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The Virtual Academic Adviser: A Generative AI-based Chatbot for Course Selection in Open and Distance Learning

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ABSTRACT

This Research Examines The Challenges Learners Face During Course Selection In Open And Distance Learning Frameworks And Evaluates The Effectiveness Of AI-Powered Virtual Academic Advisers In Addressing These Issues. While Distance Education Offers Flexibility, The Absence Of Personalized Guidance Often Complicates Decision-Making. This Study Aims To Develop A Virtual Academic Adviser Aligned With Anadolu University's Registration And Course Selection Regulations And Analyze Its Responses To Learner Inquiries. Using Openai's Mygpt Application, Virtual Advisers Were Trained To Interact With Learners Based On Their Academic Performance. A Qualitative Holistic Single-Case Design Was Applied To Compare Responses From Virtual Advisers With Those Of Chatgpt 3.5 And Chatgpt 4. Findings Suggest That Integrating Virtual Advisers, Accounting For Academic Risks Like Repeated Course Performance, Can Enhance Learner Experiences. The Study Underscores The Potential Of AI-Based Virtual Advisers To Improve Academic Performance And Decision-Making In Course Selection, Advocating Further Research Into AI's Role In Distance Education.

Keywords: Higher Education, Open and Distance Learning, Academic Adviser, Generative Artificial Intelligence, Chatbot

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1. Introduction

Since their inception, humans have instinctively continued to learn, although the precise beginning of conscious and organised learning remains unknown. Fırat (2024) hypothesises that the first open school was located in Göbeklitepe. According to Fırat, the cultural activities of a community began with the experiences of individuals gathered at this open school teaching one another. Subsequently, learning activities were presented through different educational methods by churches and madrasahs, continually evolving to the present day. Today, education is predominantly conducted under the hegemony of universities at the higher education level. Following the invention of the printing press, sharing knowledge on paper became more accessible and faster. The earliest documented instance of distance education commenced in Boston, USA, with Caleb Phillips offering education through weekly lessons transmitted via the US postal service. It has continued to be provided through various communication tools influenced by technology. The first electronic distance education started over radio airwaves in the 1920s. A paradigm shift in distance education occurred with the widespread adoption of the Internet in the 2000s. Advancements in technology now enable many educational institutions to provide distance education services, enabling learners to easily access information through technological devices (Clark, 2020).

In institutions conducting open and distance learning, registered learners can oversee most processes from enrolment to graduation through their knowledge, experience, and research, unlike learners in the formal system. Particularly in Giga Universities conducting open and distance education, such as Anadolu University, learners can perform many tasks independently without an academic adviser. One such task is course selection. Learners in the Anadolu University Open Education System can independently choose their courses and renew their registration between registration renewal dates. The steps learners need to take during the registration renewal phase are clearly explained on the information screen. However, this stage may pose challenges to newcomers to higher education or those accustomed to selecting courses with an academic adviser. Therefore, it is expected that the registration renewal and course selection pages of higher education institutions that cannot offer individual academic advising services in open and distance learning be understandable and guide learners. Learners aiming to succeed by selecting courses on their own may make moves that reduce their academic success if they do not receive guidance from an expert on the sequence and method of selection.

Given the vast number of learners and limited staffing, individual academic advising in large open and distance learning institutions is impractical; this study explores productive AI-supported academic advising services at Anadolu University's Open Education System for course selection. In the Anadolu University Open Education System, each semester of every program has 30 ECTS credits worth of courses. Starting from the Spring Semester of the year they register, learners can select up to 10 courses on their initiative without exceeding 45 ECTS credits. Moreover, owing to regulatory changes, learners lacking compulsory courses yet unable to graduate due to a GPA below 2.00, as well as those who wish to improve their academic performance by re-selecting a course they have passed (with a letter grade of AB-DD), have been allowed to select any course previously taken in their program except those with an AA letter grade from the 2022-2023 Academic Year Fall Semester onwards. With the implementation of this change, the option "I want to re-select a course I have passed" is shown on the course selection screen for learners. Short messages (SMS) are sent, and videos are shared on the official page (Anadolu Üniversitesi, 2023).

In the Anadolu University Open Education System, letter grades are assessed based on the learners' success scores, with an AA letter grade given to learners who rank within the top 4% according to their success scores. Consequently, a learner may receive a BB for a course with a success score of 79 in one term and a CC or AA in the next with the same score of 79. Learners must consider this factor when selecting courses. Factors such as the difficulty of exam questions" to "Variables like the difficulty of exam questions, the letter grade evaluation system, and the performance level of learners taking the course during the relevant term can cause changes in the lower limits of letter grades each term. This, in turn, can lead to learners who retake the course receiving a lower letter grade, potentially dropping to FF, necessitating that they retake the course to graduate.

Anadolu University is a Giga University with over one million learners in its open education system. It operates in a dual mode, providing both conventional and open education. While conventional learners select courses with academic advisers face-to-face, open-education learners make their course selections independently. Given the high number of learners and limited staff, it seems impossible for institutions to provide individualised attention to all learners, hence exploring alternative support mechanisms. One such mechanism, introduced in 2022, is the Virtual Assistant application, which currently only provides simple FAQ-based answers to queries related to student affairs (registration, examinations, graduation). Research conducted on users of this application indicates that learners find the lack of academic support

a deficiency, particularly during the registration and course selection phases, where some seek expert support in complex situations (Öncü & Süral, 2024).

The conceptual framework of learner support services reveals various definitions and classifications. Berge (1996) categorises support systems into pedagogical, social, administrative (managerial), and technical support. Under pedagogical support, academic advising can guide learners in managing their learning processes. Tait (2000) classifies support services holistically based on cognitive, emotional, and systemic functions. Here, cognitive support enhances learning through course materials and academic advising; emotional support creates conditions that boost attachment to and motivation for learning, with academic advisers also helping learners understand their emotional needs; systemic support manages learner-centred administrative processes, where academic advising can play a crucial role in coordination. Simpson (2012) further classifies learner support into academic and non-academic support according to a holistic model, with academic advising falling under the academic support category, which helps enhance learners' academic performance and assist in achieving their career goals.

