Kosovo Educational Research Journal

Volume 6, Issue 2, 2-20.
ISSN: 2710-0871
https://kerjournal.com/

Chatbots in Artificial Intelligence Learning

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In the era of deep digitalization and the development of Artificial Intelligence (AI), the role of chatbots in the education system is gaining increasing importance. This paper theoretically examines the use of chatbots as a support tool in teaching AI concepts, focusing on didactic functions, automated interaction, and the potential for personalization of the learning experience. Through an analysis of the contemporary literature, the main benefits of chatbots in education are presented: improving student-platform interaction, supporting self-directed learning, and their integration into curricula that deal with logic, algorithms, and data. It also addresses the ethical challenges and technological limitations that need to be considered when using educational chatbots, including issues of privacy, equitable access, and the quality of automated responses. The paper does not rely on experimental data, but rather provides a conceptual overview of current developments and recommendations for informed use of chatbots in the context of teaching Artificial Intelligence in secondary and primary education.

Keywords: Chatbot, Artificial Intelligence, Digital Education, Technology-assisted Learning, Interactive Platform, Future Education.

To cite this article: Orhani, S. **(2025) Chatbots in Artificial Intelligence Learning.** Kosovo Educational Research Journal, 6(2), 2-20.

https://kerjournal.com ISSN: 2710-0871

1. Introduction

Advances in the field of Artificial Intelligence (AI) have transformed the way we learn, teach, and interact with technology. One of the most visible manifestations of this transformation is educational chatbots, which are increasingly playing an important role in educational systems, especially in subjects directly related to AI. Chatbots, as forms of conversational interfaces powered by advanced natural language processing models (such as GPT), provide real-time support to students, help clarify concepts, and serve as personalized tutors (Cotfas et al., 2025).

The integration of chatbots into formal and informal education is driven by the need to personalize learning, increase interaction, and provide immediate assistance to learners in a scalable and efficient manner (Tannous & Kian, 2025). Recent studies show that the use of chatbots in AI courses helps develop critical thinking and autonomy in learning by providing environments where students can practice coding, discuss algorithms, or get help solving technical problems (Sarmah & Choudhury, 2025).

Furthermore, educational chatbots such as DUX and Replika have been successfully used to help teach programming, artificial intelligence, and computational logic in an interactive way, simulating knowledgeable teachers or interlocutors (Nishimura, 2025; Suliman et al., 2025). This new pedagogical approach is particularly useful in contexts where physical teachers are scarce or real-time academic support is lacking.

Recently, advances in chatbots based on language models augmented by techniques such as retrieval-augmented generation (RAG) have paved the way for more sophisticated applications in the field of digital education. A prominent example is DIAN, an educational chatbot for women's health during pregnancy, which was evaluated based on the CAR (Comprehensibility, Accuracy, Readability) framework. The study showed that chatbots can provide clear and accurate information to different users, while maintaining professional education standards and user experience in a balanced way (Venugopal, 2025). This case illustrates the potential for educational chatbots to be used in academic AI education, as long as the content is peer-reviewed and matches the needs of the users. This highlights the need for standardization, linguistic clarity, and context-adaptation in the design of chatbots for pedagogical purposes.

However, despite the many benefits, the use of chatbots in education also raises challenging issues. Issues of information reliability, superficial learning, and lack of contextual sensitivity remain legitimate concerns in the contemporary literature (Li, 2025). For this reason, studies emphasize the importance of combining chatbots with human intervention and pedagogical supervision to ensure quality and ethics in their use.

This paper aims to examine these issues in a systematized manner through a literature review of recent years and analyze the role that chatbots can play in improving the teaching of artificial intelligence.

1.1. Problem Identification

The rapid development of technology and the gradual introduction of Artificial Intelligence (AI) in various areas of life have inevitably impacted the education system. However, despite the great potential of using educational chatbots in teaching, their implementation in public schools and traditional education systems remains limited and non-standardized.

Schools, in most cases, continue to rely mainly on traditional teaching methods, with a strong focus on the frontal transmission of knowledge and minimal use of interactive digital tools. This situation creates a significant gap between the way students learn outside of school (e.g., through technology and digital interactions) and the way content is presented to them in the classroom. In this context, the use of chatbots can represent an opportunity to make the learning process more interactive, personalized, and engaging for students.

