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(JISTM)**www.gaexcellence.com/jistm**AI-DRIVEN LEARNING FOR IMC413: ENHANCING
MASTERY THROUGH ASKME247**

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Abstract:

This study assesses AskMe247's instructional viability and pedagogical efficacy, a course-specific AI-driven learning assistant engineered to support higher education students in mastering IMC413 Information Storage and Retrieval. The course presents learning challenges due to its abstract theoretical constructs and dense technical terminology, such as search algorithms, metadata indexing, and retrieval models. Employing a mixed-methods design, empirical data were gathered from 40 respondent of IMC413 students, who had been selected across two distinct academic cohorts using purposive sampling. Quantitative survey metrics evaluating ease of use, conceptual mastery, efficiency, and engagement were combined with qualitative open-ended responses and continuous system usage logs collected over one semester. Results reveal that AskMe247 significantly enhanced student's self-reported confidence and conceptual comprehension, with over 80% of respondents reporting improved clarity on complex topics previously unaddressed in live lectures due to hesitation. Students described AskMe247 as easing anxiety, acting like a confidence enhancer and serving as a constant personal tutor, while usage logs indicated peak engagement during exam preparation weeks. additionally, the platform showed initial utility in streamlining routine inquiry resolution, thereby

lowering repetitive instructional workload. The implication of this research is the research helps educators implement AI tools in classroom settings and outlines simple safety measure for source attribution and fair content use. Instead of relying on generic conversational AI, AskMe247 shows how specialized, adaptive systems can be embedded into technical courses to bridge classroom instruction with self-directed study. The implications of this study show how educators can incorporate domain-tailored AI tools into classroom environments while keeping simple safeguards for source attribution and fair content use. Instead of depending on broad, general-purpose conversational models, AskMe247 demonstrates how adaptive, course-specific AI can connect classroom instruction with self-directed study, encouraging deeper learning and supporting technical curricula.

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Keyword:

Adaptive Learning, AI-Driven Learning Educational Technology, Higher Education, IMC413, Information Storage and Retrieval, Self-Directed Learning



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Introduction

The use of Artificial Intelligence (AI) in education today helps deliver more personalized, flexible, and student-centered learning experiences. Access to real-time academic support via online AI-powered learning tools also enables students to tackle challenging subjects outside of the formal learning environment. While Holmes et al. (2019) and Carvalho & Sharma (2022) discussed how learning can be tailored to individual learners, such that they can learn better and become more independent, the application and benefits of learning tailoring in higher education, particularly in Information Storage and Retrieval (IMC413) courses with abstract theoretical concepts and numerous technical terms and definitions, are further elaborated in this paper. Specifically, difficulties that learners encounter in trying to comprehend indexing, search procedures and retrieval frameworks and applying them in realistic scenarios are also discussed (Chen et al., 2020).

The AskMe247 system was developed for students taking the IMC413 Information Storage and Retrieval course. It can function as a 24-hour AI learning assistant. AskMe247 provides guided explanations, feedback, and assessment for students who engage in self-directed learning. It can facilitate a connection between classroom learning and individual learning outside the classroom. Technical content can be made simpler, and students can acquire confidence in learning. It was designed based on the intelligent tutoring systems framework (Woolf, 2021; Luckin et al., 2016). An early trial run using the system showed that students using the AI-based tool could master course materials better and have the courage to explore more complex materials (Jiao et al., 2021).

The impact of individual learning goes beyond this, as AskMe247 also supports the larger objective of the digital transformation of higher education to support various models of education, including hybrid, online and flipped learning models. This innovative system, while reducing the instructional time of faculty members in repetitive tasks, supports learning analytics and AI-enabled learning innovations to support future-ready education systems (Tsai & Gašević, 2017). Being scalable and integrable with learning management systems, this system has great potential to be replicated across disciplines to support strategic innovation in academic institutions, empower students to take charge of their learning and support the digital growth of academic institutions through facilitation of continuous, flexible and inclusive learning.

