

# A Smart Conflict Resolution Framework for Higher Education Tutoring Using AI

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**Abstract.** This study presents a smart framework for analyzing academic tutoring processes in higher education through the use of artificial intelligence (AI). As universities increasingly adopt open and inclusive educational practices, they are integrating AI-powered tools into their tutoring strategies, emphasizing collaboration as a core principle. Consequently, there is a growing need for intelligent systems that can detect interpersonal or academic conflicts early in the tutor-student relationship. This work combines a conceptual and technical review of AI-supported tutoring environments and explores how such technologies can enhance the organization of tutoring sessions. It promotes a broad range of open applications that support transparency, inclusion, creativity, innovation, and collaboration in academic mentoring. The paper introduces a conceptual framework while also exploring the transformative potential of open educational practices in academic tutoring contexts. The findings suggest that AI not only enables more effective conflict resolution but also enhances the overall quality of the educational process, encourages deeper learning, and provides valuable insights for institutional decision-making. This proposal contributes to rethinking academic tutoring through a more human-centered perspective, supported by technology but always focused on the individual and their personal development.

**Keywords.** Artificial Intelligence, academic mentors and advisors, E-learning, academic environments.

## 1 Introduction

Education is one of the sectors that has had to shift most urgently to virtual or online formats to ensure continuity in student learning at all levels: from basic education to higher education institutions (HEIs) and graduate programs, as noted by Roa Rivera (2023).

Universities around the world launched various initiatives to support and guide students. In Mexico, as elsewhere, institutions faced major challenges that forced them to adopt creative and innovative strategies to restructure their core functions of teaching, research, outreach, dissemination, and extension, making the most of available technology García and Cordero (2024).

Amid these changes, academic tutors have taken on increasingly critical roles within HEI networks, leading to an improvement in the tutoring experience for students, Rodríguez (2024). Drawing on faculty experiences at Mexican universities, this study explores the importance of academic tutoring in shaping the student experience, as well as the challenges faced by faculty members acting as personal tutors and the areas identified for improvement.

The methodology section of this article highlights the benefits of using action research in academic tutoring and how it can lead to more successful projects by involving key stakeholders:

faculty and students, in one-on-one mentoring. An analysis of collected data identifies three key issues: ambiguity around the role of academic tutors, unclear goals or purposes of individual tutoring sessions, and a lack of trust in faculty, Wakelin (2023).

In recent years, both in practice and research, academic tutoring has gained increasing importance. More and more institutions are implementing strategies to mentor university students, particularly to support their retention and academic completion Salazar, Hernández, and Ávila (2023).

Despite the growth in studies, research, and tools to support tutoring, there is still a lack of research into student behavior, especially within academic and professional contexts, even though academic tutoring programs are increasingly common. Understanding how students feel, act, and respond to the tutoring process should not be seen as a bonus, but rather as an essential component if these strategies are to be truly effective. Students' behavior influences not only their academic performance but also the way the pedagogical relationship with the tutor is built and sustained a relationship that is often more complex and delicate than it is recognized to be Chandrasekera et al. (2024).

Reference Romero and Burgoa (2023) highlights the importance of academic tutoring in HEIs and presents a study on how students benefit from one or more academic tutors in terms of performance and improvement.

In Mexican universities, particularly autonomous institutions, there is a strategic plan to assign a group of university students to each academic tutor. In some universities, tutoring groups are considered highly valuable, as they play a key role in both academic progress and learning, as noted in García Martínez (2023).

Currently, new tools are needed to improve tutoring for students, especially those who need academic reinforcement or guidance on how to manage their coursework and implement effective strategies to successfully complete their studies. As noted in Vázquez and Gutiérrez (2023), AI tools today are highly beneficial for managing many tasks traditionally handled by humans, including managing tutoring groups within universities or research institutes. Given the high number of

students and the need to address academic, social, and didactic conflicts, AI-based tools can serve as a valuable support mechanism for enhancing tutoring, as recommended in Perera and Padilla (2024).

In Zhang and Goyal (2024), researchers examined the use, perceptions, and impacts of decision-support systems in higher education administration. Focusing on their strategic value, a cross-sectional survey was conducted among HEI administrators from various institutions.