A review of literature on the concept of academic advising shows that Bektaş Köser & Mercanlıoğlu (2010) define academic advising as one of the responsibilities of universities to assist learners in necessary matters, guide, and counsel them. An academic adviser is a faculty member tasked with helping learners familiarise themselves with and adapt to the higher education institution they are enrolled in. Universities must consider academic advising as a strategic part of the higher education process to effectively provide this service (Gizir & Gizir, 2020). Hart-Baldridge (2020) states that academic advising guides learners through registration to graduation and even post-graduation career goals, highlighting the adviser's role in providing information about the institution's system and advising for academic success throughout a learner's educational life.

Chan et al. (2019) reviewed 6189 studies on academic advising, emphasising that the primary actors in the advising process are the adviser and the advisee. The definitions of roles can vary depending on the institution's administrative and academic structure (Axelson, 2007). Weir et al. (2005) and Fulk (2023) stress that there is no one-size-fits-all method in academic advising due to learners' varying needs and preferences, and the human factor must be considered. The academic histories, study behaviours, and other characteristics of learners with similar grades and courses should be analysed during the advising process. According to Hemwall & Trachte (2005), the principles of academic advising are as follows:

- Academic advising should facilitate learners' understanding of the institution's mission.
- Academic advising should ease the learning of both low and high-level thinking skills.
- Academic advising should teach learners the paths to achieving the goals outlined in the institution's mission and relevant legislation.
- An academic adviser should actively help learners understand the institution's mission.
- Academic advising should include information about individual learning styles.
- Academic advising should consider how the social context affects the learner's educational understanding.
- An academic adviser should acknowledge that the learner's opportunities affect their learning.
- Academic advising should be a dialogue that allows learners to express their goals and ideas.
- Academic advising should be a directive dialogue where the adviser guides the learner.
- Academic advising should consider any anomalies, discomforts, errors, and contradictions the learner may experience.

When academic advising is examined within the context of open and distance learning, Mutlu et al. (2006) and Gravel (2012) state that academic advising services can be offered electronically in systems where face-to-face advising is not feasible. Academic advisers can provide online support for registration, orientation, and course enrolment issues. This can be beneficial for accessing current GPA, course registrations, transcripts, and system information. In institutions providing open and distance education academic advising services, learners expect academic guidance on courses, and that advice includes mentorship and career opportunities (Sutton & Sankar, 2011). Morris (2007) describes the challenges of academic advising in open and distance learning as follows:

- It presents challenging problems for traditional academic programs.
- It must maintain a sense of community and learner relationships in online environments.
- Advising interactions should be more noticed in online settings.
- Interaction can be problematic in online environments.
- Morris also notes the opportunities:
- Higher education institutions can reach a broad audience by offering learning programs in non-traditional models.
- A virtual campus environment can provide a variety of educational experiences.
- Non-traditional programs can be made more accessible and cost-effective.
- Online learner-adviser interaction opportunities can be provided.

Assiri et al. (2020) describe traditional academic advising as an interaction where an academic adviser sits in a room, reviews the learner's educational records, and offers various advice or recommendations. Even in large conventional universities, efficient operation can improve this process. Moreover, the experience and motivation of the academic adviser can prevent this process from being effective even if it operates. In this context, there are studies on the digital transformation being a part of the transformation of academic advising.

Advancements in information and communication technologies have enabled studies on human (advisee)-machine (adviser) interactions after human (advisee)-human (adviser) interactions, allowing institutions to enable learners to receive support from a machine. The idea of academic advising with artificial intelligence support is examined, including a study by Valtorta et al. (1984) at Duke University, one of the first examples of using a machine in academic advising processes. The Graduate Course Adviser (GCA), a rule-based application designed at Duke University, determines the most suitable courses for learners and creates potential course schedules from these courses. Kamarthi et al. (1992) developed a system with an application called ADVISOR, which provides recommendations for course selection based on the courses needed for graduation. Mckillop (2000) designed a virtual academic adviser for the Open University, working on an application that offers program and course recommendations for distance learners. De Carolis et al. (2006) designed MyCoach, which analyses learners' e-learning capacities and experiences, offering suggestions from course selection to material selection. Taha (2012) developed a system capable of detailed filtering and classification considering learners' academic skills, aiming to determine the most suitable courses for learners. Almutawah (2014) worked on an application at the University of Bahrain that could recommend regulations, students' preferences, and career trends using the information in the learners' database. Al-Imamy & Zygiaris (2022) designed an application using Ethereum blockchain network technology for academic advising, which guides course selections based on learners' academic histories and course selection actions. Atalla et al. (2023) researched a program at the University of Dubai that advises learners throughout their academic journey. They found that many factors affect academic success, such as the learner's characteristics, course difficulty, learning method, and personal circumstances. Thus, a

recommender system developed for academic advising could assist learners in overcoming difficulties and achieving their goals.

The foundations of artificial intelligence were laid in 1950 with Alan Turing's Turing Test, which questioned what would happen if machines were asked questions and whether machines could think like humans. The event that started artificial intelligence as a discipline was the 1956 Dartmouth Summer Research Project. The development of artificial intelligence has continued with improvements in perception, object recognition, hardware technology, and the performance of increasing algorithms (Stone et al., 2016). Since 2020, generative artificial intelligence has accelerated, becoming a powerful tool capable of learning independently from complex data and possessing strong data generation capabilities. Pre-trained artificial intelligence language models that learn abstract information from raw data have extensive data generation capacities. ChatGPT, one of the recent Natural Language Processing (NLP) models, is a variant of the Generative Pre-trained Transformer (GPT) architecture (Goar et al., 2023). Advanced language models like OpenAI's ChatGPT are used for various field tasks. "In-context learning" (ICL) offered by GPT plays a significant role here. ICL, which includes an internal loop, can model more contextual information to solve specific tasks (Wu et al., 2023). The development of NLP is creating new technological opportunities in various fields, including education.

The literature highlights a growing focus on AI applications in higher education since the 2020s, particularly in enhancing teaching, administrative processes, and curriculum design (Noroozi et al., 2024; Watermeyer et al., 2024). While AI tools like ChatGPT promise to reduce employee workloads and transform content development, their integration into processes such as course determination remains underexplored (Kumar, 2021; McDonald et al., 2024) Studies also underscore widespread AI adoption’s ethical, social, and pedagogical implications, calling for a balanced approach to leverage its potential responsibly (Alali & Wardat, 2024). Despite its benefits, AI tools like ChatGPT are prone to hallucinations and require critical evaluation to ensure accuracy and reliability in higher education applications.

