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# Academic Advising for University Students in the Digital Environment

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***Abstract***

*Academic advising serves as the connective link between students, training programs, and the university, directly shaping learning outcomes and student engagement within credit-based training systems. Digital transformation, big data, and artificial intelligence are profoundly reshaping how this activity is delivered, shifting from traditional face-to-face advising toward e-advising systems, AI-driven chatbots, and predictive learning-analytics tools. Using a literature-review approach, this paper synthesizes domestic and international research on academic advising to clarify: (1) the nature and theoretical models of academic advising; (2) the impact of digital transformation on the role and modalities of academic advising in universities; (3) the categories of technological tools currently applied to support academic advising in the digital environment, including e-advising systems, AI chatbots, and learning analytics combined with recommender systems for predicting academic performance and advising on course selection; and (4) the data-ethics and algorithmic-fairness risks that must be managed when deploying these tools. The review finds that academic advising in the digital environment is shifting from an administrative role toward a personalised, developmental advising role, technology-enabled yet still requiring human judgment in consequential decisions; it also identifies a gap in integrating predictive-analytics tools into academic-advising workflows in Vietnam, as well as a gap in the corresponding data-governance framework. On this basis, the paper proposes directions for applying digital technology to academic advising at Vietnamese universities in line with a responsible-AI approach.*

***Keywords*— academic advising, digital environment, digital transformation, artificial intelligence, recommender systems, data ethics, algorithmic fairness.**

## I. INTRODUCTION

Academic advising is the link connecting students, training programs, and the university, directly influencing learning outcomes within credit-based training (Tran Thi Minh Duc & Kim Anh Tuan, 2012). Digital transformation, big data, and artificial intelligence are profoundly changing how this activity is carried out, shifting from traditional face-to-face advising toward e-advising systems, AI chatbots, and predictive learning-analytics tools (Assiri et al., 2020; Brdesee & Alsaggaf, 2022). However, existing research on academic advising in the digital environment has focused largely on electronic course-registration systems and information-support chatbots. In contrast, the potential to integrate learning analytics and educational data mining into the advising process to detect at-risk students early and recommend suitable courses remains insufficiently systematised, particularly in the Vietnamese context (Iatrellis et al., 2017).

The pressure to digitalise described above stems not only from within universities themselves but is also driven by top-level policy direction. Decision No. 131/QD-TTg dated 25 January 2022 of the Prime

Minister of Vietnam, approving the Scheme "Strengthening the Application of Information Technology and Digital Transformation in Education and Training for the Period 2022-2025, with a Vision to 2030," requires higher-education institutions to comprehensively digitalise management and student-support activities, of which academic advising is one of the most directly affected services. However, a top-down policy push does not automatically translate into genuine implementation capacity at the institutional level: the gap between policy targets and the actual state of data infrastructure, advisors' digital competence, and student readiness remains an open question, particularly given that most existing research on advising technology has been conducted in countries with more developed digital infrastructure than Vietnam. This is precisely why the present paper aims not merely to catalogue technological achievements but also to examine them critically.

Building on this gap, the paper synthesises and analyses domestic and international research to answer four questions: (i) How is academic advising conceptualised under existing theoretical models? (ii) How does digital transformation change the role and modalities of academic advising in universities? (iii) Which categories of technological tools are currently being applied to support academic advising in the digital environment? (iv) What ethical and fairness risks and limitations must be controlled for when applying digital tools, particularly predictive analytics, to the academic-advising process?