The research reveals a positive influence on strategic planning, enrollment management, resource allocation, and student success initiatives. It also shows a clear link between system use and favorable outcomes, including greater efficiency and perceived benefits Veneros Barrios (2020). Nevertheless, current challenges in administrative management, such as data quality, privacy concerns, and resistance to change, highlight the need to strengthen data management strategies, ethical considerations, and change management approaches.

As scholar-practitioners, we firmly believe that future research must go beyond academic outcomes to focus on the human dimension, responding to student questions and supporting them throughout their academic journey. In this way, more sensitive, empathetic, and coherent tutoring models can be designed for university students, addressing the genuine complexity of this sector today Trolan (2023).

## **2 Theoretical Framework and State of the Art**

As mentioned in Wakelin (2021), increasing pressure on students has led to a diversification of their support needs, placing greater demands on personal tutors to provide comprehensive answers. The definition of a personal tutor makes it clear that tutors may not always have the capacity to offer all necessary support but can act as facilitators by referring students to other support services. The manual includes a detailed list of services in key areas identified by both staff and students, such as academic and study skills, attendance and engagement, employability, and well-being. While this may not enhance the tutor's

expertise directly, it does broaden their awareness of the support network available.

A more recent definition of mentoring outlines five core characteristics, which are explored in more depth. First, it builds on pre-existing tutoring programs that were already designed and implemented with specific goals in mind. These goals include promoting student success, developing competencies, and supporting professional growth. Second, online tutoring programs grounded in learning theories can be led by a more experienced peer, a faculty tutor, or a professional in the field. An analysis conducted in this study revealed the following:

- Peer tutoring is frequently used to improve student success.
- The role of tutors is critical in developing students' competencies, and both academic and professional tutors are commonly involved in fostering professional growth.
- Academic tutors often receive specific training, which tends to serve as compensation for the lack of professional tutoring experience.

Fourth, mentors and mentees engage in developmental relationships established through individual or group mentoring sessions. The focus on fostering student reflection through cyclical, personalized feedback aligns closely with key learning theories Nuis, Segers, and Beausaert (2023).

In George and Wooden (2023), one of the key areas where AI has had an impact on HEIs is data collection and analysis for teaching, learning, and administrative purposes. Intelligent tutoring systems and virtual assistants can provide personalized guidance and support tailored to individual student needs and learning styles.

Another study investigates the rapid advancement of AI and its strategic implications for the concept of "smart universities" (George & Wooden, 2023; Atenas, Nerantzi, & Bussu, 2023; Roa Rivera, 2023; Pérez & Toledo García, 2024). Recent researchers have focused on integrating AI into educational settings, particularly academic tutoring, to enhance learning and student outcomes. AI-powered virtual tutors in university settings enable timely feedback and adaptive

learning strategies, contributing to more effective tutoring experiences.

Despite these advances, ethical challenges remain central to the implementation of AI in education. Issues around personal data privacy and the nature of interactions within educational processes are key to ensuring responsible and effective use of these technologies Ifenthaler et al. (2024).

Proper training for tutors in AI-based tools is essential to maximize their benefits while minimizing potential drawbacks. Peer mentoring also remains a valuable strategy for supporting students' academic and professional development, complementing technological tools (Basri, 2024).

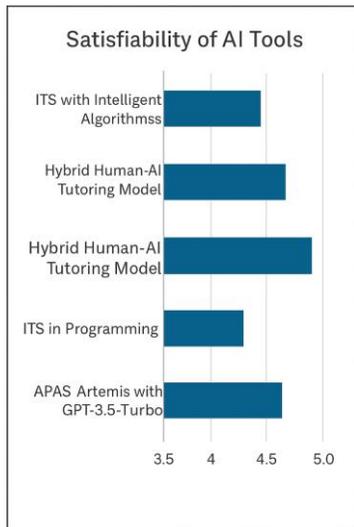
Combining traditional and technological approaches to tutoring can create a more comprehensive and effective educational experience. Higher education institutions must continuously evaluate the effectiveness of these programs and make evidence-based adjustments to meet students' evolving needs Basri, (Thomas et al., 2024).

Collaboration among departments and active engagement from all stakeholders are essential for the success of tutoring initiatives. Finally, continued research in this area is necessary to identify best practices and ensure that tutoring interventions remain effective and sustainable.

