REPORT 17

Use of Artificial Intelligence in the Creation of Questions for Teachers:

A Study on the Improvement of Educational Efficiency

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Abstract

This article investigates the use of Artificial Intelligence (AI) to alleviate teachers' workload and employs speculative design to project possible futures. AI can automate repetitive tasks, such as creating exercises and tests, allowing teachers to focus on more strategic activities and the development of students' socio-emotional skills. Using Large Language Models (LLM), AI personalizes teaching according to students' needs. Through speculative design, the article envisions future scenarios that could transform educational practices, highlighting the importance of an ethical and responsible implementation of AI to maximize its benefits.

1. Introduction

Education is one of the fundamental pillars for the development of a society, and teachers play a crucial role in this process. However, this profession has faced growing challenges, among which burnout syndrome stands out, an occupational stress condition that significantly affects teachers' health and well-being [Carlotto 2011; Dias and Silva 2020]. Burnout syndrome is frequently associated with an excessive workload, which generates intense stress of a depressive nature and compromises the lives of education professionals [Carlotto 2011]. Factors that contribute to this condition include the bureaucracy involved in the development of teaching activities, such as lesson planning, exams, and reports, which require high demands and often result in feelings of frustration and demotivation when goals are not fully achieved [Carlotto 2002].

In this context, Artificial Intelligence (AI) emerges as a promising tool to assist teachers in their classroom activities,

with the potential to reduce workload and soften some of its effects [Cardoso et al. 2023; Santos et al. 2024]. AI can be employed in various educational tasks, ranging from the creation of personalized teaching materials to the automation of administrative processes, allowing teachers to dedicate more time and energy to teaching itself and to individualized student support [Santos et al. 2024].

The customization of educational content, based on data derived from AI, can meet the individual needs of each teacher or group, making learning more relevant [Picão et al. 2023]. In addition, AI can be employed to improve teaching, provide more effective and engaging educational experiences, and represents a global trend in the field of education [Cândido 2017].

In various parts of the world, educational institutions are exploring these technological potentials, and many are integrating AI into their pedagogical practices. In [omitted], although still in an incipient manner, initiatives in this direction can already be observed, such as the Data Science in Schools program, which seeks to introduce programming and data science concepts to public school students [Cândido 2017].

Given this scenario, this work aims to discuss how algorithm teachers can benefit from the use of AI and ensure that the benefits of this technology are harnessed in a responsible and ethical manner [Santos et al. 2024].

The concept of speculative design stands out as an innovative approach within this educational context, offering a new perspective on the integration of emerging technologies, such as AI, in education. Speculative design is not limited to solving current problems, but also aims to explore possible and imaginary futures, encouraging critical reflection on the potential impacts of these technologies. By applying speculative design in the creation of AI-based educational tools, it becomes possible to anticipate scenarios in which these technologies may not only alleviate teachers' workload but also radically transform the dynamics of teaching and learning.

Speculative design allows educators, developers, and policymakers to reflect on the opportunities and challenges of implementing AI in education, creating prototypes and narratives

that help visualize different futures and make informed decisions about integrating this technology into the educational environment [Hameed Khan et al. 2021].

These prototypes serve as catalysts for debates on ethics, privacy, and the human–machine relationship, allowing educators and educational policymakers to carefully consider the long-term implications of adopting these technologies. By involving teachers, students, and other stakeholders in this speculative process, it is possible to obtain valuable insights into the needs and concerns of end users, ensuring that the solutions developed are not only technically viable but also socially desirable and ethically responsible.

Furthermore, speculative design can inspire pedagogical innovations that go beyond the mere replacement of bureaucratic tasks. By imagining scenarios in which AI not only facilitates teachers' work but also enriches the educational environment in unexpected ways, educators can explore new teaching methodologies that promote creativity, collaboration, and personalized learning.

The remainder of this article is structured as follows: Section 2 presents the theoretical foundation. Section 3 addresses speculative design. Section 4 presents the mapping of the current state. Section 5 examines possible futures. Section 6 presents the projection of desirable futures. Section 7 presents the conclusion.

2. Theoretical Foundation

The incorporation of Artificial Intelligence into education has been the subject of increasing academic and institutional interest. This interest is driven by the potential of AI to transform teaching practices, personalize learning, and optimize educational management processes. However, the use of these technologies also raises theoretical, ethical, and pedagogical questions that need to be carefully examined.

