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# Investigating The Relationship Between Leadership, Self-Efficacy, And Research Productivity In Educational Settings

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## Abstract

*This comprehensive study investigates the intricate interplay between leadership characteristics, research self-efficacy, and research productivity in the Philippine educational settings. The study was gathered from a group of 475 educators, encompassing both teachers and school leaders from selected schools within two School Divisions in Central Luzon of the Department of Education, Philippines. The assessment of leadership characteristics reveals positive perceptions of school leaders among educators, highlighting strengths in effective communication, goal alignment, and collaborative decision-making. However, it also uncovers areas where improvements are needed, particularly in mentorship, research orientation, and information-sharing aspects of leadership. Participants in the study exhibit a moderate level of research self-efficacy, indicating a reasonable level of confidence in research-related tasks. Prominent strengths emerge in the form of achievements in goal attainment and a strong ability to adapt. Conversely, areas necessitating further growth encompass the refinement of problem-solving skills and the adept management of intricate research challenges. Furthermore, the study introduces a predictive model that exhibits commendable accuracy when identifying educators with lower research productivity, albeit encountering difficulties in distinguishing between intermediate and higher levels of research productivity. This underscores the intricate nature of research productivity, which is influenced by a myriad of factors extending beyond leadership and self-efficacy alone. The research underscores the pivotal role played by effective leadership and self-efficacy beliefs in fostering an environment conducive to productive research. It advocates for targeted interventions and professional development initiatives aimed at enhancing leadership efficacy and research self-assurance among educators. The study yields valuable insights into the complex interplay between leadership, self-efficacy, and research productivity in educational settings. It underscores the ongoing need for improvements in leadership methodologies and the cultivation of self-efficacy convictions to positively mold the future landscape of education.*

***Keywords:*** *Leadership characteristics, Research self-efficacy, Research productivity, Educational settings, Philippines*

## Introduction

Research is an indispensable component of modern societies, as it determines the extent to which a country is capable of producing ground-breaking technologies and solutions that are vital for ensuring sustain[1]ability in the knowledge-driven age of today. It exerts a profound

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influence in numerous industries, including agriculture, law, education, and business. The absence of robust research frameworks poses a threat to the advancement and flexibility of knowledge. Competitive advantage is frequently reflected in a country's research intensity (Ketels, 2013; Endovitsk, Korotkikh, & Voronova, 2020). As a result of global influences including ASEAN integration, the pervasiveness of Information and Communication Technology (ICT), and globalizing forces, the Philippine education system has undergone substantial transformations. A reassessment of educational practices and standards is necessitated by the opportunities and challenges that the Fourth Industrial Revolution presents to the nation's educational landscape. Approximately 28 million pupils were impacted by the Philippines' decision to close educational institutions in response to the COVID-19 pandemic, which further emphasized the significance of research (UNESCO, 2020). Successful crises management necessitates the implementation of research-based approaches, proactive strategies, and practices that are grounded in empirical evidence.

A substantial reform was initiated with the implementation of the K-12 Basic Education system pursuant to Republic Act No. 10533, which aimed to harmonize student proficiencies with contemporary economic demands (Geisinger, 2016). The redesigned curriculum places an emphasis on curriculum development, policy-making grounded in empirical evidence, and the excellence of educators (Abulencia, 2015, Sergio, 2012). The Department of Education places significant importance on research as a component of public education in its strategic vision, which is firmly grounded in Republic Act 9155 (Official Gazette, Chapter 1, Section 7(5) Rep. Act No. 9155). In addition, BERA promotes interdisciplinary research collaboration among academic disciplines (DO No. 39, s. 2016). Nevertheless, the educational system in the Philippines encounters substantial obstacles, as demonstrated by PISA assessments (Punongbayan, 2019). As a response, the Philippine Professional Standards for Teachers (PPST) were developed, emphasizing the significance of research abilities in facilitating effective teaching. These standards are intricately connected to the K-12 Program. Notwithstanding these policies, a disparity persists between the aspirational state of research-driven pedagogical approaches and the practical implementation of such methods among educators. This disparity underscores the critical necessity for educational leaders to adopt a reformed approach that prioritizes research in the field of pedagogy. Although policies acknowledge the significance of research, its implementation in teaching methodologies frequently fails to meet expectations; this is the subject of the present study. In order to address a knowledge deficit regarding primary and secondary education, the researcher, who was also an accomplished public school educator, implemented a blended methodology in order to examine the level of research engagement among secondary public school educators. This study not only seeks to align the competencies of existing educators with the requirements of Industry 4.0, but also provides guidance to aspiring educators by emphasizing the significance of research in the pursuit of educational excellence.

