue. Universities have people from different backgrounds and income levels. Not everyone can easily adapt. However, this will be overcome with time; this is not a major issue. Pros and cons can be discussed or addressed through training to facilitate adaptation."* - P7

To overcome these challenges, it is recommended to plan transition period strategies, increase motivation through educational materials and seminars, ensure student-educator readiness, organize trial periods and pilot programs, and facilitate adaptation through film screening, orientation, and training programs. One participant suggested attracting students' interest first, instead of sudden transitions, to make them willing to participate.

> *"We can teach through cinema. At the beginning of the semester, we visited the Flag Museum. In a small room, a simulation was projected onto every wall. It would be beneficial to provide training that simulates these experiences. Simply stating that we are transitioning to this*

situation may not generate interest. Structure and discipline alone will not be beneficial. We need to focus their attention on the outcomes. It makes sense to think more creatively." - P3

Overall, GenAI will enhance the quality of education in the medium term, the adaptation process will improve over time, and the positive effects of strategic use will increase. However, it is emphasized that supervision and security are also important. Considering data security and legal responsibilities, it is crucial to use GenAI applications as supportive elements.

CONCLUSION

The existing literature and research findings suggest that GenAI applications will not only present risks for higher education in the present and future but will also serve as valuable tools. Higher education institutions will greatly benefit when the critical aspects of GenAI applications are effectively managed and the necessary teaching environments are established to generate added value. This will offer significant advantages for both educators and students, enabling them to capitalize on numerous new opportunities. The ability of GenAI applications to mitigate language-related learning challenges, reduce dependency on instructors, and facilitate self-directed learning is particularly noteworthy. Therefore, the following recommendations are provided for higher education institutions, educators, and learners within the scope of the study.

Recommendations for Higher Education Institutions:

- Higher education institutions should have declarations that explain their policies regarding GenAI usage.
- They should prepare procedures containing clear and detailed definitions of the areas in higher education where GenAI applications can be used.
- Infrastructure adjustments should be made for GenAI usage, and security measures should be taken.
- Higher education institutions should establish a GenAI Center where experts are tasked with monitoring current GenAI developments, conducting detailed examinations of GenAI applications that will be important for educational integration, and regularly publishing the names and addresses of these GenAI applications through appropriate channels for educators and learners. Through its expert team, the GenAI Center should also provide psycho-technical support and guidance to educators and learners who may experience anxiety, mismatches, or failures during and after the transition process.
- Educators should conduct level determination, training, and regular progress monitoring assessments to enhance their competencies in GenAI usage.
- To successfully transition to GenAI usage, higher education institutions should implement precursor practices, including pilot classes, to effectively prepare for the change.
- Institutions should create engaging multimedia content, like films and interactive videos, showcasing the benefits of GenAI integration to address resistance and mismatches during the transition. Conducting focus groups and surveys will identify concerns, guide the establishment of integration principles for GenAI in education, and ensure a smooth transition to an advanced educational system.

- Regulations enabling internships in digital environments with the support of GenAI and immersive technologies can be implemented. In these digital internship settings, GenAI can play a crucial role in guiding interns or providing support to rectify their mistakes, enhancing their learning experience.
- It is crucial to understand and associate content produced with GenAI. Providing information about GenAI as a prerequisite will ensure everyone is well-informed and prepared for the changes.
- Disciplinary practices for using GenAI beyond established principles should be added to existing disciplinary practices and announced through appropriate channels.

Recommendations for Educators:

