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Editorial

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Will Artificial Intelligence (AI) Make the School Principal Redundant? A Preliminary Discussion and Future Prospects

Turgut Karakose

Abstract

Background/purpose. Developments in the world of Artificial Intelligence (AI) is full steam ahead in the wake of the fourth industrial revolution. One of the hot discussions over the exponential advancement of AI has been whether this ability of machines to accomplish tasks that require human intelligence could take over the roles of humans in the workplace and make the human workforce redundant. The field of education was no exception since AI technologies have made significant inroads into the realm of education.

Materials/methods. Although the potential of AI to replace teachers with all the seismic shift it created in the teaching-learning processes has sparked passionate debates, arguments over the potential influence of AI on school principals is scarce. This paper is an attempt to start this debate by construing how recent developments in AI-based systems could impact the process of management in schools, with its outcomes for the role and the status of the school principal.

Practical implications. We argue that, in school management, the integration of AI can facilitate the efficiency of administrative roles such as keeping/analyzing student records, decision-making, planning, budgeting, and communicating with staff or parents while at the same time improving the learning environment. When automated systems support these routine administrative duties of school principals, it will free up valuable time to handle more critical issues that require a "human touch" such as leadership. However, we signify the complementary role of humans and AI, suggesting a more symbiotic relationship in which both human and AI could bring in their own strengths and overcome their limitations.

Conclusion. We suggest that principals will not become redundant but will be even more crucial actors in the creation of human-AI symbiosis by continuously updating their AI literacy, invoking the effective integration of AI into educational and managerial processes, and guiding the other stakeholders' views and attitudes. However, principals have to realize that different times require different approaches, and their roles as school managers and leaders need to evolve in line with the changing realities of the new age of AI.

1. Introduction

Developments in the world of Artificial Intelligence (AI), which is 'the ability of machines to adapt to new situations, deal with emerging situations, solve problems, answer questions, device plans, and perform various other functions that require some level of intelligence typically evident in human beings (Coppin, 2004, p. 4), is full steam ahead in the wake of the fourth industrial revolution (Vázquez-Cano, 2021). Several innovative tools with astonishing performance are introduced one after the other; the most recent version of ChatGPT (GPT-4o), for instance, which was released just before we finalized this paper. Yet, as once iterated by the theoretical physicist Stephen Hawking, 'the rise of powerful AI will be either the best or the worst thing ever to happen to humanity. We do not yet know which'.

One of the hot discussions over the exponential advancement of AI has been whether this ability of machines to accomplish tasks that require human intelligence could take over the roles of humans in the workplace and make the human workforce redundant (Dowling & Lucey, 2023: Kanbach et al., 2024). It is even considered that AI might have the capability to 'deliver higher quality, greater efficiency, and better outcomes than human experts' (Haefner et al., 2021, p. 1) in various fields of operations. Indeed, AI has now penetrated several organizational operations that were once reserved for humans such as decision-making and management (Jarrahi, 2018; Raisch & Krakowski, 2021).

AI-enhanced smart technologies have also made significant inroads into the realm of education (İpek et al., 2023; Ramirez & Esparrell, 2024). As suggested by Chen et al. (2020), 'AI in the education sector is transitioning from simply computers to embedded systems, such as robots or colleague robots (cobots) that work with instructor or educators or independently, to perform teacher like functions' (p. 75270). Continuing this rapid integration of AI into the education sector, whether AI-based learning systems that offer customized learning opportunities and timely feedback to learners could replace teachers in the future has become a point of discussion (Louis & ElAzab, 2023; Orhani, 2023). In addition to instruction, teaching and learning, recent developments in AI have also opened potential avenues for the management of education (Chassignol et al., 2018), sparking a debate over its emerging influence on educational management and leadership. Van Quaquebeke and Gerpott (2023) have recently stressed that 'the question is not anymore whether AI will play a role in leadership, the question is whether we will still play a role. And if so, what role that might be. It is high time to start that debate' (p. 272).

The purpose of this paper is to extend this iteration by Van Quaquebeke and Gerpott (2023) through evaluating the potential of recent intelligent systems such as learning analytics, automated administration, chatbots, and robots to challenge and enhance the role and the status of the school principal. Although the potential of AI to replace teachers with all the seismic shift it created in the teaching-learning processes has sparked passionate debates, arguments over the potential influence of AI on school principals have remained scarce (Hejres, 2022). This paper is an attempt to start this debate by construing how recent developments in AI-based systems could impact the process of management in schools, with its outcomes for the role and the status of the school principal.