**Leadership, Self-Efficacy, and Their Impact on Academic Research Productivity**

The productivity and research culture of academic institutions are significantly influenced by the effectiveness of leadership, according to a study by Jones, Lefoe, Harvey, and Ryland

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(2012). Recent research, on the other hand, highlights the significance of leadership's influence on research productivity at the individual level in addition to its institutional influence. According to Smith and Ulus (2018), there is a positive correlation between research output and individual academic leadership, which includes self-leadership and autonomy. Research leaders play a pivotal role in fostering collaborative research endeavors by establishing platforms, providing resources, and establishing a supportive environment (Walter, Lotsch, and Leitner 2018). Capitalizing on Bandura's (1997) notion of self-efficacy—an individual's conviction in their own ability to successfully complete tasks—it is apparent that self-efficacy exerts a substantial impact on motivation, cognitive resources, and behavior, specifically with regard to research output. An investigation by Richardson, Abraham, and Bond (2015) revealed evidence supporting a robust association between elevated levels of self-efficacy among scholars and heightened levels of research output. Faculty members who possess a strong conviction in their research capabilities are, on average, more productive, according to a study by Blackburn, Bieber, Lawrence, and Trautvetter (2018). In addition, recent studies have investigated the relationship between self-efficacy and leadership. Williams and Leahy (2017) contend that self-efficacy among researchers can be increased through leadership that fosters autonomy and empowerment. On the contrary, Kahn and Wiener (2020) have observed that insufficient backing from leadership can impede the complete realization of the research capabilities of even those who possess a strong sense of self-efficacy. In essence, although self-efficacy may inspire an individual's resolve and exertion, leadership's contribution to the optimization of research output through the provision of vital resources and the establishment of a favorable atmosphere is equally indispensable.

**Gaps in Literature and Practical Aspects in the Domain of Research Productivity**

In the realm of teacher research productivity, numerous studies have encountered criticism for their heavy reliance on objective or anecdotal evidence and their tendency to narrowly examine particular aspects of a broader issue. The urgency and significance of this study are heightened in light of the COVID-19 post pandemic, as it expands upon previously collected data and experiences. Its primary objective is to gain a comprehensive comprehension of secondary school research productivity in Region III, Philippines, as well as the methodologies and policy implications that result from this investigation. The objective is to establish pragmatic approaches that revitalize the research milieu by means of a model system for assessing the research productivity of educators. Notwithstanding the substantial amount of research dedicated to comprehending the determinants that impact the productivity of institutional research across different sectors (Blasco-Blasco, Demeter, & Goyanes, 2024, Sun, et al, 2024, Kwiek & Roszka, 2023, Osunronbi, et al, 2023), a significant void in the academic literature persists with regard to basic education, particularly as it pertains to secondary school educators employed in public educational establishments.

This investigation aims to offer valuable insights that will predominantly support educators in the Philippine Basic Education system as they strive to improve their research capabilities. The hypothesis posits that by establishing a conducive learning environment bolstered by adaptive and robust instructional management, educators can gain access to a multitude of opportunities to enhance their research capabilities. This, in turn, would enable them to effectively disseminate knowledge. The primary contribution of this study is the creation of a research productivity model that is tailored to the needs of Basic Education instructors. Equipped with policy insights, this model has the potential to serve as an indispensable instrument for educational administrators and strategists, facilitating the alignment of pedagogical approaches with the overarching mission and vision of the DepEd. Aligned with the Education Sustainable Development Goals (SDGs), the purpose of this study is to assist educational administrators in

revitalising their approaches to foster a climate of research output. The proposed framework aims to delineate fundamental components, approaches, and trajectories that contribute to research productivity. Its purpose is to provide educators and policymakers with a manual for cultivating an academic milieu that is focused on research.

