

Challenges and Opportunities for Applying Artificial Intelligence to Learning in Secondary Schools

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Abstract: Artificial intelligence is gradually becoming part of everyday practice in secondary education. Teachers now encounter AI-based tools in different aspects of school work, from feedback and classroom organisation to adjusting learning activities to fit individual student needs. As the use of such technologies expands, their educational role and practical value in schools require closer examination. This becomes particularly relevant in classrooms with varied learning characteristics, where students differ in learning pace, participation, learning needs, and overall educational readiness. In such settings, AI technologies can support the adaptation of instructional material, provide more individualised feedback, and offer additional forms of participation in the learning process. Their educational value, however, depends on professional judgement and on the way these tools are used within everyday classroom practice. The present paper addresses opportunities and challenges connected with the use of artificial intelligence in secondary education. It focuses on teachers’ perspectives and on their experiences with the educational use of AI tools in school practice. This doctoral work adopts a primarily qualitative approach. Data will be collected through semi-structured interviews with secondary education teachers and later analysed through thematic analysis. Through interview responses, the analysis will examine how AI is perceived in relation to lesson preparation and student support, as well as the practical limits of its implementation in schools. Special attention will be given to professional preparedness and to the everyday classroom conditions that affect the responsible use of AI. The analysis will also consider how participants understand the educational value of AI tools and the ways these technologies are applied in secondary school classrooms. The paper therefore approaches AI not as an independent solution, but as a tool whose usefulness depends on teachers’ judgement and the pedagogical context in which it is used.

Keywords: Artificial Intelligence, Secondary Education, Teachers’ Perspectives, Classroom Practice, Qualitative Research, Responsible AI Use

1. Introduction

Artificial intelligence is becoming more visible in secondary education through applications designed to support feedback, lesson preparation and the adaptation of learning material (Chen et al, 2020; Kasneci et al, 2023). Its presence in schools, however, does not automatically mean that students actually learn better or that AI has pedagogical value. For AI-supported teaching to be meaningful, the tools must be able to serve the purpose of the lesson, fit the classroom context and remain under the educator’s professional judgement and control (Selwyn, 2024; OECD, 2026).

Teachers are therefore central to the classroom use of artificial intelligence, with research on their perceptions showing that they may recognise AI as a possible support for teaching while still reporting limited knowledge and concerns about its ethical and practical use (Chounta et al, 2022). This issue becomes particularly relevant in secondary schools, where students may use generative AI for school-related tasks. The OECD (2026) notes that generative AI can improve short-term task performance but may weaken learning when it is used mainly as a shortcut. For this reason, the educational value of AI depends not only on access to the tools, but also on how teachers guide its use and connect it with the purpose of the lesson.

This paper is part of an ongoing doctoral project on the use of artificial intelligence in secondary education. At this stage, it draws on existing literature to explain why the study examines the views of secondary education teachers and to outline the planned qualitative orientation.

2. Literature Background

Artificial Intelligence in Education (AIED) does not refer to a single type of technology. It includes earlier forms of educational AI, such as intelligent tutoring systems and adaptive learning environments, as well as newer tools based on generative AI. Previous research examined structured systems designed for tutoring or adaptation, whereas more recent work has turned toward applications that teachers and students can use directly in learning activities (Chen et al, 2020; OECD, 2026).

This shift becomes clearer in the case of generative AI, where large language models can produce explanations, reformulate texts and support feedback. These capabilities have made such tools more relevant to everyday teaching than many earlier educational AI systems. Easier access, however, does not make AI educationally

meaningful by itself. Its use still requires critical checking and pedagogical planning, especially when teachers use AI-generated material with students (Kasneci et al, 2023).

For this reason, the role of the classroom teacher needs to be examined more closely. Zawacki-Richter et al (2019), in a review of 146 studies, found that AIED research was strongly influenced by Computer Science and STEM perspectives and relied mainly on quantitative methods. Their review also showed weak links with pedagogical theory and limited critical discussion of educational risks. Although the review focused on higher education, it raises a useful question for this paper: AI in education is often examined through the design and effectiveness of systems, while less attention is given to educators' pedagogical judgement in real classroom situations.

