The Influence of Robotic Process Automation on the Administrative Workload of Teachers.

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Abstract

Teachers often encounter a massive volume of administrative tasks that may affect their productivity and overall satisfaction with their work. Due to excessive workloads, teachers may encounter high levels of stress and a decline in the quality of their teaching. An advanced solution technique that incorporates Robotic Process Automation (RPA) offers a possible resolution to optimize teachers' workload. Therefore, this study investigates the influence of RPA in optimizing administrative workload and job satisfaction. Moreover, this study has the goal of identifying key considerations and challenges in developing RPA projects within educational settings. The research included a sample of 30 teachers selected from several schools, ensuring a diverse sample in terms of experience, subject specialization, and school type which are public and private. The surveys are conducted to allow for a comprehensive understanding of the varying impacts and perceptions of RPA across different educational contexts. The results demonstrate a significant integration of RPA in terms of minimizing administrative workload, challenges of adaptation, enhanced job satisfaction, and increased efficacy and productivity. Teachers also expressed a greater positive impact of the implementation of RPA with 76.7% influence on interaction with students and 46.7% able to improve job satisfaction. The integration of RPA into administrative workload not only streamlines administrative tasks but also allows teachers to dedicate more time to instructional and student-centered activities. Future research could focus on long-term impacts and exploration of RPA across different educational contexts.

Keywords: *Robotic Process Automation, Informatics, Job satisfaction, Education*

1. Introduction

Teachers sometimes experience administrative overload, which distracts them from primary teaching responsibilities. Studies by Garcia et al. [1] suggest that instructors encounter substantial obstacles as a result of a huge variety of administrative duties, which limit their capacity to participate in educational activities that improve their teaching techniques. The research proposed by [2] also emphasizes that improving teachers' working circumstances via the delegation of administrative responsibilities may positively impact their motivation and overall job satisfaction.

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In education, the presence of technology and informatics can have both positive and negative effects on learners' psychological and social development. Integrating digital technologies in school administration and culture may have an enormous impact on the learning environment and academic results [3]. The influence of informatics on society and daily life is substantial and diverse. Information technologies, such as the Internet, big data, and cloud computing, have been seamlessly incorporated into people's everyday lives [4]. The integration has resulted in modifications to lifestyle patterns and presents obstacles compared to traditional forms of living [5]. The process of informatization has become extensive in every aspect of human existence, with modern technological advances being easily visible in everyday life [6]. The rapid advancement of the social economy has resulted in the steady establishment and enhancement of informatization in many areas, significantly facilitating people's everyday activities [7].

In informatics, specifically the use of robotic process automation (RPA), is having a profound impact on routine work across several industries, especially the field of education. The research indicates that administrative tasks, which are both time-consuming and repetitive, may be made more efficient by using RPA solutions such as Microsoft Power Automate and Zapier [8]. These solutions facilitate the automation of tasks such as data input, scheduling, email management, and report preparation. As a result, they save time for more important activities and enhance overall efficiency. RPA employs software bots that can engage with diverse digital systems and applications to execute activities in an approach similar to humans [9]. However, RPA provided enhanced speed, precision, and reliability. The use of RPA in the field of education is rapidly growing, motivated by the need to maximize resources and enhance operational effectiveness [10].

Moffitt et al. [11] suggest that RPA has the potential to revolutionize traditional models by efficiently automating processes. The automation of robotic processes has gained considerable interest, particularly in the realm of digital transformation [12]. Choi et al. [13] demonstrated that RPA tools are effective in terms of cost-saving and performance metrics. In addition, it offers benefits to organizations, especially in educational institutions. In order to successfully integrate RPA into educational environments, it is essential to use an organized approach to identify procedures that are appropriate for automation [14]. By implementing RPA, teachers can enhance their efficiency, decrease administrative burdens, and ultimately enhance job satisfaction. As the educational landscape evolves, embracing technologies like RPA can assist educators in adapting to growing demands and optimizing their time for impactful teaching practices. This report explores the impact of RPA on teachers' administrative workload through a survey of educators from various schools.

Motivated by the benefits of RPA in the field of education, particularly in minimizing the administrative workload, this study is conducted to analyze the influence of RPA on the administrative workload of teachers. The study addresses the key considerations and challenges in developing RPA projects within education and the adoption of RPA impact on teachers' overall job satisfaction and administrative workloads. The implementation of RPA by teachers is able to prioritize their core objective of teaching students by improving efficiency, accuracy, productivity, cost-effectiveness, and flexibility.

