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SPECIFYING TEN ROLES OF USING CHATGPT IN SECONDARY EDUCATION: A TEACHER´S PERSPECTIVE

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SPECIFYING TEN ROLES OF USING CHATGPT IN SECONDARY EDUCATION: A TEACHER´S PERSPECTIVE

Short Paper

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Abstract

ChatGPT can benefit education; however, challenges arise that demand competent and responsible usage. Competence development needs to start in schools, with the teacher being the gatekeeper for integrating it into the teaching process. Existing research suggests that schoolteachers lack specific guidance on integrating ChatGPT into teaching, as current discussions remain high-level and omit specific use cases throughout the entire teaching process. To guide an informed usage, this paper presents the results of a systematic literature review, analyzing 38 selected papers on investigating ChatGPT in schools. This selection is based on rigorously defined criteria, adhering to the PRISMA guidelines, initially screening 1075 papers. The central value of this paper is to aggregate research into ten roles for secondary teachers on using ChatGPT in schools, presenting corresponding use cases throughout the teaching process. Future research validates the ten roles, conducting interviews with teachers to present an exhaustive framework for integrating ChatGPT in schoolteacher practice.

Keywords: ChatGPT, Teacher, Secondary Education, Schools, Generative AI

1 Introduction

Large Language Models (LLMs), particularly ChatGPT, have already been integrated into various sectors of society and professional fields, thereby transforming the educational sector (Beege et al., 2024; Van Slyke et al., 2023). The introduction of ChatGPT has created numerous new opportunities by providing new ways to access information, create content, and engage in personalized learning experiences (Beege et al., 2024). At the same time, it presents significant challenges and risks, raising critical questions about how it should be integrated into learning processes (Bansal et al., 2024). Schools must address managing these changes and identify the necessary prerequisites for effectively adapting to this emerging technology (Aufenanger et al., 2023, p 199; Rietz & Völmicke, 2020).

One essential requirement is the development of competencies related to using ChatGPT, a point that has garnered considerable attention and advocacy. The Information Systems (IS) community has begun exploring the extensive opportunities and challenges Generative AI (GenAI) introduces to education (Bansal et al., 2024; Issa et al., 2024; Van Slyke et al., 2023), including how these can be addressed through further education and student reskilling initiatives (Bansal et al., 2024). The research includes, e.g., investigations into optimal GenAI feedback design (Sengewald et al., 2024), and strategies students employ to gather and verify information from ChatGPT (Das et al., 2024). Building on this, it is important to identify the competencies needed for the productive use of ChatGPT in educational settings (Fleischmann et al., 2024). While research addresses how students can build competencies for using ChatGPT effectively, guiding teachers in using ChatGPT is neglected (Beege et al., 2024). However, achieving a reflective use of this technology requires integrating it into the organic learning

environment—the classroom. Therefore, teachers´ knowledge and competencies regarding ChatGPT are crucial in determining whether and how ChatGPT is used (Beege et al., 2024). As such, *teachers become the gatekeepers* to students´ access to, application of, and critical reflection on ChatGPT use, shaping a foundational element in the competent use of technology in education.

Accompanying competency development, specific ways teachers might leverage ChatGPT within their teaching practices and in preparatory or supplementary tasks still need to be explored (Aufenanger et al., 2023, p. 206). A more nuanced examination of applications would contribute meaningfully to discussions, shifting from a generalized "Should ChatGPT be used in schools?" towards a practical understanding of *how* and *for what specific use cases* ChatGPT can be effectively used. IS research provides recommendations on ChatGPT´s potential as a global technology, highlighting a spectrum of impacts and responses for education (Van Slyke et al., 2023). Recommendations range from minimal AI integration to the potential for AI to compete with educators, proposing responses that range from doing nothing to fully embracing AI as a legitimate learning aid. As a next step, a nuanced understanding of chances and limitations would benefit teachers, e.g., by recommendations for specific use cases. However, a lack of structure for integrating ChatGPT is criticized (Aufenanger et al., 2023; Rietz & Völmicke, 2020; Röhl, 2024). Hwang and Chen (2023) postulate use cases on how ChatGPT can be integrated. However, this is limited to the classroom, neglecting other crucial tasks of teachers.

