



WP3: Participatory Action Research on Needs and Prioritisation Map



TABLE OF CONTENTS

Chapter 6 Needs and priorities of HE educators in relation to ITS. Lessons learnt.....	2
6.1 Needs.....	2
6.1.1 Personalization of learning	3
6.1.2 Effective assessment	4
6.1.3 Workload reduction	4
6.1.4. User Experience and Engagement.....	5
6.1.5. Improved communication and collaboration.	5
6.1.6. Early detection of difficulties	6
6.1.7. Infrastructure and Accessibility.....	7
6.1.8. Training, Support and continuous improvement	8
6.2 Priorities	9
6.2.1 Best practice Usability and ease of use.....	9
6.2.2 System integration	9
6.2.3 Educators' training	10





Chapter 6 Needs and priorities of HE educators in relation to ITS. Lessons learnt

The educators at higher education institutions (HEI) are the professionals responsible for developing students' knowledge, skills, and abilities through formal education. Due to technological advancements that have the potential to revolutionize the education system, educators have certain needs and priorities regarding the use of the Intelligence tutoring system to support students in their academic journey and to provide individualized support and guidance during their learning process (Merrienne, C., & Woolf, B.P. (2019). To sensitize educators about the use of generative AI (Sancar et al., 2021), we reviewed the scientific, up-to-date literature to distill their needs and priorities.

Therefore, as technology advances, it is crucial to understand educators' needs and priorities to fully realize the potential of ITS: An in-depth look.

6.1 Needs

Innovations in EdTech (education technologies) and digital technology advancements increased the application of personalized learning. Personalized learning is essential because it tailors education to meet each learner's unique needs, strengths, and interests and allows them to progress at their own pace. It provides content and features that are adaptive to individual needs and is effective and efficient in supporting and promoting desired learning outcomes (Spector, 2016; Outhwaite & Van Herwegen, 2023). To support personalised learning the intelligent tutoring systems play an important role (Shemshack & Spector, 2020), because it uses advanced algorithms and data analytics to assess individual learning styles, preferences, and performance. However, personalized learning yet remains among the biggest challenges in the educational systems, as it requires a novel approach and the re-development and orchestration of the existing digital solutions to achieve the required customisation, quality and outcomes.

Need: Provide each student with a personalized learning experience that adapts to their pace, learning style, and individual needs.

Priorities:

- Systems that can accurately assess each student's knowledge, skills, and preferences.





- Algorithms that adapt content, activities, feedback and learning pace based on individual progress.
- Options for educators to customize the system to their specific needs and those of their students.
- Customizable Learning Paths. Enabled customization of learning paths within the HITS to cater to different courses, subjects, and student needs.
- Seamless Integration with Existing Curriculum. Align the HITS with the university's curriculum to ensure that it complements and enhances traditional teaching methods rather than replacing them.

6.1.1 Personalization of learning

In accordance with the 2030 Sustainable Development Goal 4, which aims to ensure inclusive and equitable education and promote lifelong learning opportunities for all, inclusive education shall cover all aspects of educational policy and its implementation (Ainscow, 2020). Higher education institutions need to provide inclusive education to ensure equal opportunities for all students, regardless of their diverse backgrounds, abilities, or socio-economic statuses. By embracing inclusivity, high education institutions enhance their academic community and fulfill their social responsibility to contribute to a more equitable and just society. However, research shows that students with disabilities are yet marginalized from inclusive and equitable quality education (McLinden et al., 2023), especially in less developed economies (Hennessy et al., 2021). In accordance with the inclusion policies and practices, the university's digital infrastructure should effectively support the needs of all students, especially if they require assistive technologies to close the gap.

Need: provide each student, especially students from marginalized groups, regardless of their diverse backgrounds, abilities, or socio-economic statuses, with technologically orchestrated solutions for their better engagement in the education process.

Priorities:

- Digital systems that operate in accordance with assistive technologies;
- Options for high education institutions to integrate multiple and innovative technological solutions to ensure the usability and accessibility to the HITS.