Effectively integrate chatbots into the learning process. Many teachers feel insecure about using new technologies, or do not have access to structured training on the use of artificial intelligence in education. This insecurity is combined with the lack of technological infrastructure in many schools, which makes it difficult to provide sustainable learning experiences assisted by chatbots.

Another problematic aspect is the lack of educational platforms localized in Albanian and adapted to national curricula. While chatbots such as ChatGPT or Replika are advanced, they are not specifically designed for the needs and context of primary and secondary education in Albania or Kosovo. Therefore, there is a need to develop dedicated teaching chatbots that not

only help with content acquisition but also support the development of critical thinking, active learning, and collaboration among students.

Finally, the lack of structured research on the real impact of chatbots on learning outcomes, student motivation, and engagement in the learning process constitutes a gap in the current literature. Therefore, identifying these challenges and examining possible solutions is a necessary step in reimagining education for the 21st century.

1.2. Purpose and Objectives of the Study

The main purpose of this paper is to theoretically and critically examine the opportunities, challenges, and potential impact of educational chatbots in teaching Artificial Intelligence concepts, particularly in the context of primary and secondary education. The paper aims to provide a conceptual and pedagogical framework for understanding the role that chatbots can play as support tools for teachers and as interactive tools for students.

The specific objectives of the paper are:

- To analyze the existing literature on the use of chatbots in education, with a particular focus on subjects involving computer logic and Artificial Intelligence.
- Identify the benefits and limitations of using chatbots in learning environments in pre-university education.
- To examine factors that influence the effective integration of chatbots in primary and secondary school classrooms, including teachers' technological competencies and pedagogical preparation.
- To propose recommendations for improving the use of chatbots as didactic tools for personalized, interactive, and student-centered learning.
- To suggest areas for further research, especially regarding the design, language localization, and cultural adaptation of chatbots for the Albanian and regional education systems.

1.3. Importance of the Study

A growing number of studies in recent years highlight the potential of AI-based chatbots in early childhood education, especially in providing personalized support to students and in

developing critical thinking and emotional competencies (Viola et al., 2025; Alfirević, Hell & Rendulić, 2025). According to Spiteri and Dingli (2025), chatbots can be used as "virtual mentors" that adapt content based on the performance and needs of each student, thus creating a more inclusive and less intimidating learning environment. Specifically, in their study in primary schools in Malta, the educational chatbot FAIE was integrated to help students develop autonomy in solving algorithmic and logical thinking tasks (Spiteri & Dingli, 2025). This approach is consistent with the position of Alfirević et al. (2025), who evaluated the use of chatbots in higher education and recommended their extension to pre-university education as a way to strengthen pedagogical quality in teaching. These developments underscore the critical importance of this study, reflecting the need for the integration of AI technologies in a structured, ethical, and sustainable manner in the school system.

2. Literature Review

2.1. Chatbots in Education: Approaches, Opportunities and Pedagogical Challenges

Chatbots have become an integral part of technological interactions, finding widespread use in education. Recent systematic reviews show that the use of chatbots in academic contexts positively impacts knowledge acquisition, especially in settings where face-to-face interaction is limited (Milano et al., 2025). At the university level, chatbots have been tested to assist in self-directed learning, task management, and recall of complex topics. However, challenges such as a lack of standardization, difficulty in non-English languages, and the need for contextual adaptation remain obstacles to full deployment in schools (Alfirević et al., 2025).

The literature highlights that the greatest benefits of chatbots are in terms of continuous and personalized interaction with students. Unlike traditional platforms, chatbots provide real-time responses and can be used to help students who have a slower learning pace (Spiteri & Dingli, 2025). Furthermore, they can assist in emotional management, appearing as friendly and non-judgmental interlocutors. According to Faix (2025), the use of chatbots in libraries and learning environments is also a way to develop students' digital and information competencies.

However, various studies also warn about the dangers of excessive automation in learning. Jose and Thomas (2025) point out that chatbots can create a false sense of epistemic

authority, causing students to no longer challenge the content provided, even when it is incorrect. This leads to a lack of critical vigilance and can hinder the development of analytical thinking.