## II. RESEARCH METHODS

The paper adopts a literature-review approach based on thematic synthesis. Sources fall into two groups: international works on academic-advising theory, digital transformation in higher education, and advising-support technology (mainly published in peer-reviewed journals between 1994 and 2025), and domestic studies on the status and models of academic advising at Vietnamese universities. Sources were retrieved through academic platforms (Google Scholar, domestic scientific journals) using the keywords "academic advising," "e-advising," "digital transformation higher education," "learning analytics ethics," "algorithmic bias education," and their Vietnamese equivalents combined with "digital transformation" and "artificial intelligence." Sources were selected according to three criteria: direct relevance to concepts, models, or technological tools in academic advising; publication in a peer-reviewed journal, conference proceedings, or official documentation of a professional body (such as NACADA) or a state management agency; and theoretical or practical value for the higher-education context. The content of the selected sources was classified into five themes: concepts/theories of academic advising; digital transformation in academic advising; supporting technological tools (e-advising, AI chatbots, learning analytics, recommender systems); ethical and fairness issues related to the application of digital technology in academic advising; and academic-advising practice in Vietnam, which were then synthesised into the findings presented in Section 3.

## III. FINDINGS

### *3.1. Concept and theoretical models of academic advising*

Academic advising is defined by NACADA (2006) as a series of intentional interactions, grounded in the curriculum, pedagogy, and learning outcomes, that help students connect their educational experience to their own goals, capabilities, and life direction. Crookston (1994; originally published 1972) distinguishes two basic advising models: prescriptive advising, in which the advisor provides direct guidance on course selection and regulations, and developmental advising, in which the advisor acts as a companion who supports students in making their own decisions and developing critical-thinking and problem-solving abilities. In Vietnam, Tran Thi Minh Duc and Kim Anh Tuan (2012) show that academic advisors simultaneously perform class-management duties and act as advisors on study methods, research, and employment, reflecting a blend of the prescriptive and developmental models in Vietnamese practice.

Crookston's distinction between prescriptive and developmental advising, although highly influential, reveals its limits when applied as a rigid dichotomy. Later models, most notably proactive advising and appreciative advising, proposed by Bloom, Hutson, and He (2008), add an important dimension: rather than waiting for students to seek help once problems arise, advisors are expected to reach out proactively and early, while adopting a strengths-based approach rather than one focused solely on remedying deficits. This is arguably the most appropriate theoretical foundation for understanding the value of the predictive-analytics tools discussed in Section 3.3 because the "proactive, early-warning" nature that digital technology aims for is


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not a purely technical innovation, but needs to be anchored in an advising model already validated in educational theory. Notably, most of the technology literature reviewed in this paper (Assiri et al., 2020; Brdesee & Alsaggaf, 2022; Ngo Van Thap et al., 2025) focuses almost exclusively on technical aspects—natural-language-processing performance, predictive accuracy—while lacking explicit engagement with these established advising-theory models. This theory-practice gap carries a real risk: if technology is designed and deployed without a clear underlying advising philosophy, the likely outcome is a digitised version of the prescriptive model—fast and convenient, but lacking depth in personal development—running counter to the shift toward developmental advising analysed in Section 3.2.

In terms of content, academic advising encompasses five main task categories: developing study plans under the credit-based system; advising on study methods; guiding scientific research; providing career and employment guidance; and helping students resolve psychological and academic difficulties. The quality of academic-advising services is assessed through criteria such as interaction frequency, timeliness, and the advisor's professional competence (Abernathy & Engelland, 2001), the very criteria that digital technology tools aim to improve, as discussed in Section 3.3.

### *3.2. Digital transformation and the changing role of academic advisors in universities*

Digital transformation in higher education goes beyond digitising administrative processes; it also changes the fundamental nature of the interaction between the university and students, with academic advising being one of the services most visibly affected (Fernandez et al., 2023). A case study at King Abdulaziz University (Saudi Arabia) found that digitising the course-registration and academic-advising system significantly increased student satisfaction with the advising role, from 33.9% (agree and strongly agree) in 2018 to 51% in 2020, while also improving access to services regardless of time or location (Brdesee & Alsaggaf, 2022).

Pelletier and Hutt (2021) emphasise that digital transformation requires academic advisors not merely to adopt new tools but also to shift their mindset and professional skills to make effective use of student data in advising. In other words, technology does not replace the advisor's role. However, it reshapes it: reducing time spent on repetitive administrative tasks (course registration, regulation lookups) to free up more time for in-depth, developmentally oriented advising interactions tailored to individual students. This trend aligns with the developmental-advising model discussed in Section 3.1, now operating with the support of digital technology.