6.1.2 Effective assessment

The recently organized discussion for diverse groups of academic personnel, including educators, administrators, and in-service teachers participated in the professional development session (Nyaaba, M., & Zhai, X. 2024), highlighted the need for the automatic scoring and other assistance provided with the use of generative AI.

Need: Offer students timely, quality evaluation and feedback that helps them improve their learning.

Priorities:

- Systems that can automatically evaluate student work in different formats (written, oral, practical, etc.). HE educators have an increasing demand for the students assignments' evaluation using GAI (Nyaaba, M., & Zhai, X. (2024).
- Automated, personalized feedback that identifies areas of strength and improvement, including specific suggestions for action.
- Options for educators to review and customize system-generated feedback, adding relevant comments and examples.

6.1.3 Workload reduction

The increasing administrative and grading workload faced by educators is a significant challenge that can detract from their primary responsibilities of teaching, interacting with students, and conducting research. There is a pressing need to alleviate these burdens to allow educators to focus more on qualitative aspects of education and student engagement.

To meet this need, universities should prioritize the implementation of systems that can automatically grade assignments, exams, exercises, and written work, thereby freeing up valuable time for educators to provide in-depth, qualitative feedback. Additionally, incorporating classroom management tools that automate routine administrative tasks—such as tracking attendance, creating schedules, communicating with students, and organizing group activities—can further reduce the workload on educators. It is also crucial to provide options for educators to configure and customize assignments and assessments according to their specific requirements, ensuring flexibility and relevance in their teaching methods. By focusing on these priorities, universities can significantly reduce the administrative and grading workload, enabling educators to dedicate more time to enriching the student learning experience and advancing their research initiatives.





Need: Reduce administrative and grading workload, so educators can devote more time to teaching, interacting with students, and research.

Priorities:

- Systems that can automatically grade assignments, exams, exercises and written assignments, freeing up time for qualitative evaluation.
- Classroom management tools that automate administrative tasks such as attendance, creating calendars, communicating with students, and organizing groups.
- Options for educators to configure and customize assignments and assessments to their needs.

6.1.4. User Experience and Engagement

With the rapid advancement of technology, educational institutions are increasingly focused on leveraging intelligent tutoring systems (ITS) to enhance the learning experience for students. These AI-driven platforms significantly improve student engagement and academic outcomes. However, despite their potential, many universities face challenges in effectively integrating these systems into their educational frameworks. To fully realize the benefits of ITS, it is crucial for universities to address specific needs and make strategic improvements and develop intuitive and engaging digital infrastructure

Need: Improved student 's experience during the education process.

Priorities:

- Intuitive User Interface. Design an intuitive and user-friendly interface that makes it easy for students to navigate and use the ITS.
- Gamification and Interactive Elements. Incorporate gamification elements and interactive features to boost student engagement and motivation.

6.1.5. Improved communication and collaboration.

In today's interconnected educational landscape, effective communication and collaboration are essential for enhancing the learning experience and fostering a sense of community within universities. The need to improve communication and collaboration among students, between students and educators, and among educators themselves is critical for creating a dynamic and supportive educational environment.





To address this need, universities should prioritize the development and deployment of tutoring platforms that enable real-time interaction between students and educators, both on an individual basis and within group settings. It is important to allow students to work together as a team, share ideas, and efficiently manage projects and to equip educators with the ability to moderate and manage online interactions, ensuring that the virtual learning environment remains positive, inclusive, and conducive to collaboration.

Need: Foster communication and collaboration between students, between students and educators, and between educators.

Priorities:

- Tutoring platforms that facilitate interaction between students and educators in real time, both individually and in groups.
- Collaboration tools that allow students to work as a team, share ideas and carry out projects effectively.
- Options for educators to moderate and manage online interactions, fostering a positive and collaborative learning environment.