AskMe247 is particularly invented to address the learning difficulties encountered by students who registered subject IMC413 Information Storage and Retrieval. It is a course characterized by abstract theoretical constructs and dense technical terminology, which require both high conceptual clarity and practical application. To support the course learning outcomes, AskMe247 functioned 24/7 provided a real-time assistance, offer guided practice and personalized feedback. It bridges the gap between classroom instruction with student's self-reliant study. The system helps students grasp the theoretical understanding by simplifying technical content into contextual, easier to understand explanation. It allows students to actively practice, simulate question formulation, track progress and retrieval exercises while mastering the IMC413 topics. Furthermore, the outcome of this system will strengthen students' confidence, offer anxiety-free environment outside class, increase engagement, and improve course content understanding in information storage and retrieval.

The main objective of this study is to determine the extent to which AI-powered learning support, AskMe247, enhances the learning performance and understanding of Information Storage and Retrieval concepts among IMC413 students. It also intends to examine the impact of AskMe247 on student engagement and confidence in learning.

Literature Review

AI, or artificial intelligence, has become a global trend in the classroom, turning classrooms into more customized, adaptable, and student-centered ecosystems. Learning assistants with AI capabilities have shown great promise for improving student autonomy, engagement, and comprehension. According to Woolf (2021), intelligent tutoring systems enhance academic results by tracking learner progress and offering contextual feedback. Similarly, Luckin et al. (2016) stress that by adjusting to personal demands and learning preferences, AI technologies promote deeper learning. In difficult courses like Information Storage and Retrieval, where students frequently struggle with abstract concepts like indexing, search algorithms, and retrieval models, such systems are especially helpful (Chen et al., 2020).

Recent study indicates that the impact of the learning process differs depending on how AI-supported learning can improve students' academic and affective outcomes. In a meta-analysis of 24 randomized tests, Wu and Yu (2024) found that AI chatbots significantly improved students' learning outcomes, with higher education students exhibiting greater effects. However, they discovered that shorter interventions were more effective than lengthier ones. This implies that results may be impacted by the length of AI-supported learning and novelty. While earlier studies showed that schooling promotes AI through experimental assessment,

Deng et al. (2025) collected 69 experimental investigations discovered that ChatGPT therapies improved higher-order thinking, affective-motivational outcomes, and academic achievement.

Evidence on student involvement is further strengthened by Heung and Chiu's (2025) systematic review employing meta-analysis of 17 empirical research papers including 1735 students. The study discovered that ChatGPT-supported learning had a medium overall impact on student engagement (Hedges' $g=0.55$). The study's findings demonstrated that using ChatGPT, content production, technical assistance, and customized instruction can enhance behavioral, cognitive, and emotional involvement. However, over-reliance on AI could lead to disengagement. This suggests that AI-supported learning's pedagogical design is still crucial.

Embracing the AI-driven systems in higher education from instructional perspective, indicates few challenges including the administrative burden and teaching workloads. Hamzah (2025) and Tsai & Gasevic, (2017) stated that automating repetitive primary support reduces cognitive overload for educators and allows active blended learning with creative curriculum innovation. AI able to cope with these issues and evidence was showed by Goldman et al (2024) as they studied how AI may assist special education teachers with their common time-consuming tasks and emphasized on how AI can reduce their burden especially in progress monitoring and instruction adjustment.

In Malaysia, the significance of artificial intelligence in higher education has garnered attention. Students in Malaysian institutions expressed high levels of enjoyment and perceived utility while interacting with AI tools, especially in courses requiring technical competence, according to Mat Yusoff et al. (2025). Recent studies were conducted to investigate the usefulness of AskMe247 and other existing AI systems in bridging individual study and classroom learning. Hamzah (2025) elaborated on how the implementation of AI in higher education in Malaysia could bring about a revolutionary learning experience by means of personalized learning and adaptive teaching. Meanwhile, the National Artificial Intelligence Roadmap 2021–2025 (MIDA, 2025) has initiated several key performance indicators towards the implementation of AI, such as AI curriculum, AI-skilled human resources, and others, but its implementation is in its nascent stage.

The effort to develop the AI-driven learning platforms also ties in with the broader global educational reforms aimed at equipping future workforces. While Malaysian higher education policymakers are concerned with the importance of digital transformation and learning analytics in higher education (Tsai & Gašević, 2017), the design of AskMe247, which incorporates real-time feedback, adaptive assessments, and integration with learning management systems (LMS), provides an empirical connection with the positive findings reported by Jiao et al. (2021) that chatbot-based learning systems can significantly increase students' confidence in using learning systems and enhance their learning engagement.