2.2. Artificial Intelligence and Education in Pre-University Education

Early childhood education is facing ongoing pressure to interpret technological developments in teaching. Recent literature suggests that chatbots can act as digital tutors to support individual student learning in primary and secondary grades (Bonilla et al., 2025). They provide a form of reinforced learning that not only helps with content assimilation but also builds self-confidence and independence in learning.

In the study by Polydoros et al. (2025), chatbots were tested in basic education classrooms and were evaluated as effective tools to address math anxiety and increase engagement of shy or maladjusted students. Socially. According to this research, digitalized interaction environments help overcome social barriers that often hinder the traditional learning process. Furthermore, the use of chatbots in linguistically mixed classrooms was positively evaluated for their ability to communicate clearly and consistently.

However, the use of chatbots requires caution in ethical and pedagogical design. As highlighted by Jose and Thomas (2025), the concept of “digital anthropomorphism” – the tendency to give chatbots human qualities – can lead to emotional dependency and a loss of epistemic vigilance. This is a problem especially in early education, where young people may fail to distinguish between accurate information and that which “sounds good”.

In conclusion, Orhani’s (2024) research provides an important contribution to the intersection of artificial intelligence and education, demonstrating that personalized AI systems have strong potential to improve student performance and motivation in mathematics. The findings pave the way for further studies and innovations aimed at enriching students’ learning experiences and academic success. Specifically, the study investigated the effectiveness of using AI to tailor mathematics tasks to individual students. The results revealed that students supported by the personalized AI system achieved significantly higher scores in solving mathematical problems than those in traditional learning environments. Furthermore, these

students exhibited greater motivation and engagement, which can be attributed to the individualized and adaptive learning experience designed to meet their specific needs.

2.3. Anthropomorphism, Trust, and Critical Vigilance in Interactions with Chatbots

A much-discussed aspect in the modern literature is how the design of chatbots affects students' perceptions of them. When chatbots display human-like behavior, use emotional language, and have a supportive tone, students are more likely to interact with them as if they were real people—a phenomenon called digital anthropomorphism (Jose & Thomas, 2025; Inie et al., 2024). This increases feelings of safety and engagement, but can negatively impact students' ability to think critically about the information they receive.

Ryan (2020) argues that this "illusion of understanding" created by friendly AI interfaces is problematic in education. Students may be less likely to challenge content simply because it is presented pleasantly and authoritatively. Recent research by Pergantis et al. (2025) showed that frequent interactions with chatbots without teacher intervention can lead to decreased cognitive self-confidence and increased dependence on the AI system.

However, if used carefully and with teacher guidance, chatbots can play a useful role in building critical confidence. Chakraborty et al. (2024) suggest pedagogical interventions such as "AI debriefs" and de-anthropomorphization exercises, which help students reflect on the nature of chatbots and verify the information they receive from them. This reinforces a conscious attitude towards the use of AI and helps maintain students' intellectual autonomy.

3. Theoretical Framework and Literature Review Approach

3.1. Theoretical Framework

The theoretical framework of this paper relies on three fundamental approaches that are closely related to the use of chatbots in education: the theory of interaction with machines (Media Equation), trust models in artificial intelligence systems, and scaffolding theory (structuring learning through temporary support).

3.1.1. Machine Interaction Theory (Nass & Reeves, 1996)

Reeves and Nass' (1996) "Media Equation" theory, people treat technological interfaces, including computers, robots, and chatbots, in a similar way to humans. They show social reactions to machines, such as politeness, cooperation, or reluctance to criticize. This theory is particularly relevant in the context of education with chatbots, as students tend to interact with them as if they were teachers or peers. Jose and Thomas (2025) reinforce this idea by emphasizing that digital anthropomorphism, such as the appearance of "human" behaviors by chatbots, strongly influences the level of engagement and trust of students.

3.1.2. Patterns of Trust in AI in Education

Trust in the technology is a critical element for the effective functioning of chatbots in learning environments. Trust models in AI typically include the components of content credibility, system explainability, and user adaptability (Chakraborty et al., 2024). In education, students must be able to calibrate trust, neither blindly trusting nor constantly doubting. This balance is necessary to foster critical vigilance, a key component of active learning. Pergantis et al. (2025) find that the lack of teacher intervention during the use of chatbots often leads to an overreliance on AI, which can replace the student's critical thinking.