The picture described above, while showing a positive trend, warrants caution on three grounds. First, the finding by Brdesee and Alsaggaf (2022) that student satisfaction with the advising role rose from 33.9% to 51% after digitization is a notable improvement, but it also means that fewer than half of the surveyed students were fully satisfied raising the question of whether digitizing registration and information-lookup processes genuinely improves the quality of advising content, or mainly improves the convenience of accessing the service. These are two distinct dimensions that should be disaggregated rather than collapsed into a single general satisfaction metric.

Second, Pelletier and Hutt's (2021) recommendation that advisors need to change their mindset and skills to exploit student data rests on a premise that may not yet hold in the Vietnamese context, where most academic advisors are faculty members serving in a part-time, concurrent capacity, without in-depth training in educational data analysis. A survey by Pham et al. (2021) of Vietnamese students during the COVID-19 pandemic found that students' readiness for digital transformation was uneven, depending on their awareness, attitudes, and self-directed-learning capacity a finding suggesting that the effectiveness of digital academic advising depends not only on the supply side (systems, advisors) but also on students' own digital competence, a dimension easily overlooked in studies focused on technology and operational processes.

Third, the distinction drawn by Fernandez et al. (2023) between digitising administrative processes (digitisation) and genuinely transforming the operating model (digital transformation) deserves greater emphasis in the Vietnamese context. If the push from Decision 131/QD-TTg (2022) results only in digitising existing advising processes without a parallel redesign toward the proactive, developmental model discussed in Section 3.1, the outcome will remain limited to administrative efficiency gains rather than the substantive shift in the advisor's role documented in the international literature.


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### *3.3. Technology tools supporting academic advising in the digital environment*

The literature review shows that advising-support technology has developed along three main directions, presented in Table 1, each of which carries limitations or risks that should be made explicit rather than assessed solely from the standpoint of technical benefit.

*Table 1. Categories of technology tools supporting academic advising in the digital environment and their limitations*

| Tool category | Characteristics and examples | Source | Limitations/risks to note |
|---|---|---|---|
| E-advising systems | Digitise course registration, curriculum lookup, and student-advisor connection via web portals or mobile devices | An et al. (2016); Brdesee & Alsaggaf (2022) | Improves administrative efficiency but does not automatically raise the quality of advising content unless processes are redesigned around a developmental model (Fernandez et al., 2023) |
| AI-integrated chatbots and virtual assistants | Use natural language processing (NLP), large language models (LLMs), and retrieval-augmented generation (RAG) to provide instant responses and reduce human advisors' workload | Assiri et al. (2020). Ngo Van Thap et al. (2025) | Hallucination risk; acceptance driven more by ease of use and social influence than by perceived usefulness (Bilquise et al., 2024) |
| Data-driven learning analytics and recommender systems | Apply educational data mining and regression, classification, or matrix-factorisation models to predict academic performance, detect at-risk students early, and recommend suitable courses. | Romero & Ventura (2010); Iatrellis et al. (2017) | Risk of predictive bias across demographic groups; ethical concerns over privacy, data consent, and "risk-labelling" effects (Slade & Prinsloo, 2013; Baker & Hawn, 2022; Lee & Kizilcec, 2020) |

Specifically:

- Process-digitisation tools: focus on digitising course registration and information lookup, exemplified by mobile academic-advising support systems that let advisors access student information anytime, anywhere, and automate certain tasks to save time (An et al., 2016).

- Conversational-AI tools: Ngo Van Thap et al. (2025) propose a model for integrating an AI chatbot into the academic-advising system of a university in Hanoi, based on natural-language-processing technology and retrieval-augmented generation (RAG), pursuing three objectives: providing students with instant access to information; reducing the workload of academic advisors; and improving the overall quality of academic support.