2. Literature Review

2.1. The Process of School Management in the Wake of AI-based Systems

As a subfield of public administration, the educational administration and management field has borrowed several themes and theories from public administration theorists to explain the roles and operations of school principals. One of these was Gulick and Urwick's' (1937) framework of the functions of management, which they listed as 'planning, organizing, staffing, direction, coordinating, reporting, and budgeting' (the popular acronym POSDCORB) (Nhema, 2015). With the

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changing realities of the 21st century, in addition to these managerial roles, which were already overwhelming for the principal to realize individually, the leadership role has also become the focus of attention (Hallinger, 2003).

Considering the managerial roles mentioned above, recent developments such as machine learning, big data analysis, data mining, and learning analytics have much to offer to ease principals' administrative and managerial burdens (Fullan et al., 2023; Umkabu, 2023). For instance, developments in big data enable the processing of diverse and large sets of data that cannot be processed by human effort and intelligence alone (Berkat et al., 2024). Through gathering, analyzing, and assessing large datasets, AI-based big data analysis can extract 'actionable knowledge and viable patterns from data' by employing 'a variety of technologies and tools, such as statistical analysis, data mining, data visualization, text analytics, social network analysis, signal processing, and machine learning' (Luan et al., 2020, p. 2). In the same vein, machine learning algorithms can yield reliable results, predictions and solutions that can facilitate quality decision-making, and support the process of planning, organizing, direction, reporting and budgeting (Berkat et al., 2024; Gobert et al., 2013).

By utilizing these innovative technologies such as data mining, machine learning, GenAI, and learner analytics, principals can identify patterns, trends, relationships and anomalies in data on students, teachers, curriculum, and assessment (Zhang, 2024) more accurately and quickly (Liu & Jian, 2024), which help them 'make appropriate and strategic decisions in improving the quality of education' (Berkat et al., 2024, p. 1895). As suggested by Chen et al. (2020), principals can use these results to offer recommendations for students selecting classes or universities, to follow students' aspirations, preferences, and needs of learning, and tailor curriculum and instruction to their specific needs and abilities, to create early-warning systems to intervene with students at risk of drop-out.

These advanced technologies have obviously much to offer to support the managerial roles of the school principals, which are accomplished by more technical and mechanical means. As for the leadership roles, though, the current state-of-the-art in AI seems to remain insufficient as leadership requires more sentimental qualities such as social intelligence, genuine emotional connections, and intuition in addition to cognitive abilities (Fullan et al., 2023; Leithwood, 2023). This brings us to the automation-augmentation dichotomy in adopting AI systems into the management of organizations (Keding, 2021).

2.2. Automation vs. Augmentation: A Dichotomy or a Symbiosis

Automation refers to machines fully taking over a human task while augmentation implies a close collaboration between humans and machines to perform a particular task (Raisch & Krakowski, 2021). This suggests that there is no human involvement in automated decision-making making although the outcomes from this process can guide managers to act accordingly (Newell and Marabelli 2015). In addition, automation is considered to save managers time and energy from administrative issues, which they can spare for better leadership and creativity (Daugherty & Wilson, 2018; Haefner et al., 2021).

Scholars now accentuate the complementary role of humans and AI, suggesting a more symbiotic relationship in which both human and AI could bring in their own strengths and overcome their limitations (Kasneci et al., 2023; Sallam, 2023; Papadakis et al., 2024; Tülübaş et al., 2023). Raisch and Krakowski (2021) underline that 'the human-machine relationship is no longer dichotomous, but evolving into a machine "augmentation" of human capabilities … [which can] "rehumanize work" by gradually shifting the focus from repetitive and monotonous tasks to more creative and fulfilling tasks' (p. 6). Similarly, Jarrahi (2018) suggests that in a human-AI partnership, AI could work with complex and mechanical issues using their analytical strength while humans

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focus on the more uncertain and equivocal aspects of managerial decision-making. More specifically, Jarrahi (2018) proposes that 'machines should take care of mundane tasks, allowing humans to focus on more creative work' (p. 10). Araujo et al. (2020), on the other hand, the socio-technical aspect of decision-making, and suggest that automated decision-making algorithms 'do not function in isolation but are embedded in the context of particular societal, institutional, or organizational structures, with their own mechanisms, incentives, (power) relationships, and roles in society' (p. 612). Săvoiu (2023) adds to these discussions by focusing on innovations in human brain-computer interfaces called 'the digital bridge' that potentially offer greater levels of AI-human connection in a range of applications, including organizational decision-making.

