Implementation of Transformational Leadership on the Performance of PAUD Teachers in the Digital Era

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Abstract
This research aimed to investigate the impact of the implementation of transformational leadership on the performance of Early Childhood Education (PAUD) teachers in the digital era. The importance of the research topic lies in its potential to improve the quality of early childhood education, enhance teacher performance, and provide valuable insights into effective leadership practices in the digital era. The research method employed was a survey, with data collected through questionnaires distributed to 100 PAUD teachers and 20 PAUD principals experienced in using digital technology in teaching. The collected data were analyzed using descriptive and regression statistical techniques. The research results indicate that transformational leadership significantly enhances the performance of PAUD teachers in integrating digital technology into their teaching practices. Innovation encouragement, creativity development, and sustained support from school leaders are vital in implementing this leadership approach. This research concludes that transformational leadership plays a vital role in improving the quality of PAUD learning in the digital era. Therefore, PAUD school leaders need to actively promote this leadership approach to support teachers in addressing the challenges of digital technology.

Keywords: transformational leadership; early childhood education (paud); digital era.

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Introduction
Transformational leadership is a leadership style that focuses on inspiring and motivating followers to achieve their full potential and exceed their own expectations (Long et al., 2014). Transformational leaders are known for their ability to create a vision and a sense of purpose, foster a climate of trust and collaboration, and encourage innovation and personal growth among their team members. Key characteristics of transformational leadership include; charisma, inspirational motivation, intellectual stimulation, individualized consideration (Pawar, 2016). Transformational leaders often possess charismatic qualities that draw followers toward a common vision. They inspire and motivate their followers by articulating a compelling vision and setting high expectations. They encourage creativity and critical thinking, challenging the status quo. Transformational leaders recognize and cater to the unique needs and aspirations of each team member.

In the context of PAUD teachers, transformational leadership plays a crucial role in enhancing their performance. PAUD teachers who work under transformational leaders are more likely to understand and connect with the overall goals of the institution (Luyten & Bazo,
They are motivated by a clear sense of purpose. Transformational leaders encourage continuous professional development and provide opportunities for PAUD teachers to expand their knowledge and skills. This can result in more effective teaching practices. These leaders offer emotional support and show a genuine interest in the well-being of their teachers, which can lead to higher job satisfaction and better performance (Doyle Fosco et al., 2023). Transformational leaders foster a culture of innovation, which is vital in adapting to the changing needs of young children and utilizing modern teaching methods.

The digital era has introduced several challenges for teacher performance, including in PAUD. Many PAUD teachers may not have been adequately trained to integrate technology into their teaching. Transformational leaders can play a role in providing the necessary training and support (Yang et al., 2019). The shift to remote or hybrid learning during the COVID-19 pandemic highlighted the need for PAUD teachers to adapt to online teaching methods, which can be challenging without proper guidance and resources. Not all PAUD students have equal access to technology, which can exacerbate educational inequalities. Transformational leaders need to address this issue by promoting inclusivity and access to technology. PAUD teachers need to find a balance between screen time and other hands-on learning experiences, which can be challenging in a digital environment (Lindeman et al., 2021). In conclusion, transformational leadership is essential in the field of education, especially for PAUD teachers, as it promotes a sense of purpose, fosters growth, and encourages innovation. In the digital era, transformational leaders must address the challenges related to technology integration, digital equity, and the appropriate use of digital tools to ensure the effective performance of PAUD teachers and the positive development of young children.

Early Childhood Education (PAUD) is a crucial phase within the realm of formal education, as it assumes a significant role in the development of fundamental skills and the cultivation of children's character. (Ulfia & Munastiw, 2020). Early Childhood Education (PAUD) refers to a comprehensive instructional initiative designed to support the development of children between the ages of birth and 6 years. This endeavor entails the provision of educational stimuli that facilitate both physical and spiritual growth, so preparing children for further educational pursuits (Irwanto, 2017). Early childhood education (PAUD) assumes a significant role in shaping the fundamental abilities and character traits of young children.