Studies are being conducted on using AI-based chatbots specifically for academic advising. Fadzil & Munira (2008) stated that bots that can facilitate human-machine interaction in open and distance learning institutions could be developed, suggesting that a bot capable of providing academic advising could lead to a paradigm shift in advising, allowing learners to receive guidance on program recommendations, course selection, and academic performance from a machine. Nwankwo (2018) mentioned that a virtual academic advising system called AdvisorBot could be designed to instantly provide valuable information and feedback on performance. Abdelhamid et al. (2021) stated that an intelligent adviser agent developed with machine learning could provide academic advice and make course recommendations and study plans based on learners' profiles. Majjate et al. (2023) mentioned that personalised assistants developed for learners could provide academic advising services tailored to the learner's profile. Thottoli et al. (2024) expressed that a chatbot using rapidly developing artificial intelligence technology could be used as an academic adviser. Considering the complex information on the internet and the general answers that can be confusing for learners, it is worth focusing on how AI-based technologies can be integrated into education, given that personalised chatbots have the potential to respond specifically to learners' academic success and profile.

Especially since 2020, the performance of the ChatGPT application has been a subject of research in various fields. Researching the performance of ChatGPT in academic advising, Akiba & Fraboni (2023) predict that academic advisers who respond to learners as if human, thanks to the success of its large language model, will be a significant part of higher education

institutions in the future. Especially for open and distance learners who feel more disadvantaged and isolated compared to face-to-face learners, higher education institutions need to work on integrating an application that can provide support anytime, 24/7. For this purpose, Pangestu & Karnalim (2023) designed a course recommendation system using learners' course data and performance grades. Although this system risks failing to be 100% accurate in recommendations like humans, it analyses detailed data and makes predictions based on the dataset it has. Since the courses learners can take are limited to the course list of the registered program, learners may wish to choose another course they are interested in instead of the recommended course. In this context, especially with generative artificial intelligence technologies, it should be remembered that the recommendations are just suggestions, the learner is ultimately responsible for their academic life, and human academic advisers should be consulted when necessary. Although the machine, as an academic adviser, can process and analyse extensive data and respond like a human in most languages thanks to the large language model, one should only unconditionally trust all the information a non-human adviser provides with double-checking.

The study on the MyGPT-based Generative Artificial Intelligence Virtual Academic Adviser seeks to determine whether it will be helpful to the performance of chatbots developed with prompts without coding knowledge like MyGPT compared to other ChatGPTs (ChatGPT 3.5 and 4) and to examine the expressions used. The research questions for the study are as follows:

1. How do generative artificial intelligence-supported applications respond to messages related to the course selections of successful and unsuccessful learners?
2. What is the performance of generative artificial intelligence-supported applications in terms of the responses they provide?

2. Methods

In this study, the holistic single-case design, one of the qualitative research methods, has been employed. This approach, used in qualitative research, deeply examines a particular phenomenon, situation, or example. It is particularly effective in thoroughly understanding complex and multidimensional situations within an individual or organisational context (Creswell & Creswell, 2021). The research aims to comprehensively address the studied situation, highlighting its dynamics, processes, and interactions. This approach examines the focal phenomenon in its context through a singular instance, focusing on specific findings rather than generalisations (Bowen, 2009). In this respect, the holistic single-case design offers a methodological framework suitable for the purpose and nature of the research.

(Creswell, 2013) recommends using the holistic single-case design to understand a situation’s interior deeply. He notes that this approach is ideal for thoroughly understanding an individual case and bringing out the specific details and nuances of that case rather than making generalisations. For instance, this design can be applied to study the effects of teaching methods in a school or to evaluate the internal dynamics of an institution. Creswell emphasises that the case should be studied from a broad perspective using various data collection methods (such as observation, interviews, and document analysis), which is crucial to reflect the complexity and uniqueness of the event or situation.

In this research, the responses given by generative artificial intelligence to questions about academic advising were analysed through thematic analysis. The study examined the correctness or incorrectness of the responses given by different ChatGPT versions, which had been assigned the role of virtual academic advisers, and the expressions they used while generating synthetic data. To this end, the study focused on how each application responded by generating synthetic data to the questions. Correspondence was conducted individually with

each virtual adviser through OpenAI, asking them to answer questions, and the responses provided by these virtual academic advisers were analysed. Like humans, who can give different answers to the same questions when their emotional state changes, generative artificial intelligence applications can also produce different answers to the same question. These non-organic answers vary due to natural processing techniques, the perception of sequential messages, and the underlying algorithms. Dengel et al. (2023) similarly conducted semi-structured interviews with Google Bard and ChatGPT, emphasising this situation by noting that the responses given during the interviews were considered.

Data collection for this study was carried out by assigning the role of Virtual Academic Adviser to eight distinct GPT agents, each configured with varying features. These agents were presented with written queries (messages) designed explicitly around the course selection process. At the time of the research, the responses provided by the relevant versions of the artificial intelligence applications were subjected to an in-depth analysis. Additionally, the accuracy of the responses was meticulously examined to ensure the data's reliability and validity.

The collected data were synthesised and holistically evaluated in the final stage to derive meaningful insights and actionable recommendations. The findings demonstrated the performance differences among the GPT versions, highlighting their strengths and weaknesses within the scope of the study. Additional details regarding the analytical processes employed—such as thematic analysis and comparative performance evaluation—have been provided to ensure methodological rigour.

Since OpenAI's GPT applications are artificial intelligence models, they lack any consciousness or ethical considerations, and their purposes and functions are entirely based on design and programming. Therefore, using AI systems in qualitative research depends on the ethical evaluations of the people who design and use them. Using AI systems in research can provide speed and consistency in data collection, analysis, and summarisation of findings. However, ethical concerns such as the limitations, biases, and privacy issues of these systems must be carefully considered. Data privacy protection and algorithms' transparency and fairness are crucial. Using artificial intelligence in research can enhance efficiency and carry certain risks. Therefore, it is essential to establish ethical standards for AI use and act accordingly. For this purpose, in the research, the same questions were asked in the same way to virtual academic advisers, and the responses were recorded and analysed as they were. Subsequently, various scenarios were discussed with different versions of OpenAI's AIs. Finally, all the questions and answers recorded during the interviews were listed and given to ChatGPT 4, which was asked to describe the responses briefly.