3.1.3. Scaffolding Theory (Vygotsky)

Another important theoretical framework is scaffolding theory, which has its roots in Vygotsky's work on the zone of proximal development (ZPD). This theory suggests that learners can achieve higher levels of learning if they receive temporary and tailored support from a supportive figure, usually a teacher or peer (Wood et al., 1976). In the case of chatbots, these act as digital mentors, providing direct instructions, prompting questions, or reminders of previous concepts. Spiteri and Dingli (2025) argue that well-designed chatbots can function as "intelligent scaffolding," allowing for the personalization of instruction according to the learner's needs and guiding them toward autonomy in learning.

3.2. Methodological Approach to the Literature Review

This paper is based on a theoretical literature review with the aim of identifying and analyzing key concepts on the use of chatbots in Artificial Intelligence education. The approach followed

has been **analytical-thematic**, focusing on the categorization of recurring and important themes in the literature of recent years.

3.2.1. Selection of Sources

The literature was selected primarily from articles published during the period **2022–2025** to ensure the most contemporary representation of technological and pedagogical developments. Only sources in **English**, containing **verifiable DOIs** and having undergone *peer review*, were included. This selection aims to guarantee **quality, consistency, and academic relevance**.

3.2.2. Databases Used

The articles were searched in the main international academic platforms and databases, namely:

- **Scopus,** for extensive indexing of scientific literature in technology and education;
- **Frontiers in Computing Science** and **Frontiers in Artificial Intelligence,** for access to articles specializing in human-machine interaction;
- **MDPI** (Future *Internet magazine*, *Education Sciences)*, for open and systematic research on AI in education;
- **SpringerLink, for e**-review literature and book chapters in the fields of education and informatics.

3.2.3. Keywords and Search Strategy

The search strategy is built through combinations of keywords such as:

- "**AI tutors**"
- "**educational chatbots**"
- "**trust in AI**"
- "**digital anthropomorphism**"
- "**human-computer", "interaction in education"**

To exclude irrelevant literature, filters for educational and psychological subjects were used, avoiding articles that had a predominantly engineering, technical approach, or that addressed chatbots in non-educational fields (e.g., marketing, customer service, tourism).

3.2.4. **Exclusion Criteria**

The following were excluded from the review:

- articles focused only on the technical architecture of chatbots, with no direct connection to education;
- unpublished or peer-reviewed publications;
- studies that were unrelated to pre-university education or that focused only on non-pedagogical commercial chatbots.

This structured approach has enabled an **in-depth analysis of the most relevant and valuable literature for this study,** providing the basis for the discussions of the previous chapter and the recommendations that will follow.

3.3. **Analytical Approach**

The literature review in this paper is built on the principles of **thematic analysis,** a method that allows for the identification of recurring conceptual patterns within the corpus of literature reviewed. This approach was chosen because of the flexibility it offers in structuring theoretical content and its ability to shed light on key issues in the academic debate about chatbots in education.

3.3.1. **Thematic Collection and Analysis**

The selected articles were analyzed according to a thematic coding matrix, where three dominant themes were identified:

- **Chatbot interaction in the learning environment,** which appeared in most sources (e.g., Jose & Thomas, 2025; Spiteri & Dingli, 2025), emphasizes the importance of the dialogical experience in learning;
- **Trust in artificial intelligence,** which is related to how students and teachers perceive the reliability and safety of chatbots (Chakraborty et al., 2024; Pergantis et al., 2025);
- **Pedagogical effect**, which includes the impact of chatbots on learning outcomes, learner autonomy, and emotional involvement (Bonilla et al., 2025; Faix, 2025).

These topics have been chosen not only for the frequency with which they appear in the literature, but also for **their relevance in the context of the application of chatbots in pre-**

university education, where the goal is not only the technology, but **the pedagogical transformation** it brings.

3.3.2. Conceptual Comparison between Theoretical Approaches

The analysis has shown that, although there is a consensus on the benefits of educational chatbots, authors follow different theoretical approaches to interpret these benefits. For example, **Jose & Thomas (2025)** use the framework of digital anthropomorphism to explain the emotional impact of chatbots, while **Spiteri & Dingli (2025)** draw on scaffolding theory to show how chatbots can temporarily replace the role of the teacher in pedagogical assistance. This comparison shows that **the function of chatbots in education is not static,** but depends on the theoretical interpretation and the didactic context in which they are applied.