However, there are some obstacles to students' mastery of studying complex issues and materials. These issues and challenges are addressed in this study to enable students to make the best use of AskMe247 to enhance their self-directed learning, to bridge any conceptual learning gap and to access appropriate and current learning resources. A strong empirical connection can be established on how grounding AI adoption in the Malaysian higher education context can lead to improved learner confidence, increased student engagement and efficient instructional design.

Method

This study employed a mixed-methods approach. According to Creswell & Plano Clark (2021), the mixed-methods approach provides a comprehensive approach to investigating educational innovations by combining data from statistical analysis with views of learners. The design of this study was informed by recent studies on the use of AI in learning, pointing to the importance of feedback and learner analytics that are adaptive in nature and can be used in higher education (Holmes et al., 2021; Tsai & Gašević, 2022). This study aimed to determine the effectiveness of AskMe247 in enhancing students' understanding of the learning outcomes of IMC413 Information Storage and Retrieval. It also aimed to determine the educational value of the system in terms of achieving academic results, usability and students' opinions. Thus, the findings from quantitative analysis and the views of the learners were combined and presented within a comprehensive framework.

Using a purposive sampling approach, a total of 40 students were selected from two different cohorts of students who were enrolled in the subject IMC413 Information Storage and Retrieval. A purposive sampling approach was used to ensure that participants had diverse levels of digital literacy and varied in their academic performance, as reported in previous studies on educational technology evaluation (Hamzah, 2025; Mat Yusoff et al., 2025). Hence, through this approach, it was possible to evaluate and capture the diverse ways in which a number of learners with different levels of academic achievement and digital literacy were able to use the AI-based learning system under investigation.

Over the semester, data was gathered to record both post-implementation feedback and real-time user behavior. The system was assessed based on its influence on students' learning improvement, engagement, and confidence. It focuses on student's understanding of the IMC413 subject. The system performed 247 and act as a learning partner, offered real time discussion, guidance into practice, assist feedback, and provide self-direct learning. Students' experiences were examined, including how they used it to prepare assignments, its use for revision, assignments and understanding difficult course concepts. To suit that, a survey was formulated in Google Form to gather the qualitative information. It was aimed to measure the students' perception of the usefulness, perceived learning enhancement, and engagement of AskMe247. At the end of the survey, an open-ended section was provided to capture the qualitative information. This multi-layered approach aligns with recent calls for evidence-based evaluation of AI-driven learning platforms in higher education (Carvalho & Sharma, 2022; Jiao et al., 2023). Students were given the opportunity to write on their experiences with the system and describe the advantages they gain from it.

The continuous usage patterns and students' feedback were recorded during the assessment especially during examination period which perceived as the highest engagement. As a result, our study was able to evaluate AskMe247 from both a quantitative and qualitative perspective. In addition, the quantitative approach provides information on perceived learning improvement and engagement, while the qualitative approach was demonstrating the deeper insights of students' confidence, comprehension, learning experiences, and perceived usefulness of the system. The results were then utilized to measure AskMe247's pedagogical value in term of educational effectiveness in supporting learning mastery in IMC413.

Findings

AskMe247, as an AI-based learning tool, provided benefits for IMC413 students. After using the system, learners reported higher confidence in understanding complex concepts like Boolean logic, metadata indexing and retrieval models. Most respondents (over 80%) agreed that AskMe247 helped them understand concepts they didn't feel comfortable sharing in class. The results align with Mat Yusoff et al. (2025), who found higher satisfaction and perceived usefulness among Malaysian students who used AI tools in technical subjects.

From the feedback obtained, it was clear that the immediate responses from AskMe247 alleviated the problem of cognitive load when doing revision and completing assignments. In this regard, students were able to focus on tackling problems as opposed to struggling with language. This aligned with the study by Nguyen (2025) that highlights the significance of AI incorporation in enhancing learning and supporting various modes of teaching. The AskMe247 tool was well regarded for simulating questions and answering questions, and hence encouraging active learning. Usage statistics indicated the high usage of this tool during examination weeks. From the qualitative feedback received, AskMe247 was referred to as a “a 24/7 tutor” and “a confidence booster.”