Given the large number of learners and the limited staff, providing individual academic advising, as in the case of Anadolu University's Open Education System, appears unfeasible. Integrating generative artificial intelligence technologies into open and distance learning is becoming increasingly important in this context. OpenAI's ChatGPT application is rapidly evolving. Different versions of ChatGPT can respond to users' questions. This research used OpenAI's MyGPT application, allowing users to develop it according to their needs. A virtual academic adviser based on generative artificial intelligence, intended to assist learners in course selection in the Anadolu University Open Education System, was designed on the MyGPT application of ChatGPT 4.0, which can also perform mathematical calculations such as credit calculation and General Point Average (GPA) calculation. MyGPT allows the design of multiple virtual advisers; hence, separate assistants have been created for successful learners with a GPA of 2.00 and above and those below 2.00, as well as assistants who do and do not

perform web browsing. The creation, training, and use of MyGPT for academic advising in the Anadolu University Open Education System are illustrated in Figure 1.

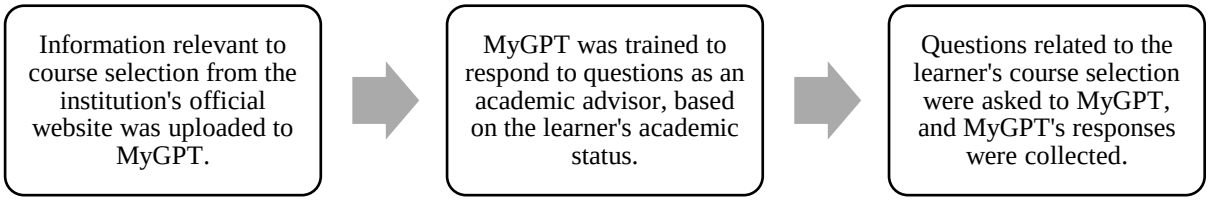

Figure 1. Creation of Institution-Specific MyGPT

In the Open Education System of Anadolu University, four distinct MyGPTs have been designed to provide academic advising during course selection. Figure 1, which illustrates the development stages of these MyGPTs, includes the following steps:

- Initial Loading of Information: Initially, the rules related to course selection, which are available on the institution's official website, the required credits, the necessary ECTS credits for graduation, and General Grade Point Average (GPA) calculation information were uploaded to the MyGPTs.
- Training for Academic Advising: The MyGPTs were trained to respond to questions based on the learners' academic performance, acting as academic advisers. Different MyGPTs were created for learners with a GPA below 2.00 and those with a GPA above 2.00. Additionally, one of the MyGPTs was allowed to perform web browsing while another was instructed to respond based solely on the official information shared with it (without web browsing).
- Final Implementation for Course Selection: In the final stage, questions related to learners' course selection were posed to the MyGPTs. Each MyGPT was designed to respond by considering the learner's GPA, course data, ECTS credits, and letter grades from their transcripts.

Alongside the developed MyGPTs, virtual academic advisers created using ChatGPT 3.5 and ChatGPT 4 were also used for comparison. Table 1 displays details about these virtual advisers.

Table 1. Information on Virtual Advisers

Adviser	Platform	Usage	Trained?	Web Browsing	Role
A1	MyGPT	Paid	Yes	Open	Responding personally to questions from successful learners.
A2	MyGPT	Paid	Yes	Closed	Responding personally to questions from successful learners without web browsing.
A3	MyGPT	Paid	Yes	Open	Responding personally to questions from unsuccessful learners.
A4	MyGPT	Paid	Yes	Closed	Responding personally to questions from unsuccessful learners without web browsing.
A5	ChatGPT 4	Paid	No	Open	Providing general answers to questions from successful learners.
A6	ChatGPT 4	Paid	No	Open	Providing general answers to questions from unsuccessful learners.
A7	ChatGPT 3.5	Free	No	Open	Providing general answers to questions from successful learners.
A8	ChatGPT 3.5	Free	No	Open	Providing general answers to questions from unsuccessful learners.

Table 1 illustrates the information and assigned tasks related to virtual academic advisers, which have been coded as A1, A2, A3, A4, A5, A6, A7, and A8 on the ChatGPT platform (type), usage, training status, web use, and according to their roles. The first four advisers have been specifically trained via MyGPT, but the first two advisers are restricted from using information on websites outside of the provided documents and data. For A5 and A6, questions have been posed via ChatGTP 4; for A7 and A8, via ChatGPT 3.5. Example scenarios have been created in the study. According to these, a successful learner has a GPA of 3.48 with only one failed course in the Fall semester. A failing learner has a GPA of 1.95 with one failed course each in the Fall and Spring semesters. Both learners have recently received a BB grade in the English I course, which was taken multiple times. Additionally, the only required courses are included for the sample learners.

3. Findings

The results obtained from the study in response to the research questions are detailed below.

3.1. Findings on Responses Given by Generative Artificial Intelligence-Supported Applications to Prompts from Successful and Unsuccessful Learners

This section analyses separately the responses provided by different generative artificial intelligence-supported applications to prompts from successful and unsuccessful learners.

M1 (Message) 1: I am enrolled in the Call Centre Services Associate Degree Program at Anadolu University Open Education Faculty. Based on the attached transcript, which courses would you recommend I select for the Autumn Term?

- Prioritising the retake of essential failed courses to improve academic standing and GPA.
- Considering new and strategic course enrollments will deepen understanding and contribute positively to GPA.
- Adding foundational courses if they still need to be taken or passed satisfactorily, supporting general education and program requirements.
- The overarching advice is to manage the total course load effectively, ensure it does not exceed the 45-credit limit per term, and strategically select courses that align with immediate recovery from failed courses and long-term academic success.

M2: What should I consider when selecting courses? Could you please respond, considering my circumstances?