2.1. Artificial Intelligence in Education

Artificial Intelligence can be defined as a field of computer science dedicated to the development of systems capable of

performing tasks that normally require human intelligence, such as learning, reasoning, perception, and language understanding. In education, AI has been applied to a variety of contexts, including intelligent tutoring systems, automated assessment, adaptive learning platforms, and educational data analytics.

According to Santos et al. (2024), AI technologies enable the automation of repetitive tasks and support decision-making processes, contributing to greater efficiency in educational environments. In the case of teachers, AI can assist in tasks such as preparing teaching materials, correcting assessments, and monitoring student performance, reducing workload and allowing greater focus on pedagogical activities.

Large Language Models (LLMs), in particular, have shown significant potential in educational contexts. These models can generate natural language text, answer questions, and create educational content, such as exercises and tests, based on specific pedagogical objectives. By analyzing data about students' performance and learning styles, LLMs can contribute to the personalization of teaching, adapting content to individual needs.

Despite these benefits, the use of AI in education raises concerns related to data privacy, algorithmic bias, and transparency. Educational data often contain sensitive personal information, and their misuse can compromise students' rights. In addition, AI systems trained on biased data may reproduce or amplify inequalities, negatively affecting educational outcomes.

2.2. Teachers' Workload and Burnout Syndrome

Teachers' workload is a central issue in discussions about educational quality and sustainability. In addition to classroom teaching, teachers are responsible for a range of administrative and bureaucratic tasks, such as lesson planning, preparation of assessments, grading, and reporting. These demands often extend beyond working hours and contribute to high levels of stress and exhaustion.

Burnout syndrome is characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment, and is particularly prevalent among education professionals. Studies by Carlotto (2002, 2011) and Dias and Silva (2020) indicate that

excessive workload and lack of institutional support are significant factors contributing to burnout among teachers.

In this context, AI is often presented as a potential solution to reduce workload and mitigate burnout. By automating repetitive and time-consuming tasks, AI systems can free teachers' time for activities that require human judgment, creativity, and emotional engagement. However, it is important to critically assess whether these technologies truly alleviate workload or whether they introduce new forms of pressure and control.

2.3. Personalization and Educational Efficiency

Personalization is frequently cited as one of the main advantages of using AI in education. Personalized learning aims to adapt content, pace, and teaching strategies to the individual characteristics of each student, considering factors such as prior knowledge, learning preferences, and performance.

According to Picão et al. (2023), personalization supported by AI can increase student engagement and improve learning outcomes. By analyzing large volumes of educational data, AI systems can identify patterns and recommend interventions tailored to specific needs.

Educational efficiency, in this sense, is understood not only as the optimization of resources but also as the ability to promote meaningful learning experiences. However, the pursuit of efficiency must be balanced with pedagogical and ethical considerations, ensuring that personalization does not lead to excessive standardization or surveillance of students.

2.4. Ethical and Social Considerations

The implementation of AI in education raises important ethical and social questions. Issues such as data privacy, informed consent, transparency, and accountability are central to debates about the responsible use of these technologies.

Ethical guidelines and regulatory frameworks are essential to ensure that AI systems are used in ways that respect human dignity and promote social justice. In educational contexts, this includes protecting students' data, ensuring fairness in

automated decision-making, and maintaining human oversight over critical processes.

Moreover, the introduction of AI may reshape power relations within educational institutions, affecting the roles and autonomy of teachers. It is therefore crucial to involve educators in the design and implementation of AI-based tools, ensuring that these technologies support rather than undermine professional practice.

3. Speculative Design

Speculative design is an approach that seeks to explore possible futures through the creation of artifacts, scenarios, and narratives that provoke reflection and debate. Rather than focusing on solving immediate problems, speculative design aims to question assumptions, challenge dominant narratives, and examine the social, ethical, and cultural implications of emerging technologies.

In the context of education, speculative design provides a valuable framework for reflecting on how Artificial Intelligence may transform teaching and learning practices in the long term. By imagining alternative futures, it becomes possible to anticipate challenges, identify opportunities, and consider the unintended consequences of technological adoption.

According to Dunne and Raby (2013), speculative design uses design proposals as a form of inquiry, enabling critical engagement with the future. These proposals are not intended to be implemented directly, but rather to stimulate discussion and inform decision-making. In educational contexts, speculative design can help educators and policymakers explore how AI technologies might reshape pedagogical models, institutional structures, and professional roles.