2. Literature Review

Research on automation, especially in administrative settings offers essential knowledge on how technology might improve efficiency and reliability. RPA is a concept that incorporates principles from computer science, artificial intelligence, and management. It focuses on the advantages of automating repetitive tasks. Several research investigations have analyzed the implementation of RPA in many industries offering insights into its possible effects in the field of education. Several research that specifically examine the use of RPA in the education sector are provided by Gunawan and Wijaya [15] by investigating the adoption of RPA for automating attendance tracking in schools and the impact of RPA on administrative efficiency. The automation is designed to simplify the verification process in an asynchronous online class. The implementation showed that the time required to perform the activity was decreased by 99.9%, and the cost related to accomplishing the task decreased by 43% after 5 years. RPA has shown huge potential to enhance productivity and enable the administrative workload to prioritize activities that generate more value-added.

In addition, the research conducted by Khan et al. [16] and Almgren [17] offers valuable insights into the influence of RPA on job satisfaction in the education field. Implementation of automating repetitive tasks, RPA reduces stress and workload, allowing teachers and administrative staff to dedicate more time to relevant and engaging responsibilities. The research proposed by Guacales-Gualavisi [18] et al. highlights the particular significance of RPA in school administration and its application in detecting low performance of students. Results have shown that using the goal question matrix method, RPA demonstrates satisfactory levels of system effectiveness, efficiency in task execution task, and easy to use.

RPA has been found to offer numerous advantages in the education field by enhancing the efficiency and effectiveness of administrative and educational tasks. This advancement of technology assists in creating efficiency in minimizing administrative workload, enhancing accuracy and efficiency in the administrative process, maximizing job satisfaction among teachers, and allowing the service for personalized and responsive students.

3. Methodology

The quantitative data method was implemented to conduct the survey by focusing on the teacher's job role in gathering the data.

3.1. Participant

The survey was conducted with 30 teachers from various schools, ensuring a diverse sample in terms of experience, subject specialization, and school type (public and private). This diversity allows for a comprehensive understanding of the varying impacts and perceptions of RPA across different educational contexts.

3.2. Research Instrument

A survey consisting of ten questions was developed for the participants. The questions were as follows:

1. How many hours per week do you currently spend on administrative tasks?
2. Which administrative tasks consume the most time in your daily routine?
3. Have you used any automation tools to assist with administrative tasks?
4. How do you perceived the potential of RPA in reducing your administrative workload?
5. What specific administrative tasks do you believe could be effectively automated using RPA?
6. How would you rate your current level of job satisfaction?
7. Do you think the implementation of RPA would improve your job satisfaction?
8. Have you received any training or information about RPA tools in your school?
9. What are your main concerns about using RPA in your administrative tasks?
10. How do you think RPA implementation could affect your interaction with students?

4. Findings and Discussion

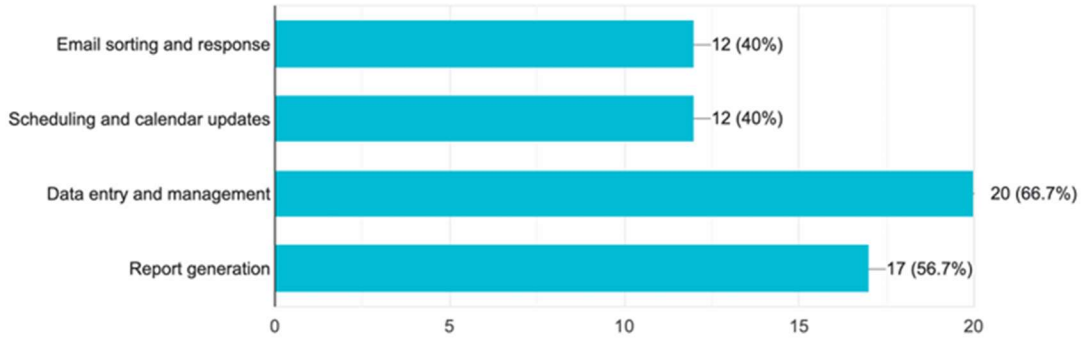
The study conducted on the impact of RPA on the administrative tasks of teachers is motivated by several compelling reasons that highlight the current challenge faced in the education sector. Acquiring an understanding of these causes offers a clear context and justification for conducting the research. The findings indicate the greater impact of RPA in education is discussed in the following sub-sections.

4.1. Data Collection

The data findings from 30 teachers from various schools have been collected to study the impact of RPA on the administrative workload. The question was designed to gather data on various aspects such as the time that was spent on administrative workload, specific tasks consuming the most time, and the perceived potential of RPA in minimizing workload. Most of the teachers have allocated 5-10 hours per week to administrative task especially in data entry and management that contribute until 83.3%, reporting and documentation by 63.3%, scheduling by 33.3%, and email management by 20%. The outcomes indicate that data entry and record keeping, as well as reporting and documentation, are the main administrative tasks that teachers spend their time on. These procedures are usually characterized by their routine and reliance on predefined rules that make them well-suited for automation using RPA. Automating these tasks might greatly decrease the amount of time teachers allocate to them, therefore allowing them to dedicate more time to other meaningful educational tasks. The study conducted indicated that 56.7% of teachers do not use any automation tools for their administrative tasks. This result shows an inadequate level of technological adoption in their administrative tasks. Therefore, presents a significant opportunity for the advantages of RPA in educational streamline.