- Focusing on retaking failed courses to improve GPA and meet graduation requirements, primarily focusing on courses.
- Balancing course load to maximise efficiency without overwhelming oneself, ensuring total credits stay within the 45-credit term limit.
- Considering course availability and prerequisites, ensuring alignment with the academic calendar and program sequencing.
- Consulting academic advisers to align course choices with educational and career objectives, ensuring that the selections support long-term goals.

M3: Should I select courses I have previously succeeded in again? If it is advisable, please make a suggestion.

- Retaking these courses is generally only necessary to significantly boost GPA for specific academic or professional reasons.

- If considering this option, focus on courses with a realistic expectation of grade improvement that can materially affect GPA, such as attempting to raise a BB to an AA.
- Weigh the benefits against potential risks and costs, such as the effort involved and the opportunity cost of not taking new or more directly beneficial courses.
- Advisers generally advise prioritising courses directly impacting degree progression and GPA recovery from lower grades before considering retaking courses for minor GPA improvements.

M4: I have received the grades FF, FF, FF, CC, and BB sequentially in the 3-credit course English I. If I were to retake this course, what would you predict my final grade would be at the end of the term?

- The advisers note that predicting the outcome of retaking the English I course depends on various factors, including the student's study habits, course content, teaching methodologies, and previous experiences.
- Reviewing your past performance reveals FF, FF, FF, CC, and BB grades, illustrating your progression. The most recent grade of BB indicates an improved command of the course materials. If you take this course and continue your studies diligently, achieving a higher grade, such as a BA or even an AA, could be within your reach.
- They also emphasise that consistent effort and time management in the course could improve your results. However, the course's difficulty level and other external factors might influence your final grade.

M5: Could you calculate my new Cumulative Grade Point Average (CGPA) based on the predicted grade of the course I will choose? If I retake the 3-credit Turkish Language I course, in which I initially received a grade of BB and achieved an AA, what would my new GPA be? What if I attain a CC in the same course?

- Achieving an AA could increase your CGPA, reflecting significant improvement in mastery of the course material. This could be beneficial if you aim to elevate your academic standing or meet specific grade thresholds for program qualifications or honours.
- A CC would decrease your CGPA, which might not be desirable but still reflects passing the course. It’s important to consider whether retaking the course for a potential CC would be worthwhile versus other strategies to improve your academic profile.

M6: What minimum passing grade do I need to pass a course, and which passing grade corresponds to the BB letter grade? For example, if I get 70, will it be BB?

- The minimum passing grade typically depends on your institution's specific grading policy. Generally, a passing grade starts from a D or the equivalent, but this may vary between institutions.
- A BB letter grade is usually considered a good performance and is above the minimum passing grade.

Six questions were posed to virtual academic advisers, who were designed to respond according to different strategies based on the learner's academic status. The responses were thematically analysed. According to the model by Miles & Huberman (1994), the agreement percentage between two experts on the identified themes is 0.86. Figure 2 illustrates the thematic organisation of all responses.

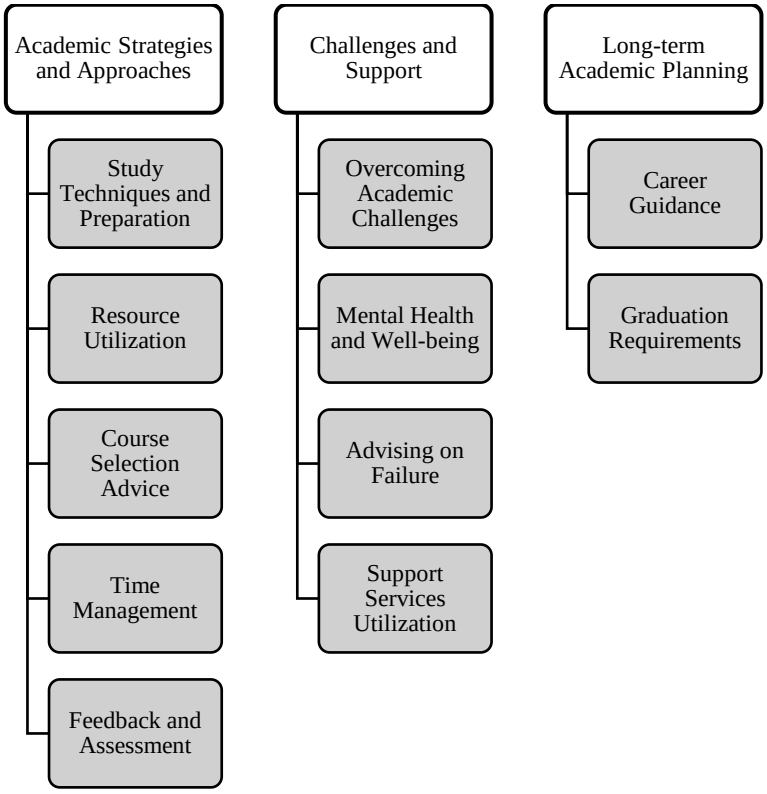

Figure 2. Theming Interviews Conducted with Artificial Intelligence

Academic Strategies and Approaches

- Study Techniques and Preparation: The perspective of academic advisers is that adopting diverse study methods and preparation strategies significantly enhances students' academic performance. Advisers strongly recommend a tailored approach that aligns with individual learning styles and educational objectives. e.g. "Given your history of grades in this course, focus intensely on improving your English skills. Consider using additional resources such as online tutorials, practice exams, and perhaps tutoring if available (A3)."
- Resource Utilization: Academic advisers underscore the critical importance of utilising all available resources, such as tutoring services, library facilities, and online educational platforms. These resources are pivotal in enriching the students' academic experience and fostering a conducive learning environment. e.g. "Make sure to keep up with the coursework and seek help immediately if you find certain topics challenging (A4)."
- Course Selection Advice: Advisers guide course selection, emphasising the importance of aligning choices with students' academic strengths and future career aspirations. This strategic selection is deemed essential for fostering academic success and personal fulfilment. e.g. "If you are unsure about course selection or need further guidance, do not hesitate to consult with academic advisers or faculty members (A5)."
- Time Management: Effective time management is advocated by advisers as a crucial strategy for balancing academic responsibilities and personal commitments. They propose structured planning and prioritisation as critical techniques to manage time efficiently. e.g. "Managing your time effectively to allow for adequate study (A6)."
- Feedback and Assessment: Continuous feedback and regular assessments are highlighted by academic advisers as fundamental in helping students gauge their academic progress. These mechanisms indicate performance and opportunities for

reflective learning and educational adjustment. e.g. "Reflect on the feedback (if any) you received in your previous attempts (A7)."