The speculative design process adopted in this work involves the identification of current signals and trends related to the use of AI in education, followed by the construction of future scenarios. These scenarios serve as narrative tools that illustrate different ways in which AI could be integrated into

teachers’ work, highlighting both desirable and problematic outcomes.

By engaging with speculative scenarios, stakeholders are encouraged to reflect on questions such as: How might AI change the nature of teaching? What tasks should remain under human responsibility? How can ethical principles be embedded into technological systems? These questions are essential for ensuring that the adoption of AI in education aligns with pedagogical values and social goals.

In addition, speculative design emphasizes participation and inclusivity. By involving teachers, students, and other stakeholders in the speculative process, it becomes possible to incorporate diverse perspectives and address concerns that might otherwise be overlooked. This participatory dimension is particularly important in education, where technological changes have direct impacts on people’s daily lives.

The next sections present the application of speculative design to the theme of AI-assisted question creation for teachers, beginning with an analysis of the current state and progressing toward the exploration of possible and desirable futures.

4. Mapping the Current State

To understand how Artificial Intelligence can be applied to the creation of questions and assessments for teachers, it is necessary to analyze the current educational context and the existing practices related to teaching activities. This mapping aims to identify the main challenges faced by teachers and the opportunities for technological intervention.

One of the central issues identified is the excessive workload imposed on teachers. In addition to classroom teaching, educators are responsible for planning lessons, creating assessments, correcting assignments, and preparing reports. These tasks require significant time and effort and often extend beyond regular working hours, contributing to stress and burnout.

The creation of questions and assessments is a particularly demanding activity. Teachers must ensure that questions are

aligned with curricular objectives, appropriate to students' levels, and capable of effectively evaluating learning outcomes. This process requires pedagogical expertise and careful consideration, especially in contexts with large class sizes and diverse student profiles.

Currently, many teachers rely on manually created materials or reuse questions from previous assessments and textbooks. While this practice saves time, it may limit the diversity and adaptability of assessments. In some cases, digital platforms provide question banks, but these resources are often generic and lack personalization.

The emergence of Artificial Intelligence tools offers new possibilities for addressing these challenges. AI-based systems can generate questions automatically based on specific topics, learning objectives, and difficulty levels. By analyzing students' performance data, these systems can tailor questions to individual needs, supporting formative assessment and personalized learning.

Despite these potentials, the adoption of AI tools in educational practice remains limited. Barriers include lack of technological infrastructure, insufficient training for teachers, and concerns about the reliability and pedagogical quality of AI-generated content. There is also apprehension regarding the ethical implications of using AI, such as data privacy and the potential replacement of human judgment.

Mapping the current state reveals a gap between the technological possibilities offered by AI and their actual implementation in educational contexts. This gap highlights the need for careful design, evaluation, and integration of AI tools that support teachers without undermining their professional autonomy or pedagogical values.

5. Possible Futures

Based on the mapping of the current state and the speculative design approach, this section explores possible future scenarios involving the use of Artificial Intelligence in the creation of questions and assessments for teachers. These futures are not

predictions, but plausible developments that illustrate different ways in which technology may influence educational practices.

5.1. Future of Full Automation

In this scenario, Artificial Intelligence systems are fully integrated into educational platforms and assume responsibility for generating most questions and assessments. Teachers define general pedagogical objectives, while AI systems automatically create, apply, and correct assessments.

This future promises significant reductions in teachers' workload and increased efficiency in evaluation processes. Assessments are continuously adapted to students' performance, enabling highly personalized learning paths. However, there is a risk that teachers become overly dependent on automated systems, potentially reducing their involvement in assessment design and pedagogical reflection.

In addition, concerns arise regarding the transparency of AI-generated questions and the criteria used to evaluate students. Without clear explainability, it may be difficult for teachers and students to understand how assessments are constructed and graded, which could undermine trust in the evaluation process.

5.2. Future of Human–AI Collaboration

In this scenario, Artificial Intelligence acts as a collaborative tool that supports teachers in the creation of questions and assessments. AI systems generate initial drafts of questions based on curricular guidelines and student data, but teachers retain control over selection, modification, and final approval.

This collaborative approach balances efficiency with pedagogical autonomy. Teachers can use AI-generated content as inspiration or support, while applying their professional judgment to ensure alignment with learning objectives and contextual factors. AI serves as an assistant rather than a replacement.