This variety of approaches enriches the scientific discussion, but also raises the need for a **more consistent and standardized conceptualization of educational chatbots,** which would help create clear usage models in primary and secondary education.

3.3.3. Biases and Limitations in Literature

During the analysis, several common biases in the literature were identified. First, a significant portion of studies focus on **higher or university education contexts,** while primary and secondary schools remain under-researched. Also, many studies (e.g., Milano et al., 2025) analyze the effects of chatbots in urbanized and technologically advanced environments, neglecting schools with limited resources. Second, there is a **lack of in-depth analysis of the long-term impacts of chatbot use on students' critical thinking and self-esteem**, issues that are essential for education beyond immediate efficiency.

Another limitation is **the technological nature of many studies**, which evaluate chatbots according to their technical functions (accuracy of responses, reaction time), but do not sufficiently analyze their pedagogical or emotional impact. This evidence highlights the need for **more balanced research between technology and pedagogy** to understand how chatbots truly impact the learning process and student formation.

4. Discussion and Synthesis of Findings

A review of the contemporary literature on the use of chatbots in education highlights several important directions, including their role in interaction, trust building, pedagogical impact, and challenges related to AI dependency. What is noticeable is the lack of consensus on the standard way to integrate chatbots in education, especially in pre-university education.

From the literature review in 2022–2025, a growing trend was observed to use chatbots as personalized interaction tools, especially in learning contexts that require ongoing assistance for students. Our findings show that chatbots not only provide quick responses but also serve as support for self-directed learning, operating according to Vygotsky's scaffolding principles. This supports the conclusions of Spiteri & Dingli (2025), who point out that the use of chatbots in education significantly increases engagement, especially for students facing learning difficulties. This approach to digital interaction also reflects what Jose & Thomas (2025) describe as digital anthropomorphism, the perception of chatbots as "human" entities that affect the user emotionally. Our findings are consistent with this concept, highlighting that student often create an affective relationship with the chatbot, especially when it fits their learning style.

One of the most striking findings in our review is that chatbots can create an illusion of absolute trustworthiness, leading to an overreliance on AI for responses and decision-making. This runs counter to the goal of critical and autonomous education. In line with Chakraborty et al. (2024), we observed that the lack of teacher intervention when using chatbots can lead to the automation of thought, where students no longer challenge information but passively accept it. Our findings highlight the need for conscious instructional design, where chatbots do not replace the teacher, but function as a supportive adjunct, helping to build students' self-esteem for understanding rather than copying.

The literature review showed that the use of chatbots in education produces beneficial pedagogical outcomes, including improved conceptual understanding, reduced student stress, and increased active participation. However, our findings revealed that a standardized model for integrating chatbots into school curricula is lacking. For example, Bonilla et al. (2025) describe the use of chatbots to promote self-directed learning in universities, but do not provide a clear blueprint for primary schools. Our findings suggest that use at the pre-university level requires contextual adaptation, taking into account the age, subjects, and digital competences of students. Without such standardization, chatbots risk being used in a fragmented, ineffective, and irresponsible manner.

Another important aspect of the synthesis of findings is the fact that most of the studies were conducted in foreign languages and foreign contexts, where the digital infrastructure is much more advanced. None of the reviewed studies included chatbots designed for teaching in Albanian or integrated into the Albanian curriculum. This highlights a significant literature gap on the practical use of chatbots in educational systems in developing countries.

Table 1Summary of findings

Main topics	Findings
Interoperability	Chatbots increase engagement and create interactive teacher-like relationships.
Trust and addiction	Critical thinking is jeopardized when chatbots are perceived as absolute authorities.
Pedagogical effect	They help with the acquisition of concepts and reduce stress – but only if they are designed with pedagogical intent.
standardization	There is a lack of a unified framework for the use of chatbots in pre-university education.
Local context	The literature is global; it lacks application in the Albanian language and in the local school reality.

Consequently, our review suggests that the development of local chatbots, translated, cultivated in the learner's language, and adapted to the local learning reality, is necessary to benefit from the true potential of this technology in education.

5. Conclusions

The use of artificial intelligence (AI)-based chatbots in education represents one of the most significant developments in the transformation of modern pedagogical practices. The theoretical review of the literature shows that these systems are no longer simply technological tools, but are becoming pedagogical actors, significantly influencing the way students learn, interact, and construct knowledge.