### 3 Results Overview

This article proposes three key components as a research strategy. It begins by addressing the structure of academic tutoring, emphasizing the necessary steps for planning and delivering effective sessions. Next, it highlights the importance of deep subject knowledge on the part of the tutor, which is crucial for applying appropriate teaching-learning strategies. Finally, it focuses on student learning outcomes as the goal. These components are detailed below:

- Tutoring Structure: This element examines the organization and systematization of the tutoring process, including session planning, tutor availability, and clarity of objectives for each meeting Aranda, Villagómez Cabezas, and Moreno Tapia (2025).



**Fig. 1.** AI-powered Software Tools for Academic Tutoring

- Tutor Knowledge: This assesses the depth and relevance of the tutor's expertise in their specific academic field Guo et al. (2024).
- Teaching Strategies: This focuses on the pedagogical techniques employed by the academic tutor Liu et al. (2024) Liu et al. (2024).
- Student Learning: This indicator evaluates the outcomes achieved by students through the tutoring process Park et al. (2024).

The results presented in this article demonstrate that the use of AI-powered software tools leads to highly satisfactory outcomes. Moreover, it is emphasized that feedback is critical: both for improving academic environments and for enhancing the AI systems themselves, which learn through interaction with professional or academic tutors.

Some of the most important AI-driven academic tutoring software tools evaluated between 2020 and 2025 include:

- APAS Artemis with GPT-3.5-Turbo: An exploratory study integrated the GPT-3.5-Turbo model as an AI tutor within the APAS Artemis platform, which is used for teaching software engineering. The results showed improvements in student learning and educational efficiency (Frankford et al., 2024).

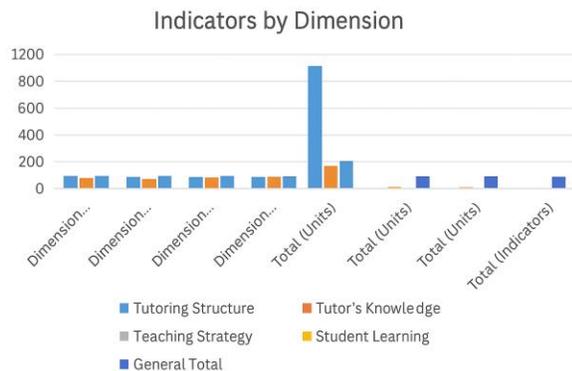
- Intelligent Tutoring Systems (ITS) in Programming: Research has evaluated the effectiveness of ITS platforms for students with varying programming experience. These systems improved academic performance and adapted well to different skill levels (Fodouop Kouam, 2024).
- Hybrid Human-AI Tutoring Models: A model combining human instruction with AI assistance showed positive impacts on learning processes and student academic performance (Thomas et al., 2024).
- AI Integration in Moodle for Academic Monitoring: A proposed architecture used autonomous agents in Moodle to monitor online student performance, enhancing personalization and learning follow-up (López-Goyez, González-Briones, & Chamorro, 2024).

Intelligent Tutoring Systems for Computer Programming: A system designed to teach programming using intelligent algorithms, such as ant colony optimization, enabled efficient, autonomous learning for students (Sharma & Harkishan, 2022).

Figure 1 presents a comparison of five AI-focused tools for university-level academic tutoring, evaluated over the 2020–2025 period. These tools supported student mentoring, and the study involved 1,822 students across the different platforms. The findings show strong student acceptance of AI tools in recent years. E-learning platforms like Moodle, when combined with well-designed pedagogical strategies, offer tangible benefits.

The evaluation emphasizes the importance of maintaining a balanced, multidimensional approach when analyzing educational quality. Only through such an approach is it possible to clearly identify which areas need reinforcement to improve platform effectiveness and support student academic growth.

As shown in Figure 2, the results paint a promising, yet complex picture, one marked by optimism but also uncertainty surrounding the role of AI in today's educational landscape. While student learning outcomes have improved, some concerns have arisen regarding the loss of human and social interaction. Despite this, students in



**Fig. 2.** Student Learning Outcomes through AI-assisted Tutoring



**Fig. 3.** Teaching Strategies in Academic Tutoring Contexts

academic environments have shown clear learning gains. The most significant area of improvement has been in teaching strategies, which are foundational to the tutoring process. Tutors initially rely on these strategies as a key component of both academic and mentoring environments.

Figure 3 proposes an academic tutoring strategy for the future, built on the use of AI-powered software tools in academic and professional environments. By equipping both students and tutors to use these technologies effectively, not by outsourcing all tasks to them, multiple areas of improvement can be achieved.