Similar results are reported in the systematic review by Assiri et al. (2020), which finds that AI-integrated advising systems help address information overload and ensure consistency in advice, while also raising challenges regarding personalisation and reliability when handling complex situations.

Building on this, a quantitative study by Bilquise, Ibrahim, and Salhieh (2024) of 207 students at two universities in the UAE yields a notable, somewhat counter-intuitive finding: the factors determining students' intention to use an academic-advising chatbot were ease of use and social influence (peer norms, the study environment), whereas perceived usefulness, autonomy, and trust in the system showed no statistically significant effect. This finding directly challenges an assumption often implicit in advising-technology research—that the more functionally useful a tool is, the more readily students will adopt it. In practice, students' adoption decisions may be driven more by convenience of use and peer influence than by a rational assessment of the advisory value received. The implication for designing academic-advising chatbots in Vietnam is that equal investment should go toward user experience and channels of social diffusion


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(for example, dissemination through student networks or integration into class activities), rather than focusing solely on improving the technical accuracy of the language model.

Beyond technology acceptance, chatbots built on large language models also carry the risk of "hallucination", generating inaccurate information with high apparent confidence. In the advising context, this risk is especially serious when it concerns academic regulations, course prerequisites, or registration deadlines areas where an incorrect answer can have direct consequences for a student's academic outcomes. This reinforces the argument made in Section 3.1: conversational technology should be designed as a support layer with built-in fact-verification mechanisms and cross-checks against human advisors for binding decisions, rather than operating as a fully autonomous, stand-alone advising channel.

- Learning-analytics and recommender-system tools: this category is especially significant for shifting academic advising from a reactive model (intervening only once a student runs into difficulty) to a proactive, early-warning model. Educational data mining is a research field that applies data-mining techniques to educational-system data to uncover latent information for improving teaching and learning quality (Romero & Ventura, 2010). Building on this foundation, recommender systems widely applied in e-commerce and entertainment have been studied for use in education to recommend learning resources, elective courses, or study pathways suited to each student's ability and interests, using collaborative filtering, content-based filtering, and hybrid-filtering techniques (Ricci et al., 2015). Predicting course-level academic performance by combining a student's learning-process data with course characteristics allows the system to recommend courses in which the student is likely to succeed, thereby supporting advisors in giving advice grounded in quantitative evidence rather than subjective experience alone. At the same time, early detection of students at risk of poor academic outcomes through classification or regression models allows advisors to intervene promptly, rather than only after a student has already received an academic warning.

However, the very tool category judged to hold the greatest potential is also the one carrying the most significant ethical and fairness risks, an aspect that existing reviews of academic advising in the digital environment, including in Vietnam, address only marginally. Slade and Prinsloo (2013), in a widely cited ethical framework for learning analytics, identify four core issues: ownership and interpretation of learning data; consent and transparency toward students as the subjects of that data; the boundary between surveillance and care in monitoring learning behaviour; and how data is classified and retained over time. These issues are almost absent from the studies of advising technology in Vietnam reviewed above, which focus mainly on technical performance and user satisfaction.

More concerning still, predictive models are not technically neutral tools. Baker and Hawn's (2022) review of empirical evidence shows that predictive models in education tend to exhibit systematic bias by race/ethnicity, gender, nationality, and socio-economic status—meaning a model can achieve high overall accuracy while performing substantially worse for certain groups of students. Empirical evidence from Lee and Kizilcec (2020), based on a university's administrative data, reinforces this concern: the student-success prediction model they built showed gender and racial bias on two of the three fairness metrics examined, and adjusting the model to improve one fairness criterion could worsen another meaning there is no single technical solution that achieves "absolute fairness" across all criteria simultaneously; institutions must instead make deliberate, transparent choices about which fairness criteria to prioritize when deploying such systems.

