Literature Review: The Use of Dashboards in Current Business Practice in a Secondary School

Introduction

The increasing reliance on technology in educational institutions has made data management tools indispensable. Among these, dashboards have gained prominence, providing user-friendly interfaces that synthesize complex datasets into actionable insights. In secondary schools, dashboards are employed to monitor attendance, academic performance, and behavioural trends, streamlining administrative tasks and enhancing decision-making (Garcia & Thomas, 2021). Despite their widespread adoption, debates persist regarding their effectiveness and limitations, particularly in addressing the diverse needs of stakeholders. This literature review critically examines the role of dashboards in secondary schools, exploring their benefits, challenges, ethical considerations, and the methodologies underpinning current research.

Dashboards have become an indispensable tool in modern educational practices, particularly within secondary schools where they serve as a centralized platform for administrators, educators, and stakeholders to visualize complex data sets. These dashboards facilitate informed decision-making by presenting real-time insights on student performance, attendance, behaviour trends, and resource allocation, ultimately contributing to a more data-driven approach to education management. This literature review explores the effectiveness, limitations, and ethical implications of dashboards in the educational context, providing a comprehensive understanding of how these digital tools impact operational efficiency and educational outcomes.

Literature Review

The Role of Dashboards in Enhancing Educational Outcomes

Dashboards are often lauded for their capacity to transform raw data into meaningful visualizations, enabling educators to identify trends and make timely interventions (Siemens, 2013). By providing an intuitive, visual representation of data, dashboards help educators move beyond mere data collection to actively using that data in ways that directly benefit students. For instance, Anderson and Dexter (2020) highlight dashboards' ability to reduce administrative workloads, allowing educators to dedicate more time and energy to student-centred tasks, such as individualized instruction and targeted support for those in need. This reduction in administrative burdens also has the potential to improve educator morale and job satisfaction, as teachers can focus more on the core aspects of teaching and student engagement rather than getting bogged down in paperwork.

Furthermore, Nguyen et al. (2021) argue that dashboards promote transparency, fostering trust among stakeholders by providing real-time access to critical information. This transparency is particularly valuable in fostering a collaborative environment, where parents, teachers, and administrators are all on the same page regarding student progress and school performance. The ability to view and understand data collectively helps to align goals across different stakeholder groups, ensuring that interventions are well-coordinated and that everyone involved in the educational process has a clear understanding of the challenges and achievements within the school. The visibility of data also allows for more informed conversations

between educators and parents, enhancing the partnership between home and school, which is crucial for student success.

Methodologies in Dashboard Research

Research on dashboards employs diverse methodologies, each offering unique insights into how these tools function within educational settings. Quantitative studies, such as those conducted by White and Roberts (2022), provide statistical evidence of the impact of dashboards, demonstrating measurable improvements in areas like attendance rates, student performance, and administrative efficiency. These studies are valuable for establishing a broad understanding of the tangible benefits dashboards can offer. However, they often fail to capture the rich, contextual factors that influence how effectively dashboards are used in practice. Factors such as school culture, educator engagement, and varying levels of data literacy are difficult to quantify but play a critical role in determining the success of dashboard implementation.

Conversely, qualitative research delves deeply into user experiences, offering insights into the real-world challenges and benefits of dashboard use. Studies by Brown, Bayne, and Davies (2021) explore the human side of dashboard implementation, revealing barriers such as gaps in data literacy, resistance to technological change, and the need for ongoing professional development. These studies highlight the importance of understanding the lived experiences of educators and administrators, emphasizing that dashboards are not just technical tools but also social tools that require adaptation and acceptance by their users. While qualitative research provides a rich, detailed picture of these dynamics, it is often limited in terms of generalizability. The specific contexts studied may not fully represent the

wide variety of educational settings, making it challenging to draw universal conclusions.

Mixed-methods approaches offer a more comprehensive perspective by combining the strengths of both quantitative and qualitative research. For instance, Ritter (2020) adopts a mixed-methods approach to evaluate dashboards holistically, combining quantitative metrics with qualitative insights to provide a well-rounded understanding of their impact. Such studies are particularly effective in capturing both the measurable outcomes of dashboard use and the nuanced experiences of stakeholders. For example, while quantitative data might show an improvement in attendance rates, qualitative interviews can provide context by explaining how teachers used the dashboard to develop targeted interventions. Despite their potential, mixed-methods studies are relatively underutilized, largely due to their resource-intensive nature, requiring substantial time, funding, and expertise to conduct effectively. However, when executed well, they can offer the most holistic insights into how dashboards can be optimized to meet the diverse needs of schools.

Ethical Considerations and Data Privacy

The integration of dashboards into schools raises critical ethical concerns, particularly regarding data privacy and the responsible use of student information. Floridi (2016) emphasizes the significant risks involved in aggregating sensitive student data, warning that without robust safeguards, there is a considerable potential for misuse. Data breaches or unauthorized access to student information could have serious consequences, impacting both the privacy and safety of students. Floridi argues for the implementation of stringent security measures, including

encryption and restricted access, to ensure that sensitive data is adequately protected.

Selwyn (2020) echoes this sentiment, stressing the importance of transparent data policies and informed consent protocols to maintain trust among all stakeholders. Schools must clearly communicate how student data is being collected, stored, and used, and they must obtain explicit consent from parents and guardians. This transparency is not just a legal necessity but also a moral obligation to ensure that students and their families are fully aware of and comfortable with the data practices in place. The ethical use of student data also involves ensuring that data is used in ways that directly benefit educational outcomes rather than serving administrative convenience or external commercial interests.