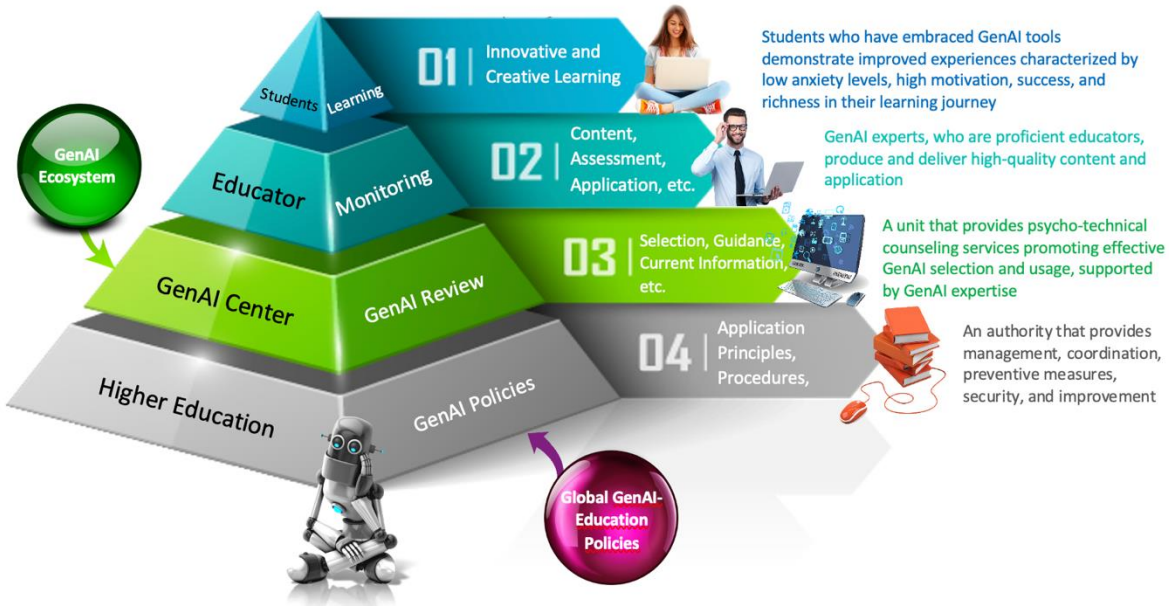
- Educators can create course content and materials using GenAI (Clear information about the GenAI used for each study should be shared with learners).
- Educators should integrate the preparation of course content with learners' career paths. By examining the status and future trends in the GenAI-related field, content can be updated, thereby supporting increased employment opportunities for learners upon graduation.
- Educators can utilize GenAI applications for preparing exam questions and evaluating exams. It should be noted that, educators should meticulously review question sets or individual questions prepared by GenAI, considering factors such as the narrative management used during the course, the relative weight of topics, their interrelations, and allocated durations.
- Considering learners' learning differences, educators can structure learner-specific learning methods using GenAI. This can positively contribute to learners' success, motivation, and development.
- Educators should request clear information about the relevant GenAI application for content created by learners using GenAI, alert learners to any knowledge gaps or errors, and encourage them to make new adjustments.
- To address learners' potential deviation from scientific and ethical principles, educators must rigorously test the authenticity of sources found in GenAI outputs using relevant testing tools. Any inappropriate use or behavior identified through these assessments must be subject to sanctions according to established procedures.
- Educators play a pivotal role in enhancing learners' critical thinking and research skills through GenAI usage. By conducting experimental studies, they can demonstrate how GenAI outputs, despite their limitations in critical thinking, can be enriched and their quality improved by integrating traditional research methods. This active involvement of educators is key to maximizing the benefits of GenAI in the learning process.
- Educators can use GenAI apps to create realistic business cases for classroom use, providing learners with practical skills for the workplace. This approach helps learners understand real-world scenarios and gain detailed knowledge. Partnering with businesses to develop case studies enhances practical experiences, with direct participation in virtual training environments using GenAI and immersive technologies.

Recommendations for Students:

- Students should prioritize GenAI applications recommended by their institution's GenAI Center (as proposed in the study) to minimize errors, biases, and prejudices in outputs. Without such a center, they should opt for GenAI applications offered by globally recognized technology firms.
- Students must corroborate the content they generate with GenAI through traditional source checks to rectify deficiencies or errors by scientific and ethical standards.
- To alleviate learning-related anxieties, students can customize the provided course content or materials using GenAI applications to suit better their learning styles (such as using shorter sentences, incorporating more visuals, providing explanatory notes, and expanding on information).
- Utilizing GenAI to create routine shapes or graphs can facilitate more detailed and expedited examinations of formation processes, thereby enhancing learning outcomes.
- Students should regularly engage with these tools to maximize the effectiveness of the GenAI applications they utilize and minimize inappropriate, erroneous, or irrelevant outputs. They should strive to enhance their request writing skills for different content types in GenAI by increasing their experience levels and utilizing resources that support request writing.
- Students should access diverse sources, synthesize information, and actively validate sources alongside the output in all GenAI content. This practice is crucial to maintaining and bolstering students' research abilities rather than diminishing them.
- Using GenAI in complex, high-stress environments helps students prepare for similar situations, enhancing their problem-solving skills for valuable post-education careers.
- Students can use GenAI to create resumes in non-traditional formats, gaining a career advantage. GenAI apps generate content based on keywords and competencies for impactful resumes, including cover letters, aligning with AI algorithms that screen job applications.

Based on these suggestions and the relevant literature, a framework proposal was prepared by the authors of the study (Figure 1). According to the Figure 1, the GenAI Learning Environment Stakeholders and Roles, depicted in Figure 1, highlight the university's responsibility for GenAI policies, global monitoring, and application examination. The GenAI Center acts as the hub for GenAI applications, updating based on global insights and disseminating innovations. Educators use GenAI tools to create diverse educational experiences, aligned with institution policies, benefiting students with enhanced learning in a quality environment, reducing anxiety levels.

Figure 1. GenAI Learning Environment Stakeholders and Roles



Source: Created by authors

The research sheds light on the benefits of GenAI in higher education especially in tourism management, the key challenges that may be encountered, its potential contribution to professional careers, and the understanding of student perceptions. The study contributes to the literature by conducting an in-depth examination and to practice through the GenAI center and the roles it presents to stakeholders. The research aims to provide guiding insights to GenAI stakeholders in this context. Among the study's limitations is the need for more implementation due to the novelty and incomplete maturity of the subject. Hence, future research should encompass a broader time frame coinciding with the proliferation of applications and focus on different user groups. Exploring diverse cultures related to student perceptions and investigating dimensions such as readiness for technology using quantitative analysis methods is recommended. Additionally, while the study only addresses student perceptions, gathering detailed opinions from practitioners and educators would enrich the research findings. Expanding research to different educational institutions and levels would contribute to presenting diverse perspectives.

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