In terms of the perceived potential of RPA in reducing the administrative workload, 73.4% of teachers agree and strongly agree that RPA has the potential to minimize their administrative workload. Among the respondents, only a small group of 6.7% strongly disagree regarding this case. The presence of different opinions highlights the need for clear communication and showcases the potential of RPA to establish consent and confidence among teachers.

To study the insights into the impact of RPA on the administrative workload of teachers, a finding has been established to capture their perspectives on specific tasks that could be automated, the potential impact of RPA on job satisfaction, and its effects on student interaction. The result of the findings is illustrated in Figure 1 (a), (b) and (c). Figure 1 (a) indicates that 66.7% identified data entry and management as suitable for automation, 56.7% pointed to report generation, 40% mentioned schedule and calendar updates and 40% indicated email sorting and response. These outcomes show that teachers recognize several key areas where RPA could be effectively implemented to minimize their administrative workload. By automating the process of data entry and management, it would not only save time but able to minimize errors, attained high accuracy and reliable data management. Figure 1 (b) demonstrated that 46.7% believe that RPA greatly improves job satisfaction, and 40% somewhat improves job satisfaction. The result shows significant majority suggest that teachers are optimistic about minimizing the administrative workload and highly concerned about the ability to focus more on teaching and student engagement. Only a few of them think it might decrease and not affect their job satisfaction. According to Figure 1 (c), the majority of teachers believe that RPA will positively impact their interaction with students by freeing up more time. Consequently, with fewer administrative tasks, teachers can dedicate more time and engage with student needs. A small group of teachers with 13.3% are concerned that RPA will reduce the personal touch and interaction with students. This may be due to fear that over-reliance on automation might depersonalize the education experience.



(a)

(b)

(c)

Figure 1. Impact implementation of RPA (a) on administrative tasks (b) job satisfaction (c) affect interaction with students.

The results in Figure 2 indicate that teachers have numerous significant issues with the use of RPA in their administrative duties. Understanding and overcoming these challenges is essential for achieving effective RPA implementation. 53.3% of the teachers expressed that the complexity and the learning process associated with RPA technology were their main concerns. This reaction indicates that teachers may have concerns about the time and cognitive commitment necessary to learn and adapt to new systems. Concerns about the security and privacy consequences of implementing RPA were expressed by 46.7% of the respondents. If proper precautions are not implemented, there are considerable risks associated with handling private student and staff information. Over 36.7% of the teachers express concern over the potential of job displacement or redundancy as a consequence of the introduction of RPA.

Teachers may have concerns over the potential impact of RPA on the need for human labour, which might potentially lead to job loss or changes in employment positions. It is essential to have clear information about the function of RPA as a technology that enhances human effort rather than replacing it. It is crucial to highlight how RPA may enhance workload management, enabling employees to concentrate on more meaningful and impactful tasks.

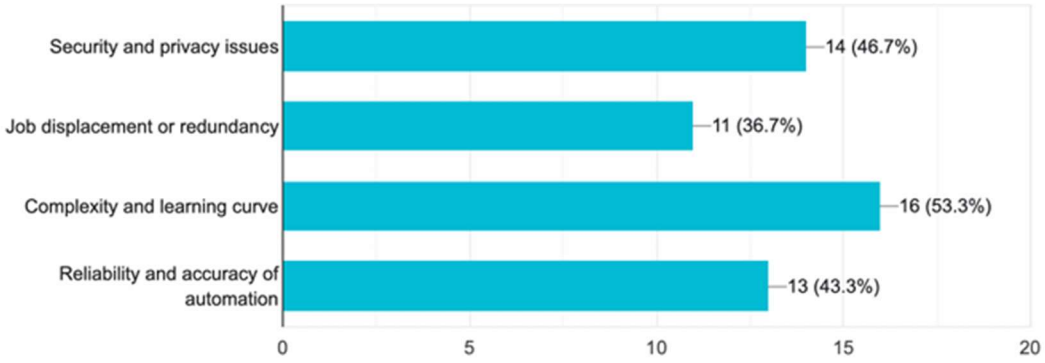


Figure 2. Feedback on concerns about using RPA in administrative tasks

4.2. Data Analysis

The study findings emphasize several significant concerns about the use of RPA in administrative responsibilities among teachers, including complexity, security, dependability, and employment displacement. To tackle these issues, specific solutions, including thorough training, improved security measures, comprehensive evaluation, and effective communication may help ensure the successful implementation and integration of RPA in educational environments. As shown in Figure 3, 63.3% of teachers do not have any training and information on the RPA in administrative tasks. It is crucial to provide training and information to increase teachers' awareness. Using proactive handling of these difficulties, educational institutions may exploit the advantages of RPA to minimize administrative tasks, enabling teachers to concentrate on their primary teaching duties and boosting general satisfaction with their work.