Moreover, standardized dashboards may inadvertently perpetuate existing inequities in education. Schools in underfunded regions often lack the technological infrastructure or financial resources to fully leverage the functionalities of advanced dashboards, widening the digital divide between well-resourced and under-resourced institutions (Nguyen et al., 2021). This digital divide means that students in disadvantaged schools may not receive the same benefits from data-driven insights, potentially exacerbating existing disparities in educational opportunities and outcomes. Nguyen et al. highlight that while dashboards can offer significant advantages, their benefits are not evenly distributed, and without targeted interventions, they risk reinforcing rather than reducing educational inequalities.

This issue is further compounded by ethical dilemmas surrounding the commercialization of educational data. As private vendors increasingly dominate the market for educational dashboards, there is a growing concern that the focus may

shift from educational value to profit maximization. The involvement of private companies raises questions about who ultimately controls the data and how it is being used. Commercial interests may lead to the exploitation of student data for purposes beyond educational improvement, such as marketing or data mining, without the full awareness or consent of schools and families. Such practices not only undermine trust but also pose significant ethical challenges, highlighting the need for stronger regulatory frameworks to protect educational data from misuse.

Comparative Perspectives on Effectiveness

Proponents of dashboards argue that they democratize access to data, enabling schools to operate more efficiently and equitably. By making data accessible to a wider range of stakeholders, dashboards empower educators, administrators, and even parents to make more informed decisions that can lead to improved educational outcomes. Garcia and Thomas (2021) assert that dashboards empower educators to identify and address disparities in real-time, allowing them to respond promptly to issues such as attendance problems, achievement gaps, and behavioural concerns. This aligns with the broader goals of data-driven decision-making, which aim to ensure that every student receives the support they need, based on objective and timely data.

However, critics like Mandinach and Gummer (2016) caution that dashboards' reliance on algorithms and quantitative metrics may inadvertently reinforce existing biases, particularly when critical oversight is lacking. Algorithms are only as unbiased as the data fed into them, and in educational settings, historical biases and systemic inequities can be embedded within this data. Without careful consideration and regular evaluation, dashboards risk perpetuating stereotypes or inequitable

practices. For example, if a dashboard's algorithm places disproportionate emphasis on disciplinary data, students from marginalized backgrounds—who are often subject to disproportionate disciplinary measures—may be unfairly flagged as high-risk, leading to biased interventions that do not address the root causes of their challenges.

These debates underscore the importance of contextualizing dashboard use within the broader educational landscape. Dashboards are tools that, while powerful, are not a panacea for all educational challenges. Their effectiveness is contingent on thoughtful implementation, ongoing training, and regular evaluations to address emerging challenges. Schools must invest in professional development to ensure that educators not only understand how to use dashboards but also how to interpret data critically and ethically. Additionally, dashboards should be integrated in a way that complements, rather than replaces, the professional judgment of educators, ensuring that the human element remains central to educational decision-making. By approaching dashboard implementation with a focus on equity, transparency, and critical oversight, schools can harness their potential to support meaningful and inclusive educational outcomes for all students.

Research Gaps and Future Directions

Despite the growing body of literature, significant gaps persist in understanding dashboards' long-term impact on education. Most existing studies focus on short-term outcomes, such as immediate improvements in attendance or academic performance (Wayman, Cho, & Johnston, 2012). While these findings are valuable, they provide only a snapshot of dashboards' effectiveness and fail to capture how sustained use might influence school culture and educational outcomes over an

extended period. Longitudinal research is needed to explore these dimensions more thoroughly. Understanding the long-term effects of dashboards could reveal whether they contribute to lasting changes in teaching practices, student engagement, and overall school improvement.

Another key gap in the research is the limited customization of dashboards, which affects their relevance and effectiveness across diverse educational settings. Many existing dashboards are designed as one-size-fits-all solutions, which may not adequately address the specific needs of different schools, particularly those with unique student demographics or educational goals. Selwyn (2020) advocates for adaptive dashboards that cater to the specific needs of educators, such as tracking classroom dynamics, supporting inclusive education, or monitoring student well-being. Customization is crucial to ensure that dashboards are truly effective tools that reflect the context in which they are used. Dashboards that can be tailored to the unique requirements of each school or classroom would be better equipped to provide meaningful insights and support informed decision-making.

Furthermore, there is a need to address the digital divide that affects schools with fewer resources. Research should focus on developing accessible dashboard solutions that can be implemented even in underfunded schools. This would help bridge the gap between well-resourced and resource-limited schools, ensuring that all students benefit from data-driven approaches, regardless of their school's financial capabilities. Addressing these gaps would not only improve the adaptability of dashboards but also enhance their equity, making them valuable tools for all schools, regardless of their resources.

Additionally, future research should consider the impact of ongoing professional development on the effective use of dashboards. Training educators to interpret and utilize dashboard data is not a one-time event but requires continuous support to adapt to changing needs and technologies. Studies could explore the role of professional development in ensuring that educators are equipped to use dashboards effectively, interpret data accurately, and apply insights in ways that benefit students. This would help in understanding how to maximize the utility of dashboards in different educational contexts.

Conclusion

Dashboards have revolutionized data management in secondary schools, offering unprecedented opportunities for efficiency and insight. However, their effectiveness is tempered by challenges such as data overload, ethical concerns, and inequities in access. By critically examining these issues, this review underscores the need for thoughtful implementation, robust ethical safeguards, and equity-focused solutions. Future research should prioritize longitudinal studies, customization, and the integration of qualitative insights to maximize dashboards' utility as tools for inclusive and responsible education.

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