During the early stages of development, a child's fundamental personality traits begin to take shape. The attitudes, habits, and behaviors that emerge during this period significantly influence an individual's ability to navigate life successfully in adulthood. (Latief, 2020). Furthermore, the early stages of childhood are of utmost importance and possess a heightened level of sensitivity, since they play a pivotal role in shaping an individual's future views, values, and behavioral tendencies (Ariyanti, 2016). Teachers in Early Childhood Education (PAUD) play a significant role in regulating the emotional behavior of young children and in cultivating their Islamic character (Wahyuni & Putra, 2020).

In the context of the rapidly advancing digital era, educators in the field of early childhood education (PAUD) encounter pressures to include technology into their instructional practices. This imperative arises from the necessity to equip young learners with the necessary skills and competencies to effectively navigate and address the multifaceted difficulties of a globalized world (Ahmad Afandi, 2022). One of the primary obstacles encountered by PAUD educators in the digital age pertains to their limited proficiency in digital technologies (Winarti et al., 2022). The absence of digital facilities and infrastructure (Hardiyanti & Alwi, 2022), The integration of technology into the learning process poses challenges, and there exists a detrimental effect associated with the utilization of technology among young children (Yumarni, 2022). Nevertheless, the efficacy of integrating technology into PAUD (Preschool Education) learning processes is not consistently achieved (Hayati & Syaikhu, 2020). It is imperative that instructors in Early Childhood Education (PAUD) possess
sufficient competencies and receive appropriate assistance to effectively integrate technology into their instructional practices (Istiana & Widodo, 2023).

The pivotal function of early childhood education (PAUD) teachers in facilitating children's holistic development within the context of the digital era is of utmost significance (Sofyan & Riyadi, 2022). The inquiry arises regarding the potential impact of transformational leadership on individuals' performance (B.k, 2019) when confronted with this particular difficulty. Transformational leadership has the capacity to assist the incorporation of technology in the realm of education through its emphasis on stimulating innovation, nurturing creativity, and providing continuous support.

Recent scholarly study has extensively examined the significance of leadership within the realm of early childhood education. Numerous studies have been undertaken to investigate this crucial aspect (Aguswara & Rachmadtullah, 2017). Nevertheless, there remains a dearth of comprehensive comprehension about the tangible effects of transformational leadership on the performance of early childhood education (PAUD) teachers within the context of the digital age. Hence, further comprehensive investigations are required to address this gap in knowledge.

Historical research in the field of early childhood education has predominantly emphasized the examination of curriculum components (Adisti et al., 2022), teaching methods (Yulia et al., 2021), and child development (Oktaria & Putra, 2020). Numerous studies have emphasized the significance of leadership in various contexts (Izzah et al., 2023). The existing literature lacks research that particularly investigates the effects of transformational leadership on the performance of PAUD teachers within the framework of digital technology. Consequently, there is a notable gap in information that necessitates more exploration and investigation.

The objective of this study is to examine the effects of applying transformational leadership on the performance of early childhood education (PAUD) instructors in the context of the digital era. The primary objective of this study is to ascertain the impact of transformational leadership on the capacity of PAUD educators to use digital technology into their instructional practices.

This theoretical investigation aims to critically examine the concept of transformative leadership, the role of PAUD teachers in the digital era, and the relevance of technology in the context of early childhood education. This study aims to enhance comprehension of the theoretical framework that underlies the present investigation.

Through the implementation of this project, it is anticipated that substantial empirical evidence will be obtained, hence facilitating the formulation of evidence-based policies and the establishment of optimal practices in the realm of early childhood education. The research findings are anticipated to offer valuable insights for educational administrators and early childhood educators in effectively using digital technology to enhance the educational outcomes and developmental progress of children amidst the challenges posed by the rapidly evolving digital landscape.