Another benefit identified by the instructors was increased participation and more relevant questions in the group using AskMe247. The conversational interface was cited for helping students become less anxious and engage in inquiry-based learning. These results demonstrate how important it is for Malaysia to strategically incorporate artificial intelligence technology into its education system to prepare students for the future (MIDA, 2025). Overall, the study shows that AskMe247 helps students become proficient in IMC413 and has great scalability potential for other information management courses.

Pedagogical Uniqueness and Educational Value

AskMe247 distinguishes itself as an AI-driven learning by delivering instant, adaptive responses tailored to individual learning styles, consistent with intelligent tutoring models (Woolf, 2021; Luckin et al., 2016). Unlike static references, the system provides simplified, contextual explanations that clarify complex IMC413 topics such as Boolean logic and metadata indexing. It actively monitors student progress, identifies learning gaps, and guides targeted revision, thereby fostering self-directed learning. Students reported increased confidence and autonomy in applying course concepts during assignments and discussions.

The assistant's versatility across hybrid, online, and flipped classrooms reduces repetitive instructor workload by handling routine queries and reinforcing foundational concepts. By encouraging active inquiry, AskMe247 promotes deeper engagement beyond lecture materials. Tsai & Gašević (2017) emphasize that such tools act as catalysts for digital transformation in higher education, a claim supported by student feedback indicating improved comprehension efficiency, particularly during exam preparation. Its conversational interface lowers anxiety, creating a safe space for inquiry and participation. These outcomes highlight AskMe247's strong potential for replication across other information management courses and disciplines, aligning with Malaysia's strategic agenda for AI-driven learning (MIDA, 2025).

Commercialization and Scalability Potential

The design of AskMe247 is not only educational but also serves as an enabler of institutional growth. This software comes with features that improve the capabilities of the institution from a business point of view. The design of AskMe247 allows for its easy integration with LMS platforms like Google Classroom, Moodle, and UFuture, which makes the software ready for deployment at a larger scale in the institution. The subscription-based model allows the software to be used by individual students as well as institutions, while the modular nature enables the white-labeling of the software for other academic or professional training areas. Overall, the mentioned features align with the modern trends in EdTech software development, based on AI technology, and featuring personalization, automation, and learner autonomy (Nguyen, 2025). However, despite the mentioned potential for adoption of this software in other areas, further assessments and experimentation are necessary.

The next improvements include voice interaction for auditory learners, multilingual support for Malaysia's heterogeneous language environment, and the development of a mobile app for the purpose of microlearning. All the above improvements correspond to the National Artificial Intelligence Framework of Malaysia and the focus of MIDA on AI commercialization in education (MIDA, 2025). According to educators' feedback, there is considerable interest in the implementation of AskMe247 at institutions due to the reduction in the workload of educators. Collectively, all the above features of AskMe247 make a solid base for the diffusion of innovation theory in higher education.

Table 1. Student Evaluation of AskMe247

No.	Dimension	Insight from Feedback
1	Ease of Use	Students consistently found AskMe247 intuitive and accessible, requiring minimal technical support.
2	Conceptual Mastery	Learners reported stronger understanding of IMC413 topics, particularly Boolean logic and metadata indexing.
3	Efficiency in Learning	The assistant accelerated information retrieval and summarization, reducing study time and cognitive load.
4	Content Relevance	Students valued AskMe247's ability to recommend contextually appropriate resources, including books and articles.
5	Interactivity and Engagement	The system fostered active participation, making learning more dynamic, inquiry-driven, and enjoyable.
6	Overall Satisfaction	Feedback indicated high satisfaction, with most students rating AskMe247 positively across all evaluation items.

Source: Amdan, A. S. (2026)

Copyright and Licensing Considerations

Copyright and licensing problems are complex, especially where there is use of artificial intelligence in educational platforms like AskMe247. In situations where an AI application extracts, summarizes or paraphrases materials from books, journal articles or database sources, there are issues of ownership and copyright infringement. The Copyright Act 1987 of Malaysia is the only law that governs intellectual property matters; however, this Act does not make reference to outputs produced by artificial intelligence technologies. According to Naimat et

al. (2025), this lack of clarity results in confusion on whether such outputs are the property of the user, institution or the creator of the system. In their feedback, students also raised issues of AskMe247 not providing information with properly referenced sources.