The core innovation of this research lies in the development of an automated online academic monitoring platform for university-level professional tutoring. This hybrid platform enhances specific aspects of the tutoring process.

The proposed software tool is capable of supporting students much like an attentive tutor would, but with the consistency and precision that only technology can offer. It is an AI- and machine learning-driven platform designed to monitor each student's academic performance, not only through

grades but also by analyzing their participation, content access frequency, and study habits. The idea is for the system to not just collect data but to turn it into useful, humanized, and timely messages: a reminder before a deadline, an encouraging note after a dip in performance, or a practical suggestion for improvement.

This is not about replacing the tutor but rather enhancing their role. With access to such data, tutors can gain a clearer picture of each student's needs and make more informed decisions, tailored to individual contexts. This is not speculative; similar proposals have already been successfully tested at prestigious universities, benefiting hundreds of students.

These experiences affirm what many educators have long believed: when technology is implemented with pedagogical intent, it becomes a true ally. Such tools not only reduce the administrative burden on faculty but also enable more precise and far-reaching support.

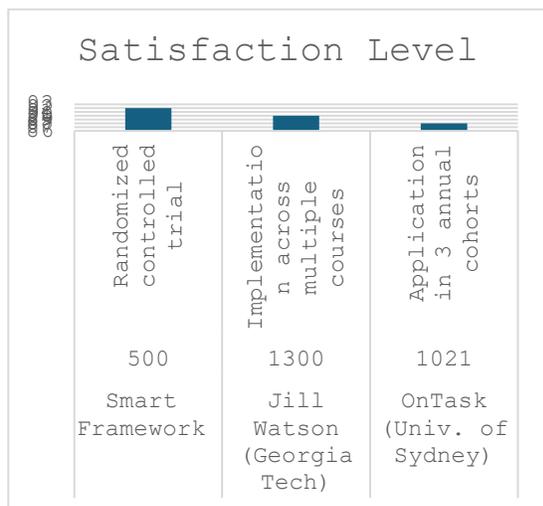
These systems offer personalized attention, timely interventions, and most importantly the feeling that someone is genuinely paying attention to the student's progress.

The Smart Framework (Figure 4) is not built on speculation: it draws from successful past implementations and adapts them to emerging needs. It is a flexible tool, capable of evolving with the educational environment and making decisions based on concrete data, while never losing sight of what matters most: supporting each student with a human touch, powered by artificial intelligence.

Figure 4 shows how students rated three AI-based approaches to university tutoring and mentoring. The Smart Framework was tested with 500 university students and achieved a 92% satisfaction rate under controlled trial conditions. Although the sample was small, the tool is scalable and suitable for broader adoption.

Ultimately, these experiences underscore a deeper truth: this is not just about technical efficiency, it is about how technology, when designed with empathy and implemented thoughtfully, can transform the very act of learning.

Rather than creating distance, AI, when used wisely, can become a stronger bridge between tutors and students, reinforcing the human connection that gives university life its meaning.



**Fig. 4.** Student Satisfaction in AI-Driven Tutoring Environments

## 4 Conclusions

By evaluating key elements such as the structure of academic tutoring, the tutor's subject-matter expertise, pedagogical strategies, and student learning outcomes, this study reveals that the academic and institutional dimensions receive the most attention. However, aspects such as the ongoing training and professional development of tutors demand greater institutional emphasis.

The comprehensive analysis conducted on educational platforms, using standardized evaluation criteria proposed by nationally and internationally recognized bodies, enabled the precise identification of factors that influence the quality of academic tutoring in universities.

This research clearly demonstrates that when artificial intelligence is thoughtfully integrated with pedagogical purpose, it has the potential to significantly enrich academic tutoring in higher education. Cases like the Smart Framework show that it is possible to provide personalized, timely follow-up on each student's progress without sacrificing the human bond that defines meaningful tutoring. Rather than replacing tutors, AI can complement and enhance their reach and responsiveness.

In today's increasingly complex and diverse educational landscape, striving for a balanced

combination of technology and empathy is not merely an option: it is an essential educational need.

Finally, this study underscores the importance of achieving a well-rounded evaluation of the tutor-student relationship within Higher Education Institutions (HEIs). This balance must address both academic and professional dimensions, as both are critical in addressing the current challenges of the educational context.

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