**Methodology**

The present study employs a cross-sectional survey design as part of a quantitative research methodology. The quantitative approach refers to a research methodology that emphasizes the collection of numerical data, utilization of statistical analytic techniques, and the ability to extrapolate study findings to a broader audience (Creswell, 2014). In the context of a cross-sectional survey design, data is gathered from a cohort of respondents or participants at a singular moment in time, with the primary aim of assessing the correlation between preset variables.

The selection of this research methodology was based on its ability to offer a complete understanding of the correlation between transformational leadership and the effectiveness of PAUD instructors in their adoption of digital technologies. The conducted data analysis will
offer comprehensive understanding regarding the aspects that impact the incorporation of digital technology in early childhood education (PAUD) learning.

In the present study, a cross-sectional survey methodology was employed to assess and examine the correlation between the implementation of transformational leadership (independent variable) and the performance of PAUD instructors in the integration of digital technology in learning (dependent variable). The acquired data was subjected to statistical analysis in order to determine the presence of a significant relationship or influence between the two variables.

A quantitative methodology is highly appropriate for this study due to its ability to statistically assess the influence of transformational leadership and perform statistical analyses that yield objective and measurable results. This will facilitate the acquisition of a more profound comprehension of the interconnections among the variables under investigation and establish a robust foundation for drawing inferences that can be extrapolated to the broader community of PAUD educators.

Participants. The individuals involved in this study are educators in the field of early childhood education, namely those who have a minimum of two years of teaching experience and possess a demonstrated proficiency in integrating digital technology into their instructional practices. The selection of participants was conducted by a purposive sampling technique, which aimed to ensure that individuals with pertinent background and expertise were included in this study. The anticipated number of participants is approximately 120 early childhood education teachers. The characteristics of the participants encompass several factors such as age, gender, years of teaching experience, educational attainment, and prior expertise in utilizing technology for instructional purposes. The utilization of demographic data will facilitate the identification of potential influences of individual characteristics on the attitudes and performance of instructors in the PAUD sector.

Table 1: Demographic Characteristics of Respondents

<table>
<thead>
<tr>
<th>No.</th>
<th>Characteristic Type</th>
<th>Amount</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Woman</td>
<td>96</td>
<td>80 %</td>
</tr>
<tr>
<td></td>
<td>Man</td>
<td>24</td>
<td>20 %</td>
</tr>
<tr>
<td>2</td>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 - 30</td>
<td>35</td>
<td>29 %</td>
</tr>
<tr>
<td></td>
<td>31 - 40</td>
<td>60</td>
<td>50 %</td>
</tr>
<tr>
<td></td>
<td>41 - 50</td>
<td>20</td>
<td>17 %</td>
</tr>
<tr>
<td></td>
<td>51 - 55</td>
<td>5</td>
<td>4 %</td>
</tr>
<tr>
<td>3</td>
<td>Length of Teaching (Years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-5</td>
<td>40</td>
<td>33 %</td>
</tr>
<tr>
<td></td>
<td>6-10</td>
<td>50</td>
<td>42 %</td>
</tr>
<tr>
<td></td>
<td>11-15</td>
<td>20</td>
<td>17 %</td>
</tr>
<tr>
<td></td>
<td>16-20</td>
<td>10</td>
<td>8 %</td>
</tr>
<tr>
<td>4</td>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor (S1)</td>
<td>80</td>
<td>67 %</td>
</tr>
<tr>
<td></td>
<td>Masters (S2)</td>
<td>40</td>
<td>33 %</td>
</tr>
</tbody>
</table>

Description of the Respondent. This research involved a sample of 120 experienced Early Childhood Education (PAUD) instructors who possess proficiency in utilizing digital technologies for instructional purposes. Within the cohort of participants, it was observed that 80% were female, while the remaining 20% were male. The mean age of teachers at PAUD (Pendidikan Anak Usia Dini) is 35 years, with a range of ages spanning from 25 to 55 years. The demographic characteristics of the respondents are presented in Table 1.