Licensing can pose another obstacle in introducing AI technology at universities. According to Mohd Syaufiq Abdul Latif et al. (2024), in order to address AI implementation in Malaysia, licensing programs similar to those used in the US and EU will be required to compensate artists for the use of their works in AI technologies. Regarding AskMe247, it is nice that the website provided recommendations on reading books and summarizing the texts; however, the lack of detail and precision in the summaries could be explained by the restricted availability of licensed academic sources.

For both effective teaching-learning purposes and to comply with laws, AskMe247 in future versions needs to include proper citations, metadata, and usage tracking logs. Collaboration with licensed repositories through institutional partnerships will not only improve the quality of content but also ensure the protection of intellectual property. As Chloe Lim & KM Loke (2023) highlight, the legal framework in Malaysia needs to be improved in order to facilitate the use of AI responsibly. Table 2 below contains an example of an AI Copyright Compensation Framework concept that was developed by Mohd Syaufiq Abdul Latif et al. (2024).

Table 2. Conceptual Copyright Compensation Framework.

No.	Component	Refined Description
1	Content Access Layer	Specifies whether the AI system utilizes open-access, institutionally licensed, or proprietary databases to generate outputs.
2	Usage Classification	Distinguishes between educational fair use (e.g., summarization for learning support) and commercial exploitation requiring formal licensing.
3	Attribution Protocol	Ensures AI-generated responses embed proper citations, metadata, and traceable links to original sources for transparency and credibility.
4	Compensation Mechanism	Outlines royalty or licensing fee structures to remunerate creators whose works are incorporated into AI training datasets or outputs.

Source: Adapted from Mohd Syaufiq Abdul Latif et al. (2024), contextualized by Amdan, A. S. (2026) for Malaysia's Copyright Act 1987 and application in AskMe247.

This model, which is inspired by modern-day EU and US models and based on Malaysia's Copyright Act 1987, would be useful to implement on platforms for AI-supported learning such as AskMe247. The importance of open, transparent, and ethically responsible use of the content in deploying the AI technology in learning environments is highlighted here. Through the use of attribution and compensation policies, AskMe247 will be able to help students learn through a pedagogical approach that complies with the intellectual property standards.

Importance of the Research

This study adds to our understanding of AI in higher education by creating and assessing AskMe247. This system is a course specific AI-driven learning assistant which was created specifically for subject IMC413 Information Storage and Retrieval. This study is not entirely

about new chatbot technology, but it is an application that support and valued personalized learning, instant feedback, student engagement, and academic assistance (Labadze et al., 2023). AskMe247's contribution lies in the combination of contextualization and pedagogical skills.

First, AskMe247 contributes a discipline-specific AI-learning model for IMC413. It is not only serving as a general-purpose conversational chatbot but aims to solve the theoretical and technical problems related to storage and information retrieval. It will assist students in gaining conceptual mastery, specially designed to address the conceptual and technical challenges. It simplifies the explanation, guidance to practice, tailored feedback, adaptive measurement, and progress tracking. This orientation is essential as frequently research on educational chatbots covers a wide range of disciplines, with many systems created for computer science, language acquisition, general education, and other areas specifically for information storage and retrieval (Kuhail et al., 2023).

Second, AskMe247 contributes an integrated self-direct learning method. It was made available 24/7 with the intention of supporting students academically beyond the classroom wall. The application also allows students to seek clarification, practise concepts and receive feedback based on their needs. Additionally, students are also able to gain support at any time and, anywhere. This is especially relevant to today's learning style, as students are expected to assume more responsibility for their own learning.

Third, the study contributes empirical evidence from a real-world university course context. A structured questionnaire with open-ended responses was used to assess AskMe247 with sample from IMC413 students. The quantitative component examined usability, perceived learning improvement and engagement, while qualitative responses provided additional evidence concerning students' experiences and perceptions. This is significant because previous studies only emphasized the need for more objective measurements, longer evaluation periods, and greater empirical evidence for evaluating AI-supported learning (Lo et al., 2024).