Figure 3. Feedback on training or information using RPA

According to the outcome of this study, two main issues can be analyzed for key considerations and challenges in developing RPA projects within educational settings and the impact of RPA by implementation on teachers. The elaboration of these two main factors is summarized below.

Key considerations and challenges in developing RPA projects in educational settings.

1. Stakeholders' involvement: Effective RPA deployment requires the active participation of several stakeholders, including school administrators, teachers, and IT workers. Effective communication and cooperation are crucial for ensuring that the RPA project is in line with the aims and requirements of the educational institution
2. Technical Infrastructure: Establishing a sufficient technology infrastructure is crucial. Schools need dependable hardware and software systems that can effectively support Robotic Process Automation (RPA) solutions. This involves establishing strong cybersecurity policies to safeguard private data.
3. Training and Support: Teachers need thorough training to proficiently use RPA technologies. Continuous guidance and advanced training are essential to assist individuals in adapting to the new technology and incorporating it into their work routines.
4. Allocation of resources and costs: Thorough planning is necessary for the financial investment in RPA technology and the allocation of resources. Schools have to determine the cost-benefit ratio and take into consideration for immediate expenditures and long-term improvements in efficiency and production.
5. Customization and adaptability: RPA solutions need to be incorporated due to the ability and adaptability to meet the particular needs of the educational setting. Furthermore, the ability of RPA tools to evolve is crucial in order to guarantee their ability to expand and adapt to the changing needs of the institution.

Impact of Implementation of RPA on teachers' administrative workload and job satisfaction.

1. Minimizing administrative workload: RPA solutions efficiently automate tedious administrative operations such as tracking attendance, evaluating performance, and generating reports. Through this method, it is able to reduce the amount of work and teachers are able to dedicate more time and attention to teaching and engaging with students.
2. Enhanced Job Satisfaction: RPA enhances job satisfaction among teachers by reducing the workload associated with administrative workloads. Teachers express a greater sense of worth and recognition when they are able to focus on teaching rather than administrative tasks.
3. Enhanced efficiency and performance: Automating repetitious tasks enhances efficiency and production in educational institutions. This not only provides advantages for teachers but also has a beneficial impact on the entire operational efficiency of the school.
4. Difficulties with adaptation: Although adopting RPA has advantages, there might arise some difficulties along the way. Several teachers may initially oppose the change due to a lack of acquaintance with the technology or concerns about job stability. It is essential to use appropriate change

management solutions to address these issues and ensure that the deployment is effective.

5. Conclusion and Recommendation

The potential for an enormous change of administrative tasks in the field of education depends on the integration of informatics, especially via Robotic Process Automation (RPA). The findings indicate that while there is a positive view of automation technology, more training and expertise are required to fully maximize the benefits. Robotic Process Automation (RPA) may reduce the workload on educational professionals, allowing them to dedicate more time to activities that directly enhance student outcomes. As a result, this might improve the general quality of schooling. To effectively use RPA in administrative procedures, it is crucial to tackle concerns about complexities, safeguarding, and employment displacement. The observed trends suggest that as educators become more familiar with and skilled in these technologies, the use of RPA is likely to increase, leading to improved and more enjoyable work conditions. Through thoughtful implementation and ongoing support, RPA can transform the administrative landscape of education, allowing teachers to dedicate more time to their primary mission of educating and inspiring students. The insights obtained from this study provide an outline for future endeavours to use automation in education, eventually leading to a more streamlined, impactful, and satisfying educational experience for everyone.

To overcome these particular difficulties and maximize the advantages of RPA in education environments, several recommendations have emerged. Longitudinal studies are essential for assessing the enduring effects of RPA on teachers' workload, job satisfaction, and student results. These studies provide an in-depth understanding of the lasting advantages and possible difficulties connected with RPA. Promoting cross-institutional collaboration may allow the exchange of best practices and insights, fostering the adoption of standardized techniques and addressing shared obstacles. It is crucial to include teachers in the development and execution of RPA tools to guarantee that these solutions are both user-friendly and efficient by using their vital insights and feedback. In addition, offering extensive training programs that include both the technical components of RPA and the pedagogical methods for incorporating automation into everyday operations can strengthen the adoption of RPA. Finally, by introducing pilot programs in various educational environments, it becomes possible to experiment with and improve RPA solutions. This enables the identification and solution of difficulties particular to each context, as well as the customization of techniques for broader implementation.

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