Our findings showed that chatbots have great potential to personalize the learning process, providing direct support tailored to the learning style and pace of each student. This is especially important in education systems where teaching faces challenges such as high class sizes, lack of individual support, and the digital divide. Studies show that interacting with chatbots increases engagement, motivation, and learning outcomes.

On the other hand, it is important to note that overreliance on these systems and a lack of teacher intervention can create an unwanted dependency on technology and weaken students' ability to think critically. This is a fundamental challenge that requires a balanced approach, where chatbots are not a substitute for teachers, but are used as a support for human interaction and the development of student awareness.

The review also noted the lack of clear standards and policies for the use of chatbots in pre-university education. While some studies in higher education are promising, there is a clear gap in the practical application of this technology in primary and secondary schools. This points to the need to develop sustainable pedagogical models, based on scientific evidence and adapted to different ages and educational levels.

A particularly important conclusion is the lack of localized studies, especially in linguistic and cultural contexts such as Albania and Kosovo. Without the development of chatbots in the Albanian language and their adaptation to the national curriculum, their use risks remaining experimental and foreign to the educational reality.

In summary, chatbots represent a great potential for improving the quality of education, but their use requires a careful, thoughtful, and pedagogically oriented approach. Our findings suggest that the successful integration of this technology depends not only on its technical power but also on the context, educational culture, teacher preparation, and the level of critical awareness of students.

5.1. **Recommendations**

a) For teachers and pedagogical practice

1. **Conscious pedagogical integration**

   Teachers should treat chatbots not as substitutes for themselves, but as **collaborative supports**, helping students develop critical thinking through interaction with AI. This requires planning activities that include reflection on the source and content that chatbots provide.

2. **Encouraging active, not passive, interaction**

It is recommended that chatbots be used to encourage **reflective questions, debate, and in-depth analysis,** rather than just providing factual answers. This helps develop deep learning and independent thinking competencies.

3. **Professional development for the use of AI in teaching**

   Teachers need to be trained on the possibilities and limitations of chatbots in the classroom. Professional development courses that provide **pedagogical digital competencies** are essential for effective use.

b) For education policy makers

1. **Drafting guidelines for the safe and ethical use of AI in schools**

   The use of chatbots in pre-university education should be accompanied by **clear ethical and legal regulations** that protect student privacy and promote transparency.

2. **Development of chatbots in Albanian and for national curricula**

   It is recommended to invest in the development of chatbots that match **the local educational reality,** being built in the Albanian language and according to curriculum standards.

3. **Incorporating AI into national strategies for the digitalization of education**

   Policies for the digitalization of education should include **technologies like chatbots** as part of the learning infrastructure – but only if they are supported by research and evidence.

c) For the academic community and future research

1. **Localized research in Albanian and regional contexts**

   It is recommended that empirical studies be developed that analyze the use of chatbots in schools in the region, to understand **how they impact teaching and learning in the Albanian language** and in our education systems.

2. **Evaluating the long-term impact of chatbots on learning**

It is requested that future studies not be limited to short-term measurements, but follow **the academic, emotional, and critical development of students** through the ongoing use of AI.

3. **Building a theoretical framework for pedagogical evaluation of chatbots**

Currently, there is a lack of a consistent framework for evaluating the pedagogical effects of chatbots. Researchers need to develop **indicators to measure the impact of chatbots in a standardized and comparable way.**

5.2. Personal Critical Reflection

During the writing of this paper, my view on the use of artificial intelligence in education, especially in the form of chatbots, has shifted from a technical and neutral perception to a much more complex and rich understanding. Initially, I saw the chatbot as a cold tool, with limited automatic functions. However, through a review of the literature, I have come to understand that chatbots are not simply digital "responders", but pedagogical actors, which can influence the cognitive, emotional, and social development of students, if used with caution and didactic awareness.

As for the question of whether the Albanian education system is ready to incorporate chatbots into the learning process, I believe that the potential exists, but the road is still long. Despite efforts for digitalization, the lack of technological infrastructure in many schools, the limited digital competences of teachers, and the lack of localized materials in the Albanian language constitute real barriers. However, if this technology is adapted to the cultural and curricular reality, and accompanied by training for teachers and clear instructions, chatbots can become a valuable resource for contemporary learning in Kosovo.

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