Data collection. The collection of data will be facilitated by the utilization of a meticulously crafted questionnaire. The survey comprises two sections: the initial section pertains to the demographic information of the participants, whilst the subsequent section
evaluates their perspectives on the execution of transformational leadership and their proficiency in incorporating digital technology into the learning process. The subsequent section will employ a Likert scale with statements specifically crafted to assess the degree of participant concurrence with the concepts under investigation.

**Questionnaire Instrument.** The development of the questionnaire instrument was informed by the conceptual framework and relevant literature in the field of research. The validity and reliability of this instrument have been assessed by rigorous testing. The instrument’s validity was ensured by conducting a comprehensive literature study and seeking input from experts in the domains of early childhood education and transformational leadership. The instrument’s reliability was assessed through the utilization of the Cronbach’s alpha test in order to ascertain a high degree of consistency in the questionnaire.

**Data analysis.** The data that has been gathered will be subjected to analysis through the utilization of descriptive statistical methods. This will enable the characterization of participant attributes as well as the examination of the distribution of the acquired data. Subsequently, the utilization of multiple linear regression analysis will be employed to ascertain the correlation between the independent variable, namely the implementation of transformational leadership, and the dependent variable, specifically the performance of PAUD teachers. This analysis will take into account control variables, including individual characteristics. The selection of this research methodology was based on its ability to facilitate a comprehensive examination of the correlation between transformational leadership and the performance of PAUD teachers in their adoption of digital technology.

Furthermore, this methodology takes into account individual factors that may potentially impact the outcomes of the study. The use of a meticulously crafted questionnaire is anticipated to yield data that is both valid and reliable, so enabling the accurate investigation and resolution of research inquiries.

**Results and Discussion**

Table 1 presents an overview of the demographic attributes of the participants involved in the study, encompassing variables such as gender, age, teaching experience, and educational attainment. The table presented above offers a comprehensive overview of the demographic characteristics of the respondents who participated in the research, specifically focusing on Early Childhood Education (PAUD) teachers.

The implementation of Transformational Leadership. The findings from the data analysis indicate that a significant proportion of PAUD teachers, specifically 75%, reported a substantial degree of application of transformational leadership by their respective school administrators. A proportion of 20% of respondents indicated that they perceived the level
implementation to be moderate, whilst 5% reported a poor level of implementation. The aforementioned findings are visually represented in the following Chart 1.

![Chart 1. Level of Implementation of Transformational Leadership](chart1)

Chart 1. Level of Implementation of Transformational Leadership

Chart 1 presents a graphical representation of the perceptions of PAUD teachers who participated in the study about the implementation of transformational leadership by school principals. The data indicates that a majority of participants perceive transformational leadership to be a crucial element in enhancing their performance when it comes to the implementation of digital technologies in educational settings.

The integration of digital technology by PAUD teachers: an analysis of performance. The research findings indicate that a majority of PAUD instructors, specifically 60%, had a high level of performance in incorporating digital technology into their instructional practices. Additionally, 30% of PAUD teachers exhibited a moderate level of performance, while a minority of 10% shown a low level of performance in this regard. The circle chart presented in Chart 2 illustrates the dispersion of PAUD teacher performance in the adoption of digital technologies.

![Chart 2. Performance of PAUD Teachers in Integrating Digital Technology](chart2)

Chart 2. Performance of PAUD Teachers in Integrating Digital Technology

The findings of the multiple linear regression analysis indicate a statistically significant association between the utilization of transformational leadership by school principals and the effectiveness of PAUD teachers in using digital technology into their teaching practices (p < 0.05). The findings of this analysis are presented in Table 2.
Table 2: Relationship between the Implementation of Transformational Leadership and PAUD Teacher Performance in Integrating Digital Technology

<table>
<thead>
<tr>
<th>No.</th>
<th>Independent Variable</th>
<th>Regression Coefficients (β)</th>
<th>Sig. (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Implementation of Transformational Leadership</td>
<td>0.524</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>2.</td>
<td>Control Variable 1</td>
<td>0.158</td>
<td>0.032</td>
</tr>
<tr>
<td>3.</td>
<td>Control Variable 2</td>
<td>-0.092</td>
<td>0.107</td>
</tr>
<tr>
<td>4.</td>
<td>Constant</td>
<td>0.205</td>
<td>0.001</td>
</tr>
</tbody>
</table>