Challanges and Support

- Overcoming Academic Challenges: Advisers address students' common academic challenges, offering strategies to surmount these hurdles. The focus is on resilience-building and the development of problem-solving skills. e.g. "Consider any external factors that may have affected your previous performances, such as personal circumstances, workload, or health issues (A8)."
- Mental Health and Well-being: The impact of mental health on academic performance is a critical concern for advisers. They stress the availability of support systems designed to assist students in maintaining their well-being and optimising their educational outcomes. e.g. "Ensure that your physical and mental health is also supported during your study period, as these greatly affect academic performance (A1)."
- Advising on Failure: Academic advisers discuss approaches to handling course failures, advocating for constructive strategies for recovery and learning from setbacks to foster future academic resilience. e.g. "Predicting a final grade for a course like English I, where you have a history of varied grades (FF, FF, FF, CC, BB), is challenging without understanding the specific reasons behind these grades (A2)."
- Support Services Utilization: There is a strong emphasis on engaging with institutional academic support services. Advisers argue that these services are integral to student support and academic advancement. e.g. "Utilise Support Services: Take advantage of tutoring and other academic support services offered by the university to help improve your understanding of challenging subjects (A3)."

Long-term Academic Planning

- Career Guidance: Academic advisers assist students in mapping their academic journey to align with prospective career paths, ensuring that course selections and academic activities are strategically planned with future employment in mind. e.g. "While fulfilling program requirements is essential, consider selecting courses that align with your interests and career goals within the call centre services field (A4)."
- Graduation Requirements: Advisers clarify the requirements, highlighting the importance of meticulous academic planning and understanding the stipulations for successful program completion. e.g. "Take note of any specific courses required for graduation, such as Atatürk's Principles and History of Reforms I (TAR201U) and Turkish Language I (TÜR201U) from your transcript (A5)."

3.2. Findings on the Performance of Responses Given by Generative Artificial Intelligence-Supported Applications

Table 2 presents the findings regarding the performance of responses given by generative artificial intelligence-supported applications. It outlines how each application performed in terms of the accuracy, relevance, and completeness of its responses to the posed questions.

Table 2: The Accuracy of Responses Given by Virtual Academic Advisers

Adviser		Message						*True Answers of Advisers*	
		M1	**M2**	**M3**	**M4**	**M5**	**M6**	**Frequence**	**Percent**
A1		True	True	True	True	True	True	*6*	*100*
A2		True	False	True	True	True	True	*5*	*83.30*
A3		False	False	False	True	True	True	*3*	*50.00*
A4		False	True	True	True	False	True	*4*	*66.70*
A5		False	False	False	True	True	False	*2*	*33.30*
A6		True	False	True	True	False	False	*3*	*50.00*
A7		False	False	False	True	False	False	*1*	*16.70*
A8		False	False	False	False	False	False	*0*	*0*
True Answers of Messages	***Frequence***	*3*	*2*	*4*	*7*	*4*	*4*	***Total:*** *24 out of 48 total data are true (50.00%)*	
	Percent	*37.50*	*25.00*	*50.00*	*87.50*	*50.00*	*50.00*		

Table 2 displays the success rates of virtual academic advisers based on the accuracy of their responses to various messages. Additionally, the table addresses the occurrence of correct responses to the messages. According to the concordance percentage by Miles & Huberman (1994), the agreement percentage between two experts in the field of academic advising is 0.95. Based on the collected data, the success status of the virtual academic advisers and the percentage distribution of correct responses to the messages are shown in Figure 3 and Figure 4.

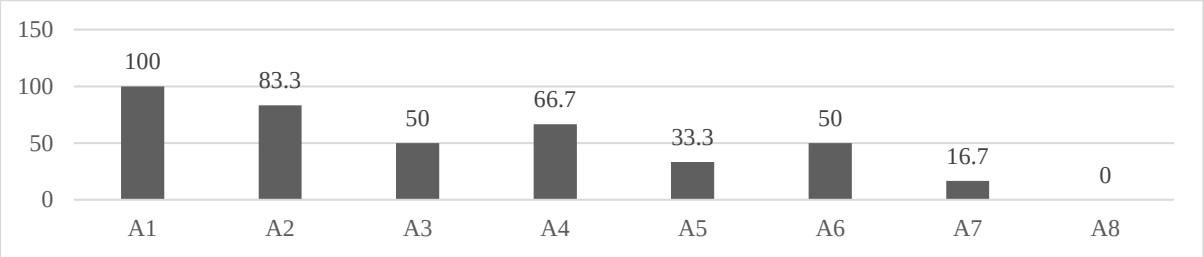

Figure 3. Percentage of True Answers of Virtual Academic Advisers

When examining the accuracy of the responses provided by the virtual academic advisers, A1 achieved the highest success (100%) and A8 the lowest (0%), as shown in Figure 3.

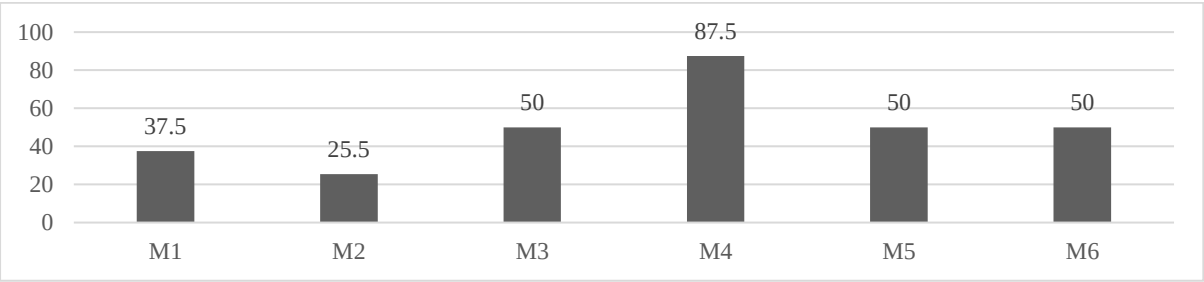

Figure 4. Percentage of True Answers of Messages

When examining the response accuracy based on the messages, the virtual academic advisers achieved the highest success in correctly answering M4 (87.50%) while showing minor success with M2.