Applied to the Vietnamese context, if a predictive-analytics system is trained predominantly on data from students in more advantaged areas, the model risks producing less reliable predictions for students from disadvantaged regions, working students, or students with distinct learning patterns precisely the groups that need the closest advising support, yet who risk receiving support based on the least accurate predictions. A further consequence is the phenomenon of "risk labelling". Once a system flags a student as belonging to an "at-risk" group, that label can shape the expectations of both the advisor and the student in a negative direction, producing a self-fulfilling-prophecy effect rather than encouraging positive intervention. This reinforces the recommendation of Iatrellis et al. (2017) discussed below, and further suggests that this recommendation needs to be translated into concrete data-governance and fairness-monitoring principles when applied to academic-advising practice in Vietnam.

Iatrellis et al. (2017), through a systematic review of empirical studies on academic-advising systems from 2008 to 2017, identify three dominant, often overlapping, strands of research: pedagogy-oriented issues, learning analytics, and educational data mining.


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The authors also caution that advising software, however advanced its analytical techniques, cannot and should not fully replace human advisors; instead, it should be designed to strengthen the relationship between students and advisors. This is a point deserving particular attention when applying technology to academic advising in Vietnam.

## IV. CONCLUSION

Academic advising plays a central role in connecting students with the training program and the university. It is shifting from an administrative, prescriptive model toward a personalised, developmental model under the influence of digital transformation. Three categories of technology tools e-advising systems, AI chatbots, and learning analytics combined with recommender systems are reshaping how academic advising is delivered worldwide, with learning analytics and recommender systems holding the greatest potential for shifting advising from a reactive to a proactive, early-warning model, while also being the category that demands the most rigorous ethical and fairness governance.

The literature review shows that research and application in Vietnam remain concentrated in process-digitisation tools and AI chatbots (An et al., 2016; Ngo Van Thap et al., 2025), while learning-analytics and recommender-system tools for predicting academic performance, early warning, and course-selection advising remain at an early research stage and have not been widely integrated into actual advising workflows. On this basis, universities should pursue the following directions: (i) build a centralized learning-data infrastructure, interoperable between the training-management system and the academic-advising system, to underpin predictive-analytics models; (ii) pilot the integration of decision-support tools (predicting academic outcomes, recommending courses) into advisors' actual workflows, rather than confining them to the research stage; (iii) preserve the human role in consequential advising decisions, using technology as a support tool rather than a replacement for the academic advisor, in line with recommendations from the international literature; and (iv) establish internal regulations on data ethics and algorithmic fairness in academic advising, including a mechanism for obtaining student consent for the collection and use of learning data, and a periodic monitoring mechanism to detect predictive bias across different student groups.

More broadly, these directions can be generalized into a "responsible AI" framework for academic advising, built on four mutually reinforcing pillars: (1) algorithmic transparency students and advisors should be able to understand the basis of any recommendation or alert generated by the system, rather than receiving it as an opaque "black box"; (2) data consent and privacy upholding the principle that learning data belongs to students and may only be used for clearly disclosed learning-support purposes; (3) fairness monitoring across demographic and socio-economic groups, to detect and promptly correct predictive bias; and (4) preserving final human decision-making authority in situations with binding consequences for a student's academic pathway. These four pillars do not conflict with, but in fact reinforce, the digital-transformation objectives set out in Decision 131/QD-TTg (2022): technology can only generate sustainable value for academic advising when accompanied by a commensurate governance framework avoiding a situation of "superficial digital transformation," in which heavy investment in infrastructure and tools proceeds while questions of data ethics, advisors' digital competence, and equity of access to learning support remain unaddressed.

A limitation of this paper is that its findings are drawn from secondary literature, without empirical surveys at Vietnamese universities to verify the specific readiness and needs of advisors and students with respect to each category of technology tool, nor experimental data to assess the degree of predictive bias across different student groups in Vietnam. Future research should survey the actual state of digital-technology application in academic advising at Vietnamese universities, providing a basis for proposing and piloting an advising model that integrates predictive analytics and recommender systems suited to domestic conditions, while also testing the fairness of such predictive models across students from different backgrounds before any large-scale rollout.

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