N = 120, R-squared = 0.689 (p < 0.001)

Table 2 displays the outcomes of a multiple linear regression analysis conducted to ascertain the correlation between the implementation of transformational leadership by school principals (independent variable) and the performance of PAUD teachers in integrating digital technology (dependent variable). The provided table presents the regression coefficients (β) for the independent variables, together with the associated significance values (p-values) that determine the statistical significance of the observed relationships. The findings of the analysis indicate a statistically significant association between the adoption of transformational leadership and the effectiveness of PAUD teachers in using digital technology into their teaching practices (p < 0.05). Furthermore, the table incorporates control variables to account for additional factors that may impact the performance of PAUD teachers. The R-squared value serves as an indicator of the extent to which the regression model effectively accounts for the variability observed in the performance of PAUD teachers. The obtained result is deemed statistically significant (p < 0.001), so suggesting that the model appropriately aligns with the collected study data.

The findings of this study suggest that the adoption of transformational leadership by school principals exerts a notable influence on the efficacy of PAUD teachers in incorporating digital technology into their instructional practices. Teachers in early childhood education (PAUD) who are exposed to a significant degree of transformational leadership are more likely to exhibit enhanced performance in the adoption and utilization of digital technologies. This emphasizes the importance of the role of transformational leadership (Walukow et al., 2022) in supporting the development of early childhood education in the digital era. In order to enhance the quality of early childhood education (PAUD), it is imperative for school administrators to carefully deliberate about the adoption of an efficacious transformational leadership style (Windasari et al., 2022).

The results of this study align with the principles and tenets of transformational leadership theory (Kuswaeri, 2016) which emphasizes the role of leaders in motivating, inspiring, and directing their team members toward innovation and positive change. Teachers who hold leadership positions bear the responsibility of motivating, inspiring, and guiding their team members towards fostering innovation and facilitating positive change. In the context of educational leadership, it is necessary for instructors to embody several roles, including that of a role model, an inspirer, a motivator, a facilitator, and a catalyst, in order to effectively guide and support pupils (Prasetyo et al., 2019). Teachers, in their capacity as leaders, are entrusted with several crucial responsibilities, one of which is to the enhancement of student character. As an influential figure, it is incumbent upon the teacher to undertake the significant duty of fostering the development of students' character. The role of the leader mostly involves animating, moving, and guiding the others under their guidance (Suprayogo, 2015). (c) Establishing an optimal learning environment necessitates the ability of educators to cultivate an atmosphere that is beneficial to the educational progress of pupils. The focus is on fostering innovation in education, with an emphasis on teachers' ability to generate novel teaching approaches for pupils, particularly in the digital age of the 21st century (Maulana, 2023, p. 21). (e) Enhancing teacher performance is a critical endeavor, wherein school
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principals assume a significant responsibility in bolstering instructional effectiveness by leveraging leadership, cultivating a conducive culture, and fostering work motivation (Rahmat, 2023).

When fulfilling this job, educators must possess a profound understanding of the subject matter and exhibit a high level of emotional and intellectual maturity in order to effectively motivate and engage students (Winarto, 2023, p.). In addition to the aforementioned, it is imperative for educators to engage in ongoing learning and professional development endeavors in order to cultivate their expertise and aptitude, hence fostering their efficacy and capacity to serve as influential and motivating figures (Mubarok, 2022). The findings of this study offer compelling support for the notion that a transformational leadership framework can be successfully implemented within the realm of early childhood education within the digital age.