Fourth, the study contributes by examining three related learner outcomes: learning mastery/perceived learning improvement, engagement, and confidence. The outcome indicates that students had better confidence in asking questions and studying, developed more understanding of IMC413 concepts, and actively participated with AskMe247 especially in examination weeks. This multifaceted approach is beneficial because prior research has shown that the effects of AI-supported learning cannot be reduced to academic performance alone. According to recent meta-analytic data, generative AI interventions can improve students' academic performance and affective-motivational outcomes, even though their effects on self-efficacy appear to be less consistent (Deng et al., 2024).

Lastly, AskMe247 contributes a potentially transferable model for AI-supported learning in information management education. It encompasses features such as guided learning, progress tracking, adaptive support, and interaction with learning management systems, provide a foundation for future adaptation to other courses and disciplines. Therefore, the significance of AskMe247 lies not in claiming that its individual AI capabilities are unprecedented, but rather because it shows how established AI capabilities can be pedagogically integrated, contextualized, and evaluated within a specific higher-education course to support learning mastery, engagement, and confidence.

In short, the novelty of AskMe247 resides in pedagogical integration of established AI chatbot abilities specifically for storage and information retrieval learning environment, merging with conceptual explanation, guided practice, personalised feedback, adaptive assessment, progress monitoring, and round-the-clock self-directed learning support. It also measures the chatbot's perceived contribution to contribution to learning mastery, engagement, and confidence.

Conclusion

AskMe247 constitutes an innovative approach towards overcoming the pedagogical difficulties associated with IMC413, which is known to be highly conceptual and technically challenging. With real-time and adaptive academic assistance, this technology creates a link between the in-class learning process and out-of-class learning activities. The immediate explanation of difficult concepts will contribute to an improved level of understanding, knowledge retention, and confidence among students. The ability to explore information individually and receive personalized feedback will make students engage in learning more actively, especially those who prefer not to ask for any help within the traditional learning process. AskMe247 will also minimize the stress associated with repetitive education and allow teachers to focus on innovative curricula and new educational approaches. These results are consistent with previous international research on AI's potential to improve personalization and engagement among university students (Long et al., 2026).

In addition to the pedagogical use of AskMe247 in IMC413, the technology has a scalable model which can easily be utilized in various information management courses. While the initial evaluations indicate that it is useful in reducing the workload for teachers, it is important that there should be further investigations from other institutions to evaluate whether the technology has commercial potential and can be operated efficiently. As it is easy for AskMe247 to be adapted into other subjects and institutions because of the scalability and user-friendly design, the relevance to the strategic use of AI in education in Malaysia is one of the factors that make the system significant on a national scale. While there are both advantages and challenges in the use of AI in education, as indicated by AlBlooshi (2026), it is critical that all the issues regarding academic integrity, ethics, and governance should be considered in the implementation of the technology.

Recommendation and Future Directions

Although the initial implementation of AskMe247 leads to an increase in students' engagement, self-directed study and confidence in studying for the subject IMC413 Information Storage and Retrieval, there are fundamental empirical, technical and regulatory features that need to be addressed in order to allow for a more comprehensive implementation of the platform beyond the current pilot phase. Instead of listing features that can be added, such as multilingual support or access via mobile devices, the study should focus on these major aspects.

Firstly, evaluating learning outcomes. Future studies must rely on a quasi-experimental approach rather than subjective feedback. Incorporating pre-tests and post-tests, along with longitudinal assessment of outcomes across different student cohorts, will make it possible to evaluate AskMe247's influence on students' academic achievement.

Second, data privacy and information security. Strict observance of data protection policies is needed for clear implementation within the institution (E.g., international standards and the Malaysian Personal Data Protection Act). Further research needs to include end-to-end encryption, automatic PII (Personally Identifiable Information) redaction processes, hidden logs of students' interactions, and clear measures to prevent any misuse of data for training models outside.

Third, the workload and instructional audits. It is advisable to keep track of the application via volume of inquiries, efficiency in grading, and time spent on higher-order activities. In order to objectively prove the claim about teachers' reduced workload, further research should measure the activity quantitatively.

Fourth, platform accessibility. It is recommended to include mobile-first optimization and multilingual assistance, along with technical and empirical validation in the future research. It is very important to support microlearning and various language backgrounds to cater to the hybrid nature of modern higher education.

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