Regarding the provision of incorrect information, the most common mistake made by artificial intelligence was to infer that an academic adviser is available within the Anadolu University Open Education System, even though there is none. It often incorrectly suggested that detailed information could be obtained from an academic adviser. This phenomenon, "hallucination,"

is a common issue with generative artificial intelligence applications that produce synthetic data.

4. Results and Discussion

This study investigated the performance of virtual academic advisers equipped with generative artificial intelligence across OpenAI's MyGPT and other ChatGPT versions (ChatGPT 3.5 and ChatGPT 4). This was undertaken to determine how they would respond to learners' queries based on their success statuses. Various questions were posed to ChatGPTs according to the learners' academic statuses, and the study examined how different generative artificial intelligence assigned various roles across different versions responded. Dengel et al. (2023) investigated the potential of using large language models (LLMs) such as ChatGPT and BARD in various applications and the potential for conducting interviews in qualitative research. The applicability of qualitative content analysis methods in interviews conducted with large language models remains to be determined. Researchers must be cautious of the limitations and biases introduced by these models and critically analyse the data obtained. This study suggests the cautious use of interviews conducted with large language models as a preliminary exploratory tool but emphasises that traditional qualitative methods should support them. In this context, this study examines responses in a specific field from machines capable of responding human-like, similar to the study by Dengel et al. (2023).

In the first part of the study, findings related to the responses given by generative artificial intelligence-supported applications to prompts from both successful and unsuccessful learners were examined. After loading learners' transcripts with different academic performance statuses, messages containing six questions were written to eight generative artificial intelligences of different versions assigned different roles. ChatGPTs were then asked to respond to the learner based on the transcript.

When ChatGPTs were asked for course selection advice (M1), they advised learners who had failed courses to retake them, suggesting that learners with low GPAs could retake courses with low grades to boost their GPAs. When asked what to consider during course selection considering the learner's circumstances (M2), ChatGPTs noted that retaking failed courses could lead to better academic success compared to previous terms, and selecting courses appropriate to the academic calendar and program course list would be advisable. When questioned whether a previously passed course should be retaken (M3), ChatGPTs responded that only learners with low GPAs should do so to improve their GPAs. In contrast, those with high GPAs could opt to retake a completed course to enhance their academic performance, emphasising that the course's credit and the grading coefficient are critical in this decision. When ChatGPTs were asked to predict the possible letter grade if a specific course taken multiple times was retaken (M4), they made different predictions based on the learner's transcript, noting that a learner consistently obtaining higher grades in a course could likely continue this trend. However, the performance during the course term would affect the new grade. When asked to calculate a course that a learner would retake based on the transcript's GPA (M5), GPTs generally were able to perform mathematical calculations to compute the learner's GPA. Finally, due to the university's grading policy, they could not definitively state what grade would result from a specific course grade (M6).

Upon reviewing all responses, the themes identified in generative artificial intelligence-based ChatGPT responses are Academic Strategies and Approaches, Challenges and Support, and Long-term Academic Planning. The Academic Strategies and Approaches theme includes subcategories such as Study Techniques and Preparation, Resource Utilization, Course Selection Advice, Feedback, and Assessment. The Challenges and Support theme includes

Overcoming Mental Health and Well-being, Advising on Failure, and Support Services Utilization. The Long-term Academic Planning theme is categorised into Career Guidance and Graduation Requirements.

Among the different versions with various roles, MyGPT was the most successful, likely due to its specific training on the research topic. Following MyGPT was ChatGPT 4, with the least successful being the older version, ChatGPT 3.5. The latest versions are more successful and handle less complex transcripts better by generative artificial intelligence. Additionally, the customizability of applications allows institutions to train and use generative artificial intelligence in many areas. Specifically designed and up-to-date MyGPT serving via ChatGPT 4 has shown higher research performance than other ChatGPT versions. However, it has yet to be as successful in answering questions from unsuccessful learners as with successful ones.

In examining the response accuracy to the questions, the highest correct response was "I have received the grades FF, FF, FF, CC, and BB sequentially in the 3-credit course English I. If I were to retake this course, what would you predict my final grade would be at the end of the term? (M4)" (87.50%), and the lowest to "What should I consider when selecting courses? Could you please respond, considering my circumstances? (M2)" (25.00%). From the scope of the questions, almost all ChatGPTs in the study could perform mathematical operations and make sequential predictions but needed to be sufficiently successful in providing specific information tailored to the learner's situation. Considering that MyGPT was provided with information about the institution's grading system and trained on it, it performed better in providing specific information to the learner. Thus, using institutions' own artificial intelligence-based support systems can be expected to yield positive results.

While the responsibility of generative artificial intelligence in responding remains debatable, a machine is not expected to assume human-like responsibility. Hence, minimising the hallucination phenomenon in AI responses is crucial, as institutions are responsible for any incorrect information AI provides. To minimise errors in the responses given by higher education institutions, the creativity mode of generative AI-based chatbots should be set at the lowest level, ensuring responses are as much as possible derived from official sources. More reliable AI systems that consider the learner's academic history and personal characteristics can serve as academic advisers if achieved. However, no matter how advanced AI technology becomes, it should be communicated that the information provided to learners is synthetic, and verification from official website data is essential, just as one should only unquestioningly trust some information found on the Internet. It must be acknowledged that even the most advanced AI can err.

Similar results have been obtained in other studies using AI for academic advising. Abdelhamid et al. (2021) emphasise that academic advising is a critical process in higher education, and a good analysis of learners' abilities is essential for understanding the curriculum structure better. Almutawah (2014) found significant improvements in learners' decision-making processes with a course selection advising tool developed at the University of Bahrain between 2009 and 2011 but noted that further enhancements could be achieved using advanced AI techniques. Higher education institutions face limitations such as data storage, sharing, personal information security, and the disclosure of institutional information when using AI applications offered by various companies. However, integrating evolving AI technologies into learner support systems for information sharing is crucial for assisting learners with course selection, among other processes from registration to graduation. Taha (2012) proposed designing an application named AAA, an advising recommendation system that suggests courses previously completed successfully by other learners with similar interests and academic performance.