This future emphasizes transparency, explainability, and ethical use of technology. Teachers are trained to understand how AI

systems work and to critically evaluate their outputs. This scenario supports sustainable integration of AI into educational practice while preserving the central role of teachers.

5.3. Future of Limited Adoption

In the third scenario, the adoption of AI in question creation remains limited due to institutional resistance, lack of infrastructure, or regulatory constraints. Teachers continue to rely primarily on traditional methods for creating assessments, with minimal technological support.

While this future avoids risks associated with automation and data misuse, it also misses opportunities to reduce workload and enhance personalization. Teachers continue to face high levels of stress and administrative burden, and educational innovation progresses slowly.

5.4. Discussion of Possible Futures

The possible futures presented illustrate different trade-offs between efficiency, autonomy, and ethical considerations. Full automation prioritizes efficiency but risks undermining pedagogical engagement and transparency. Limited adoption preserves traditional practices but fails to address systemic challenges. Human–AI collaboration emerges as a balanced alternative that leverages technological benefits while maintaining human oversight.

These scenarios highlight the importance of deliberate choices in the design and implementation of AI systems in education. The future of assessment and question creation will depend on how stakeholders negotiate these trade-offs and define the role of technology in teaching.

6. Projection of Desirable Futures

Based on the analysis of the possible futures presented in the previous section, this work projects a **desirable future** for the use of Artificial Intelligence in the creation of questions and

assessments for teachers. This desirable future is grounded in ethical principles, pedagogical values, and the responsible integration of technology into educational practices.

In this projected future, Artificial Intelligence functions as a supportive and transparent tool that enhances teachers' work rather than replacing it. AI systems are designed to operate in collaboration with teachers, offering suggestions, drafts, and analytical insights that assist in assessment design while preserving human judgment and pedagogical autonomy.

Transparency and explainability are central characteristics of this desirable future. Teachers and students have access to clear explanations of how AI-generated questions are created, including information about the data sources, criteria, and pedagogical assumptions involved. This transparency supports trust and enables critical evaluation of AI outputs.

Ethical considerations guide the design and implementation of AI systems. Data used by AI tools are collected and processed in accordance with privacy regulations and ethical standards, ensuring the protection of students' personal information. Mechanisms for accountability and human oversight are established to address errors, biases, or unintended consequences.

Professional development plays a key role in this future. Teachers receive training to understand the capabilities and limitations of AI systems, empowering them to use these tools effectively and responsibly. This training fosters digital literacy and supports informed decision-making regarding the use of technology in the classroom.

In this desirable future, the use of AI contributes to improved educational efficiency without compromising pedagogical quality. By reducing the time spent on repetitive tasks, teachers can dedicate more attention to student engagement, creativity, and socio-emotional development. Assessment practices become more flexible, adaptive, and aligned with individual learning needs.

Ultimately, the projection of desirable futures emphasizes that the benefits of Artificial Intelligence in education depend on intentional design choices, inclusive governance, and continuous ethical reflection. By prioritizing human values and educational

goals, it is possible to harness AI as a positive force for improving teaching and learning.

7. Conclusion

This work discussed the use of Artificial Intelligence in the creation of questions and assessments for teachers, considering both current challenges and possible future developments. Through speculative design, it was possible to explore scenarios in which AI plays different roles in educational practices, ranging from full automation to collaborative support for teachers.

The analysis highlighted that Artificial Intelligence has the potential to significantly reduce teachers' workload, alleviate factors associated with burnout syndrome, and contribute to more personalized and efficient educational processes. However, the responsible use of these technologies requires careful attention to ethical, pedagogical, and social considerations.

The projection of a desirable future emphasized the importance of human–AI collaboration, transparency, and professional development. Rather than replacing teachers, AI should be designed as a tool that supports pedagogical decision-making and enhances the quality of teaching and learning.

Speculative design proved to be a valuable approach for reflecting on the long-term implications of AI adoption in education. By envisioning alternative futures, educators and policymakers can make more informed decisions about how to integrate emerging technologies in ways that align with educational values and social goals.

Future research may involve empirical studies to evaluate the effectiveness of AI-assisted question creation tools, as well as participatory design processes involving teachers and students. Such efforts can contribute to the development of educational technologies that are not only technically effective but also ethically responsible and socially beneficial.

References

(Omitted for blind review)