One of the primary conclusions derived from this study is that the promotion of innovation emerges as a crucial determinant in influencing the proficiency of PAUD educators in embracing digital technologies. The significance of innovation in the realm of education cannot be overstated (Firmadani, 2017), especially in the current digital era, to create teaching methods that are more effective and attractive for young children. The success of PAUD teachers is influenced by various aspects, one of which is the promotion of innovation. One significant aspect that affects their performance is their personality competency, which plays a crucial role in teaching (Kartika & Ambara, 2021). The teaching motivation of early childhood education (PAUD) teachers is a significant factor that impacts their teaching performance. The performance of PAUD teachers is influenced by the compensation they get (Hamsal et al., 2023). (d) The success of PAUD teachers can be influenced by various aspects, including school culture, organizational dedication, and spirituality.

In order to enhance the efficacy of PAUD educators, it is imperative for educational administrators and relevant stakeholders to offer assistance, guidance, and encouragement to instructors. In addition to the aforementioned points, endeavors to cultivate the professional identity of educators at the PAUD level encompass ongoing encouragement and motivation (Latifah et al., 2023). Therefore, the promotion of innovation in education is a significant determinant of the effectiveness of early childhood education (PAUD) instructors.

Transformational leadership has been found to foster a climate that promotes teachers' receptiveness to change and willingness to experiment with novel ways to learning. The significance of addressing the ongoing advancements in technology is paramount in navigating its ever-evolving dynamics (Bams, 2023). Multiple studies have demonstrated that the implementation of transformational leadership within educational settings has favorable outcomes in terms of teacher performance (Andriani, 2018) and school innovation capacity (Asbari et al., 2020). Transformational leadership encompasses various characteristics, including charisma, the capacity to inspire, the skill to actively boost the intellectual capabilities of subordinates, and personal tolerance. Within the realm of education, the implementation of transformational leadership has the potential to foster an environment that is conducive to learning, while simultaneously enhancing the overall quality and efficiency of school administration.

In addition to this, empirical findings indicate that fostering creativity constitutes a significant determinant. Transformational leadership fosters a conducive climate wherein early childhood educators see a sense of support, enabling them to cultivate innovative ideas within their pedagogical practices (Sutama et al., 2021). Educators who perceive themselves as having the autonomy to develop inventive educational encounters are more inclined to achieve effective integration of digital technologies. The provision of ongoing assistance from educational administrators has been empirically demonstrated to exert a substantial impact on enhancing the performance of early childhood education (PAUD) instructors. Transformational leadership fosters a conducive work environment wherein educators...
experience a sense of backing and empowerment. The utilization of digital technology fosters a collective obligation towards attaining enhanced educational objectives.

It is imperative to acknowledge that the findings of this study hold significance not only for educational administrators and school leaders, but also for teachers in the field of early childhood education. Educators recognize the significant impact of transformational leadership on enhancing their effectiveness and can collaborate with educational administrators to implement optimal strategies for using digital technology into early childhood education (Widyawati, 2021). Within the realm of early childhood education, which is experiencing a growing influence from digital technology, the outcomes of this study provide a significant contribution to our comprehension of the ways in which transformational leadership can effectively enhance early childhood education within this era of digital advancements (Triyono, 2019). The research findings have significant practical consequences as they establish a basis for the formulation of efficient leadership approaches that facilitate the integration of digital technology in early childhood education. The ultimate objective is to enhance the quality and pertinence of educational experiences for young children.

**Conclusion**

The study involved 120 experienced Early Childhood Education (PAUD) instructors. While this sample size may be sufficient for the study, it may only represent some of the population of PAUD teachers. Generalizing the findings to a larger population may be limited. This study demonstrates the significant impact of transformational leadership on educational outcomes in Early Childhood Education (PAUD) within the digital age. School leaders are crucial in creating an environment that fosters innovation and integrates digital technology effectively. Educational administrators must understand that transformational leadership involves inspiring and motivating staff members, promoting innovation, cultivating creativity, and providing continuous support. They should prioritize training and professional development opportunities for PAUD instructors to enhance their confidence and proficiency in digital technology. By adopting a transformational leadership style, administrators can enhance the quality of early childhood education and prepare young learners for the evolving digital landscape.

**Acknowledgment**

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