To address the need for guidance on how teachers could integrate ChatGPT, this paper structures ChatGPT applications. Based on existing research, it screens the discourse on ChatGPT since its launch. We focus on secondary education because it is typically during this stage that students are first exposed to and begin to engage with LLMs like ChatGPT (Röhl, 2024). By secondary school, students must possess the foundational skills necessary to interact with complex digital tools, making this an appropriate period to explore and understand their potential educational applications. To address the research gap, this paper investigates two research questions (RQ):

RQ 1: *For which use cases can ChatGPT be used by teachers in the teaching process?*

RQ 2: *Which roles can be specified for integrating ChatGPT in the teaching process?*

This paper offers a specific understanding of ChatGPT´s roles in teachers´ use, which provides a dual purpose. First, with this systematic overview, the IS community offers teachers concrete use cases and a more precise orientation on the potential applications of ChatGPT, empowering them to integrate the tool in educationally valuable ways. Second, it offers the IS community a systematic foundation for discussing the potential transformations ChatGPT can bring to classroom dynamics and identifying possible areas of competence development.

2 Theoretical Background

This section provides a brief overview of ChatGPT´s role in teaching and learning. It also introduces the teaching process and outlines the specific tasks that teachers perform in secondary education

2.1 ChatGPT in Education

ChatGPT is a generative and conversational AI that enables content creation based on large data sets (Gärtner, 2024, pp. 56–60). Open AI launched ChatGPT in November 2022, and since then, it has disruptively changed large parts of society, education, and work (Crompton & Burke, 2024). Especially for education, students´ applications of ChatGPT are heavily discussed (Röhl, 2024). ChatGPT offers benefits such as researching and collecting information and explanations for complex concepts, generating ideas, and creating content, as well as potential harm, such as acquiring and distributing false information and content (Das et al., 2024). Likewise, ChatGPT offers added value for teachers, which is, e.g., discussed in the context of teaching material like creating worksheets, exercises, and instructions (Crompton & Burke, 2024; Kim & Adlof, 2024) or for facilitating administrative tasks like communication with parents and students via mail (Alier et al., 2024).

2.2 Teacher´s Tasks Throughout the Teaching Process

The teaching process involves more than teaching the lessons and follows a process divided into four phases: *planning, preparation, execution,* and *follow-up of lessons* (Riedl, 2010, pp.133–134). Every phase consists of different tasks, e.g., the design of concepts, learning objectives, and topics in the *planning phase*. Those decisions are realized in the *preparation phase*, for which the teacher develops instructional materials and creates engaging tasks tailored to student´s needs and learning objectives. During the *execution phase*, the teacher delivers content, facilitates discussions, supports students´ engagement, and adapts to varying skill levels to promote active learning. In the *follow-up phase*, the teacher assesses learning outcomes through assignments and tests, reflects on the effectiveness of the lesson, and adjusts future instruction to meet educational goals better (Riedl, 2010, pp. 133–134). In addition to tasks associated with the teaching process, teachers take social tasks that incorporate giving guidance and support to students, involving everyone in the school system. Another aspect is that teachers are increasingly facilitating the student´s social development (Aufenanger et al., 2023, p. 205). All the tasks are surrounded by communication with students and parents and tasks involving time management and project planning. Teachers perform various tasks during the teaching process. Hwang and Chen (2023) postulate six roles in integrating GenAI into teaching, incorporating the roles of *teacher/tutor*, *student/tutee*, *learning peer/partner*, *domain expert*, *administrator,* and *learning tool*. Those six roles provide a beneficial structuring of specific tasks that GenAI can perform, varying from providing materials and methodological assistance to be used by students to solve tasks in collaboration with GenAI or by helping teachers collect and analyze data to adjust the instructional material and tasks. However, those roles focus on tasks during lessons, excluding other functions in planning, preparing, and evaluating lessons and administrative tasks. We aim to expand these roles to the entire teaching process, covering the *development*, *execution,* and *evaluation* of lessons and *administrative* aspects.