6.1.6. Early detection of difficulties.

Early detection of students facing academic difficulties is vital for ensuring timely intervention and support. Early and effective identification of students at risk of failure or in need of additional assistance is increasingly recognized as a critical factor in improving student retention and success rates. High intelligent tutoring systems (HITS) can play a pivotal role in this process by providing sophisticated tools for analyzing student performance, online interactions, and engagement patterns to identify early signs of academic struggle.

To address this need, universities must prioritize the development and integration of systems capable of conducting comprehensive analyses of various data points to detect potential difficulties. These systems should be equipped with features that generate timely alerts and notifications, enabling educators to intervene promptly with personalized support tailored to each student's specific needs. Additionally, it is essential to provide educators with options to customize difficulty detection criteria and receive actionable recommendations, ensuring that interventions are both targeted and effective.

Need: Early and effective identification of students at risk of failure or in need of additional support.





Priorities:

- Systems that can analyze student performance, online interactions, and engagement patterns to detect signs of difficulty.
- Timely alerts and notifications so that educators can intervene early and personalized.
- Options for educators to customize difficulty detection criteria and receive specific action recommendations.

6.1.7. Infrastructure and Accessibility

In accordance with the 2030 Sustainable Development Goal 4, which aims to ensure inclusive and equitable education and promote lifelong learning opportunities for all, inclusive education shall cover all aspects of educational policy and its implementation (Ainscow, 2020). Higher education institutions need to provide inclusive education to ensure equal opportunities for all students, regardless of their diverse backgrounds, abilities, or socio-economic statuses. By embracing inclusivity, high education institutions enhance their academic community and fulfill their social responsibility to contribute to a more equitable and just society. However, research shows that students with disabilities are yet marginalized from inclusive and equitable quality education (McLinden et al., 2023), especially in less developed economies (Hennessy et al., 2021). In accordance with the inclusion policies and practices, the university's digital infrastructure should effectively support the needs of all students, especially if they require assistive technologies to close the gap.

Need: provide each student, especially students from marginalized groups, regardless of their diverse backgrounds, abilities, or socio-economic statuses, with technologically orchestrated solutions for their better engagement in the education process.

Priorities:

- **Accessibility for All Students:** Implement solutions that make HITS accessible to students with disabilities, ensuring compliance with accessibility standards and promoting inclusivity.
- **Digital systems that operate in accordance with assistive technologies.** Options for high education institutions to integrate multiple and innovative technological solutions to ensure the usability and accessibility to the HITS.
- **Robust IT Infrastructure:** Ensure that the university's IT infrastructure can support the deployment and scaling of high-intelligence tutoring systems. This includes high-speed internet, reliable servers, and adequate storage solutions.



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- **Data Privacy and Security.** Implement stringent data privacy policies to protect student information and ensure compliance with relevant data protection regulations. Use advanced security measures to safeguard data and prevent unauthorized access.

6.1.8. Training, Support and continuous improvement

The implementation of high intelligent tutoring systems (HITS) in universities holds great promise for transforming the educational landscape by offering personalized and adaptive learning experiences. However, to maximize the effectiveness of these systems, it is essential for both faculty and students to be adequately prepared and supported. Comprehensive faculty training programs are crucial to equip educators with the skills necessary to seamlessly integrate ITS into their teaching practices, ensuring they can leverage the full potential of these advanced tools. Similarly, student orientation sessions are vital to familiarize learners with the ITS interface, functionalities, and benefits, enabling them to utilize the system effectively from the outset.

Moreover, establishing regular feedback mechanisms is essential to gather valuable input from both students and faculty regarding their experiences with the ITS. This feedback is indispensable for identifying areas of improvement and making informed decisions about necessary enhancements. Finally, ongoing system updates, informed by this continuous feedback and technological advancements, are critical to maintaining the relevance and efficacy of the ITS. By addressing these key areas, universities can significantly enhance the overall student experience and drive better academic outcomes through the effective use of intelligent tutoring systems.

Need: to prepare university staff and students for the effective use of HITS.