All ChatGPTs used in this research share the common feature of providing instant and rapid responses, which is crucial for open and distance learners. Nwankwo (2018) highlighted this aspect of AI and designed a virtual support system model called AdvisorBot that could be adopted to enhance the efficiency of learner support and course advising. The findings indicate that the system provides learners quick and easy access to critical information. Akiba & Fraboni (2023) examined how AI, particularly AI-assisted tools like ChatGPT, can make academic advising more accessible, efficient, or practical, compiling frequently asked questions from current and potential learners in a teacher education undergraduate program in the United States and entering them into the accessible version of ChatGPT. The responses were evaluated for content and presentation. ChatGPT was particularly successful in responding to general and open-ended career-related questions in a clear, comprehensive, and supportive manner. The research suggests that tools like ChatGPT can complement but not replace human advisers and potentially facilitate equal opportunities in education.

Due to issues like hallucination in AI-based support systems, they may need more time to be fully ready to be directly presented to learners. Instead of designing virtual academic advisers that interact directly with learners, applications that assist academic advisers could be developed. This approach would allow recommendations vetted by expert academic advisers to be shared with students. Additionally, this model could speed up the process by quickly filtering complex data. Pangestu & Karnalim (2023) observed that academic advisers are often employed in universities to help increase retention rates. Considering some learners, these advisers may face challenges in making suitable course selections for them. This study proposes an adviser-focused course recommendation system. Advisers could more efficiently and accurately recommend appropriate courses to their learners.

Within the scope of this study, the prototype of a generative artificial intelligence-based virtual academic advising application developed through a sample learner's course selection scenario could be further developed and integrated into the course selection page. Furthermore, institutions can independently create their generative AI-based systems using MyGPT. In Academic Adviser-Learner interactions, Academic Advisers could receive consulting from generative AI. Atalla et al. (2023) conducted a study that systematically assesses a learner's course plan based on datasets collected at the University of Dubai, with the system created in the study achieving an accuracy rate of 86%. Although the MyGPT explicitly trained to respond to limited questions and similar questions in this research achieves a success rate of 100%, this rate is likely to decrease for questions that large groups of learners might ask in different expressions or about different topics. While MyGPT's performance can be compared with other ChatGPTs and provide insights, it should not be expected to yield deductions for large research groups.

5. Recommendations

In this research, OpenAI's GPT applications were chosen due to their widespread use, not for their software dimensions but through a user-centric perspective. Just as individuals without coding knowledge can easily design their websites using content management systems like WordPress, the accessibility of various AI applications through major companies like Microsoft and Google is inevitable. The critical issue is how individuals or institutions use and integrate this technology into their systems. There is ongoing debate about the security of personal data for AI, prompting higher education institutions to potentially offer training on interacting with AI, both for learners and staff.

Researchers could explore why learners who have been successful in a course choose to retake it. They might also examine learners' opinions on receiving academic advising from a non-

human entity. Collaboration across different disciplines could accelerate the development process as designing technologies that encompass all learners by higher education institutions alone has become nearly impossible. The prototype MyGPT created in this study can be further developed to meet the needs of institutions and made available to a larger audience. The virtual academic advising application, initially for open and distance learners, could also be used for traditional learners. While open education institutions in Turkey do not offer elective course systems, similar virtual academic advising applications could recommend elective courses based on learner interest elsewhere, even facilitating micro-credentialing and assembling different contents into a course tailored to the learner's interests. Interviews with learners who chose to retake a course they had previously succeeded in but received a lower grade in the Anadolu University Open Education System could provide insights into their course selection experiences and the reasons for their academic failures.

While institutions may not rapidly integrate generative AI applications due to regulatory issues, open and distance learners can individually receive academic advising support from ChatGPT. This study demonstrates that generative AI-based chatbots can perform effectively without sharing learners' personal information, especially in complex credit and grade calculations. Learners curious about how their semester-end GPA might change based on their course choices can seek assistance from AI. A simple GPA calculation robot, like the one that does not exist at Anadolu University and most institutions, could have its performance more profoundly investigated.

When examined from a practical implications perspective, the findings demonstrate that MyGPT outperformed other generative AI models in addressing the diverse needs of learners, particularly those with lower GPAs, by providing tailored and accurate course selection guidance. This highlights the value of institution-specific training, enabling AI tools to align with academic regulations and learner profiles. Additionally, the study underscores the potential of generative AI to enhance scalability in open and distance learning systems, where personalised support is often limited due to high student numbers. By leveraging AI-driven tools, institutions can address challenges, such as guiding learners through complex academic decisions while ensuring efficiency and consistency in support services.

Moreover, the study's broader implications of integrating AI in education, including ethical concerns, adaptability, and reliability, were evident. Issues such as hallucinations in AI-generated responses require prioritising transparency and restricting AI outputs to verified institutional data. Institutions should focus on sustainable strategies to maximise long-term effectiveness, including regular updates and customisation to reflect local educational policies and alignment with evolving global standards. These findings underscore the dual need for technical optimisation of AI tools and strategic planning at the institutional level to ensure their successful implementation and positive impact on learner success.

In summary, OpenAI’s GPT, which excels in mathematical operations, can be likened to a brilliant child who still makes simple mistakes but is also rapidly growing. The emergence of ChatGPT-4omni immediately after the findings of this research proves this significant development. With improving visual skills and the ability to respond in multiple languages verbally rather than just through text, generative AI shows great potential in higher education areas like academic advising. The apparent development potential of its versions indicates that further enhancements are likely. However, reducing hallucinations in generative AI and improving its listening skills could accelerate its development in education. Shortly, open and distance learning institutions are expected to capitalise on this potential, just as most institutions do. Assigning generative AI a working role may seem utopian, but even now, it is an excellent tool for employees. Today's question is: Are humans ready to collaborate with

machines that can think like them? The question for the future is: When the era of machines that can think better than humans arrives, will machines collaborate with humans? Future human managers will decide this, but it seems beneficial for decision-makers in higher education institutions to start delineating the roles of humans and machines now.

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