3 Methodology

This paper presents a systematic literature review (SLR) on ChatGPT use in secondary education. The authors followed the PRISMA guidelines to ensure a methodologically rigorous and comprehensive approach (Page et al., 2021). Scopus, Web of Science, and IEEE Xplore were used as databases. Table 1 depicts the keywords applied in the title search that cover ChatGPT and synonyms of GenAI in the context of education, learning, teaching, tutoring, and schools. Since these terms are used in various forms and may have different endings, we added an asterisk at the end of the word stem to include all relevant terms. We focused on publications between ChatGPT´s release on 30.11.2022 and May 2024.

Focus		**Context**
ChatGPT **OR** Generative AI **OR** GenAI **OR** GAI **OR** Generative Artificial Intelligence	AND	Learn* **OR** Educat* **OR** School* OR Teach* **OR** Tutor*

Table 1. Search String for Literature Search.

The search was limited to peer-reviewed articles, conference proceedings, and reviews to ensure high-quality results. Early-access papers were also included to cover current developments. English and German literature was included. The following inclusion and exclusion criteria were applied to ensure alignment with the research questions. Only papers focusing on ChatGPT in secondary education from the teachers´ perspective were included in the literature analysis. Accordingly, research focusing, e.g., on primary or tertiary or other forms of education, as well as on the learner, were excluded. The literature search was applied from June to September 2024. Figure 1 depicts the PRISMA procedure used. To address the RQs, 38 studies were analyzed on use cases that ChatGPT can perform in secondary education. The use cases were clustered into roles to provide a meaningful approach to various applications and functions. First, use cases were coded along the three phases of a teaching process: *lesson development, execution,* and *evaluation*, based on Kortegast and Watolla (2020). We summarised planning and preparation to *lesson development* and complemented the process with *administrative tasks*. The coding of use cases for *lesson execution* was based on Hwang and Chen (2023). Secondly, we assigned the use cases to the roles, also following the framework of Hwang and Chen (2023).

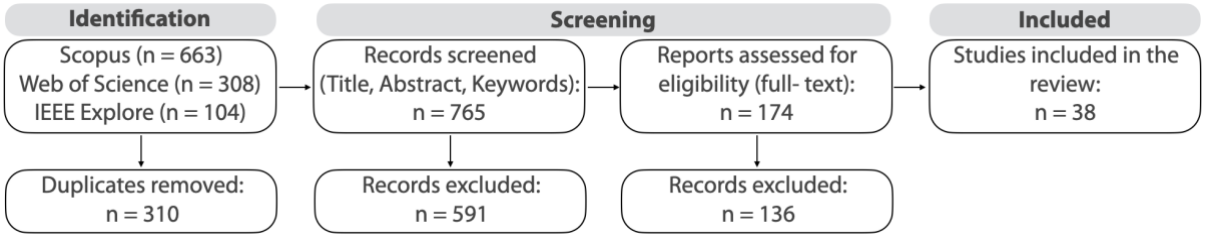

Figure 1. Literature Review PRISMA Flow Chart.