Priorities:

- **Faculty Training Programs:** Develop comprehensive training programs to equip faculty and staff with the skills needed to effectively utilize and integrate ITS into their teaching practices.
- **Student Orientation Sessions:** Conduct orientation sessions for students to familiarize them with the ITS interface, functionalities, and benefits.
- **Regular Feedback Mechanisms:** Establish regular feedback channels for students and faculty to provide input on their experience with the ITS.
- **Ongoing System Updates:** Continuously update and improve the ITS based on feedback and technological advancements to ensure it remains effective and relevant.





6.2 Priorities

The successful integration of High Intelligent Tutoring Systems (HITS) into academic environment requires a careful prioritisation of needs to ensure their effectiveness. Based on previously reviewed needs and priorities, it was identified that usability and seamless system integration with existing platforms and workflows are crucial to minimise disruption in daily practices. Additionally, providing thorough training for administrative staff and educators helps bridge the gap between technological innovation and practical use, making HITS accessible in everyday practice. Prioritizing these aspects is essential to avoid underutilisation of the system and to maximize its potential for enhancing academic success, ensuring that all stakeholders feel confident and supported in leveraging its capabilities.

6.2.1 Best practice Usability and ease of use

One of the most critical priorities for High-Intelligence Tutoring Systems (HITS) is **usability**. Usability refers to how easily users—both educators and students—can interact with and benefit from the system. **An intuitive interface** that requires minimal training is essential to ensure that the system is accessible to individuals with varying levels of technical proficiency. **Ease of use** includes simplifying navigation, offering clear instructions, and providing a seamless experience across devices. Usable systems allow educators to focus on teaching and students to concentrate on learning without being hindered by the technology itself. According to research in EdTech, systems with high usability improve student engagement and retention because they minimize frustration and cognitive load. Therefore, HITS should prioritize a design that facilitates smooth learning processes, reducing the barrier to adoption and allowing educators to integrate it effortlessly into their pedagogical practices.

6.2.2 System integration

For HITS to be effective, **system integration** is a top priority. Integration refers to the ability of HITS to work in conjunction with existing Learning Management Systems (LMS), institutional data systems, and educational resources. When integrated well, these systems can pull data from existing student records, allowing for seamless personalization of content. For example, HITS should integrate with a university's grading systems, communication platforms, and curriculum management software to streamline workflow for educators and students. Effective integration reduces redundant data entry, aligns ITS functionalities with the current curriculum, and ensures that the system enhances rather than disrupts the existing educational framework. The ability to sync with other systems also allows educators to customize learning paths, making HITS a powerful tool that complements traditional





methods rather than functioning as a standalone entity. Therefore, universities should prioritize integration as a strategic goal when implementing HITS

6.2.3 Educators' training

Teacher's and administration staff training is another significant priority for the successful adoption and utilization of High-Intelligence Tutoring Systems. Even the most advanced system will not realize its full potential unless educators are properly trained to use it effectively. Training should focus on both the technical aspects of the system and its pedagogical applications. This includes training educators to set learning objectives, track student progress, interpret system-generated reports, and provide supplemental guidance based on data insights from HITS. Moreover, ongoing professional development and support are crucial to ensure that teachers remain up to date with system updates and new features. Universities should develop comprehensive training programs that not only cover the initial use but also encourage continuous learning, offering educators the confidence and tools to maximize HITS in their classrooms. When educators are empowered with the right skills, they can better leverage the technology to enhance student outcomes, make data-driven decisions, and provide personalized support.

In conclusion, the successful implementation of High Intelligent Tutoring Systems (HITS) hinges on addressing key needs and setting clear priorities. Usability and ease of use must remain central to design and development, ensuring that all users—students, educators, and administrators—can interact with the system efficiently and effectively. Seamless integration with existing educational infrastructures is crucial to avoid disruption and to foster smoother transitions in daily operations. Additionally, comprehensive training programs for teachers and administrative staff will be vital for ensuring widespread adoption and consistent use of HITS. By prioritizing these factors, educational institutions can maximize the potential of HITS, transforming it from a technological tool into a vital resource that promotes long-term academic success.