In the field of school management, the integration of AI is likely to facilitate the efficiency of administrative roles such as keeping/analyzing student records, decision-making, planning, budgeting, and communicating with staff or parents while at the same time improving the learning environment. As suggested by Al-Omari (2024), when automated systems support the routine administrative duties of school principals, it is likely to free up valuable time to handle more critical issues that require a "human touch".

Indeed, most issues inherent to school management are too complex to be fully accomplished by automated systems and require principals' involvement and collaboration with machines before reaching a final decision (Holzinger, 2016). School principals often need to make strategic decisions in a more ambiguous and equivocal environment, mostly using subjective judgment based on past experience, intuition, and holistic insights (Davenport, 2018). What's more, these strategic decisions require a more integrated perspective (Jarrahi, 2018) and thus the collaborated efforts of the educational stakeholders become significant in producing high-quality outcomes (Harris, 2006 REF). As eloquently expressed by Leaton Gray (2020), data patterns identified by automated systems

> may be a subsequence rather than a consequence of human action, as with any statistical analysis. For example, a cluster of students experiencing lower attainment one year may be a coincidence (to do with local weather conditions, or an epidemic of some kind, for example) and have little to do with any school-related provision. This may generate false positives for a school inspection service, triggering inspections where they are not needed (p. 167).

This argument by Leaton Gray also finds support from the organizational management field, indicating that the intuitive and common-sense judgment of managers is necessary to reconcile the machine output with reality before making a final decision about the best option (Raisch & Krakowski, 2021). In addition, managers need advanced leadership skills to maintain trust-based genuine relationships in the workplace, to match the skills and expertise of the staff with the organizational tasks, and to ensure that organizational decisions are internalized by the staff (Davenport & Kirby, 2016; Karakose et al., 2024a; Karakose & Tülübaş, 2024c). All these apply even more significantly to the case of the school principal, who needs to ensure democracy, justice, trust, accountability, and responsible act (Leaton Gray, 2020). Indeed, making decisions and setting objectives 'is closely related to taking responsibility for the associated tasks and outcomes … [and] humans can only take responsibility if they retain some level of involvement with and control over the relevant tasks (Raisch & Krakowski, 2021, p. 15).

3. Conclusion and Future Prospects

Nearly half a century ago, Heller (1985, p. 43) stated that albeit slowly, technology was taking its place in education, with a promising contribution to the improvement of learning, but by any means, principals were nonreplaceable because the human element was crucial for leadership. Since then, unprecedented advancements have been made in the world of digital technologies including AI-based systems but we still believe that AI making school principals redundant is still

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'much ado about nothing', or another overhyped preposition (Jarrahi, 2018). In fact, recent developments in AI have created a co-evolutionary process of augmented intelligence in which both humans and machines learn from each other and mutually compensate for their weaknesses and inadequacies (Rahwan et al., 2019).

As such, we support Jarrahi's (2018, p. 11) claim that 'it is more meaningful to view AI as a tool for "augmentation" (extending human's capabilities) rather than "automation" (replacing them)', and argue that AI will not replace school principals but augment their potential to tackle with administrative issues so that they can engage in improved leadership practice and provide the 'human touch' that will always be necessary in the world of humans as social beings (Karakose et al., 2024b). We believe this perspective can be 'a more effective guide for the future rather than a preoccupation with superintelligent machines that can replicate every aspect of human intelligence, and eventually replace them in the workplace' (Jarrahi, 2018, p. 11).

Accordingly, we suggest that principals will not become redundant but will be even more crucial actors in the creation of human-AI symbiosis by continuously updating their AI literacy, invoking the effective integration of AI into educational and managerial processes, and guiding the other stakeholders' views and attitudes (Tyson & Sauers, 2021) so that schools can provide students with a learning experience enriched and updated by AI. On the other hand, principals have to realize that different times require different approaches, and their roles as school managers and leaders need to evolve in line with the changing realities of the new age of AI (Harris et al., 2023; Huang et al., 2019; Karakose et al., 2023; Nhema, 2015). In summary, AI technology 'can help in many ways - some proven, some potential- but schools are for people. The better the people, however defined, the better the school. There is no substitute for the skillful principal who can manage and can lead a staff' (Heller, 1985, p. 46)

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