Teachers' perspectives are therefore not a secondary issue. In a K-12 sample of 140 participants, limited knowledge of AI coexisted with a generally positive view of its possible value for teaching. This matters for the present paper because uncertainty about AI can be read as a question of preparation and classroom guidance, not only as resistance to technology (Chounta et al, 2022). From a policy perspective, European guidance makes a similar point by emphasising that educators need enough understanding to judge both the possibilities and the risks of AI and data use in teaching (European Commission, 2022).

3. Research Gap and Aim of the Study

The literature reviewed above covers both older forms of AIED, such as adaptive learning, and newer debates around generative AI and responsible use. What remains less clear is how secondary education teachers understand these tools when they think about their own classrooms.

The gap is therefore more practical than technical. Existing studies provide useful evidence about AI applications and teachers' general perceptions, but offer less detail on how secondary education teachers connect these tools with lesson preparation and student support in their own classrooms (Zawacki-Richter et al, 2019; Chounta et al, 2022). The present study addresses this gap by using interview responses to understand the conditions under which AI may become pedagogically useful.

The aim of the doctoral project is to examine the challenges and opportunities connected with the application of artificial intelligence in the learning process in secondary schools. It considers how participants understand the educational value of AI tools and what conditions they see as necessary for responsible implementation. The project examines their reflections on AI in relation to actual teaching practice.

4. Methodology

A qualitative research approach is used, as the purpose is to understand how secondary education teachers make sense of artificial intelligence in the learning process. Rather than measuring only how often AI tools are used, the analysis considers how participants describe their experience with AI and how they explain the conditions that affect classroom use (Creswell and Creswell, 2018).

Data will be collected through semi-structured interviews with secondary education teachers with different levels of familiarity with AI-related tools in school practice. This method provides a common interview structure, while allowing participants to explain their views in more detail. The interviews will address their familiarity with AI tools, as well as possible educational uses and difficulties identified in school practice.

The interview data will be analysed through thematic analysis. The process will involve careful reading of the data, coding of relevant extracts and development of themes in relation to the research questions (Braun and Clarke, 2006). Participation will be voluntary. Participants will be informed about the purpose of the study before taking part, and no individual or school will be identifiable in the presentation of the findings. The methodology is presented as the planned design of an ongoing doctoral project and may be refined as the empirical work develops.

5. Expected Contribution

Since the research is still in progress, this paper does not present empirical findings from interviews. Its contribution lies in defining a teacher-centred framing for examining artificial intelligence in secondary education through participants' interpretations of school practice. This orientation responds to a gap in the literature, where AI is often examined through system capabilities or general implementation issues, while less

is known about how such tools are judged in relation to everyday teaching conditions (Zawacki-Richter et al, 2019; Chounta et al, 2022).

The paper therefore shifts the question from what AI tools can produce to how their use is evaluated in teaching. A generated explanation or feedback response may be useful in one lesson and unsuitable in another. For this reason, teachers' perspectives can help clarify the practical conditions that affect responsible AI use in secondary schools, especially in relation to teacher preparation and classroom judgement (European Commission, 2022).

6. Conclusion

Artificial intelligence is becoming more present in secondary education, but its educational value cannot be assumed from availability alone. AI tools may support teaching when they are connected with a clear lesson purpose and when their outputs are checked by the teacher. Without this kind of pedagogical judgement, the same tools may encourage superficial task completion rather than meaningful learning (OECD, 2026).

The planned qualitative research will examine how secondary education teachers understand the opportunities and limits of AI in their work. By centring these perspectives, the paper links responsible AI use to classroom practice, where teacher preparation and human oversight remain necessary (European Commission, 2022).

Ethics Declaration

No interview data have yet been collected, and this paper presents the planned design of the ongoing doctoral project. Before data collection begins, the ethical procedures required by the doctoral programme and the university will be followed. Participation will be voluntary, and every individual will be informed about the purpose of the research before taking part. Data will be treated confidentially, and no teacher or school will be identifiable in the findings.

AI Declaration

AI-assisted support was used for language support, including translation of draft notes into English and refinement of wording. The author reviewed, edited and approved the final paper, checked the cited literature, and remains fully responsible for the content, argumentation, citations and accuracy of the submitted work.

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