4 Results

The SLR included 38 studies. The full table results are available at this Link. The findings were analyzed on use cases ChatGPT can be used for within the entire teaching process, taking a teacher´s perspective (RQ1). Most findings focus on papers discussing the usage of ChatGPT for designing and developing teaching material (N=30), e.g., tasks and written texts. This is followed by research describing ChatGPT for performance assessment and feedback creation (N=26). Another set of papers describes using ChatGPT for explanation and guidance of students during the learning process (N=21). Findings reveal using ChatGPT to facilitate teacher-to-parent and teacher-to-student communication, e.g., by delivering or feedbacking mail texts or supporting time and project management by creating to-do lists (N=19). In contrast, only a few papers discuss using ChatGPT as a sparring partner, allowing students to explain content to enhance their comprehension or develop competencies in evaluating AI output (N=4). We clustered the findings into ten overarching roles to streamline opportunities for applying ChatGPT for secondary education (RQ2). Table 2 describes the identified roles and presents corresponding use cases.

Teaching process step	Role of ChatGPT	Description	Uses cases of ChatGPT
Lessons Development	Design Assistance	ChatGPT facilitates design and development of teaching material and preparation of lessons. Using the creativity of ChatGPT, teachers can create learning material faster and more efficiently.	**Design** of **materials** and **lessons**, e.g., specific exercises (Alabool, 2023; Crompton & Burke, 2024; Ghazali et al., 2024; Mosaiyebzadeh et al., 2023), questions for discussions (Samala et al., 2024)
	Personalized Learning Designer	ChatGPT assists in creating learning content tailored to specific students´ challenges. Teacher benefit from the speed of ChatGPT to create different teaching materials that are adapted to the respective needs of the students.	**Generate personalized tasks** based on students´ difficulties (Barrot, 2024; Hwang & Chen, 2023; İpek et al., 2023; Mosaiyebzadeh et al., 2023) and p**rovide immediate feedback to personalized tasks** (Kim & Adlof, 2024)
Lessons Execution	Domain Expert	ChatGPT provides content-specific support for students, allowing to ask questions and engage in discussions. Teachers can leave assistance for students to ChatGPT and thus enable individualized content support that a teacher cannot provide for each student.	**Provide answers to questions** (Alabool, 2023; İpek et al., 2023; Patel et al., 2023; Samala et al., 2024), **provide definitions of concepts** (Samala et al., 2024) and facilitate **learning of new content** (Barrot, 2024; Kim & Adlof, 2024) **Support language learning** (Patel et al., 2023)
	Teacher Simulation	ChatGPT provides students with guidance, methodical assistance and approaches to problem solving, helping students develop strategies for overcoming learning challenges.	**Explain corrections and next steps** (Barrot, 2024; Crompton & Burke, 2024; Ng et al., 2024; Samala et al., 2024; Zhang & Tur, 2024)

		Teachers can leave assistance for students to ChatGPT and thus enable individual methodological support that a teacher alone cannot provide for each student.	Suggest **suitable materials and tasks** (Kim & Adlof, 2024; Zhang & Tur, 2024), and **simplifications** if necessary **Guiding students** through material (Ghazali et al., 2024) and **providing additional content** on teacher´s behalf (Mosaiyebzadeh et al., 2023; Yang et al., 2023)
	Student Peer Simulation	ChatGPT adopts the active role of another active student allowing for working on tasks collaboratively. By using ChatGPT, teachers can provide another option for reflecting learning content to students.	**Support** in solving tasks (Kim & Adlof, 2024), **brainstorming**, **discussing problems** (Barrot, 2024; Samala et al., 2024; Yang et al., 2023), **writing texts** (Barrot, 2024; İpek et al., 2023; Patel et al., 2023)
	Critical AI Simulation	ChatGPT adopts the passive role of a demonstrator, allowing learners to explain important content to the AI and thereby enabling learning from critical elaboration. Teachers can show reflective AI use.	Enabling competence development by **offering example-based learning opportunities,** the teacher can use it for reflecting ChatGPTs role (Hwang & Chen, 2023; Samala et al., 2024; Zhang & Tur, 2024)
Lessons Evaluation	Learning Analyst	ChatGPT facilitates the collection and analysis of student data and present progress in tables and graphs. Using ChatGPT helps teachers to decide which tasks to focus on to achieve a class´s learning goals.	**Measure** and **analyse progress**, **set learning goals, create schedules**, and **provide a possible learning path** (Barrot, 2024; Ng et al., 2024) **Offer personalized learning tips** (Mosaiyebzadeh et al., 2023; Patel et al., 2023; Yang et al., 2023; Zhang & Tur, 2024)
	Feedback Assistance	ChatGPT facilitates the evaluation of the students´ performance. Teachers can evaluate tests (e.g. multiple-choice) easily and quickly.	**Provide and discuss feedback** on student performance (Barrot, 2024) **Enable more elaborated feedback** (Crompton & Burke, 2024)
Adminis-trative Support	Coordinative Assistance	ChatGPT facilitate daily work tasks. This helps teachers to structure their daily routine by leaving the time and project management to ChatGPT.	**Communication with parents and students** (Alabool, 2023; Alier et al., 2024) **creation of to-do lists** (Kim & Adlof, 2024) and **time and project management** (Hashem et al., 2024; Kim & Adlof, 2024)
	Research and further training Assistance	ChatGPT facilitates teacher´s research and further training on specific topics. Teachers can quickly obtain information and recommendations on specific topics.	**Present Information** (Hashem et al., 2024; İpek et al., 2023; Kim & Adlof, 2024; Mosaiyebzadeh et al., 2023; Samala et al., 2024) **Support teacher training** (Alabool, 2023; Alier et al., 2024; Zhang & Tur, 2024)

Table 2. Ten Roles and use cases for integrating ChatGPT into the teaching process.

5 Discussion

Addressing *RQ1*, the results show a variety of use cases in ChatGPT can be integrated into teachers´ everyday work. Most literature focuses on using ChatGPT for designing and developing teaching material, followed by performance assessment and feedback creation and for guiding and explaining to

students during the learning process. After clustering the findings to address *RQ 2*, ten roles were specified and organized along the teaching process. For *lesson development*, ChatGPT can be used for designing materials and exercises or creating personalized learning. During the lesson, it can take the role of a *Domain Expert* and for simulating *students* or *teachers*. Furthermore, ChatGPT can be used as *Critical AI Simulation* for example-based learning of difficulties when using GenAI. In lessons evaluation it can facilitate feedback, if requested, based on analysis of student´s data. The two roles *Coordinative Assistance* and *Research and further training Assistance* were added to *cover administrative support*.

5.1 Limitations and Future Research Directions

As with any SLR, the interpretation of results is limited by the studies selected based on predefined inclusion and exclusion criteria. Therefore, the authors have followed a rigorous PRISMA guideline-based approach to minimize potential methodological biases. Nevertheless, to validate the findings, interviews are currently being conducted with teachers to ensure that the literature results are aligned with real-world educational practices. By directly engaging teachers, the research aims to gather valuable feedback on the relevance, feasibility, and applicability of the proposed roles in classrooms. The final objective is the development of a framework showing which roles ChatGPT can be used for along the teaching process of lesson development, lesson execution and lesson evaluation and, if necessary, by extending the teaching process. The large-scale interview validation enriches the literature findings with practical perspectives, ensuring that the resulting framework complements the research by identifying specific opportunities and risks associated with the use cases. Ultimately, the goal is to create a framework that offers actionable guidance tailored to the needs of schoolteachers to detect touchpoints for further information and knowledge transfer.

5.2 Conclusion

Based on an SLR, this paper presents ten roles with specific use cases for integrating ChatGPT into secondary education´s teaching process. These result in *Design Assistance* and *Personalized Learning Designer* for lesson development, *Domain Expert, Teacher Simulation, Student Peer Simulation* and *Critical AI Simulation* for lesson execution, and *Learning Analyst* and *Feedback Assistance* for lesson evaluation. Moreover, this is complemented by *Coordinative Assistance* and *Research and Training Assistance* as administrative support. The findings offer practical insights for teachers and educators involved in implementing and discussing ChatGPT for secondary education.

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