**Objectives of the Study**

Given the existing gaps and the desire to tackle these critical issues, the primary objective of this study was to construct a robust quality assurance framework aimed at enhancing research productivity in the field of basic education. This framework was developed through the synthesis of data gathered from both self-assessment of teachers' research productivity and interviews with productive teacher-researchers. More specifically, the study aimed to achieve the following objectives: (1) Characterize teachers' self-assessment of research productivity, with a particular focus on self-efficacy; (2) Identify and analyze the key factors that significantly influence research productivity by employing regression analysis techniques.

**Methodology**

**Research Design**

In this investigation, a quantitative research method was employed, with a focus on utilizing regression analysis as the primary statistical tool. Regression analysis serves as a fundamental approach for examining the strength and characteristics of the relationship between a dependent variable and one or more independent variables. Its primary objective is to predict and unravel the intricate interactions among these variables. This approach is essential for understanding how changes in independent variables correspond to variations in the dependent variable. It excels in making predictions, identifying patterns, and exploring causal connections. In this study, regression analysis is harnessed to investigate the direct impacts and predictive capabilities of independent variables such as leadership and self-efficacy on research productivity as the dependent variable. The advantage of employing regression analysis lies in its capacity to simultaneously consider multiple independent variables, enabling the isolation of each variable's influence on the dependent variable (Liang & Zeger, 1993, Sarstedt, et al, 2019). This capability is particularly valuable for this type of research, as it aims to provide a comprehensive and nuanced comprehension of the factors influencing research productivity, with the ultimate goal of deriving practical insights to enhance research effectiveness in the studied context.

**Respondents and Sampling Procedure**

In this study, quantitative data was gathered from a group of 475 educators, encompassing both teachers and school leaders from selected schools within two School Divisions in Central Luzon of the Department of Education, Philippines. To validate and determine the appropriate sample size, the Raosoft online sample size calculator, available at http://www.raosoft.com/samplesize.html, was utilized. This tool was configured using specific criteria, including a 5% margin of error, a confidence level of 95%, and a response distribution assumption of 50%, in line with the recommendations of Wright (2005) and Arora (1994). These settings underscore the tool's effectiveness for determining sample sizes for web-based surveys. Considering the total regional teacher population of 13,140, the Raosoft calculator suggested a minimum sample size of 374. Consequently, the participation of 475 respondents in this study offers a robust representation of the larger educator community. As to the characteristics of the respondents demographics, categorizing them into three groups: School Leaders and Lead Educators, Master or Expert Teachers, and Teachers I-III, also referred to as Competent Teachers. The distribution among these categories was as follows: 376 participants

(79.2%) were Competent Teachers, 74 (15.6%) were categorized as Expert Teachers, and 25 (5.3%) were School Administrators or Leading Educators. Additional demographic data outlined in Table 1 includes notable characteristics of the participants. A majority were female (78%), held permanent positions (98%), were predominantly in the 31-40 age bracket (31%), possessed educational qualifications such as BS/BEED/AB (40%), and had 5 to 10 years of professional experience (22%). This demographic information is essential for understanding the context and perspectives of the respondents in the study. Ethical considerations were rigorously observed throughout this study, guaranteeing the research's integrity and ethical soundness. Ensuring participant confidentiality and anonymity was of utmost importance, especially considering the sensitive nature of data collection among educators. Personal identifiers were omitted, and responses were kept strictly confidential. In accordance with informed consent, participants were provided with comprehensive information regarding the objectives of the study and their entitlements, which encompassed the flexibility to discontinue their involvement at any moment. The study adhered to the ethical principles of beneficence and non-maleficence, guaranteeing that participants would not suffer any damage and with the intention of making a positive contribution to the knowledge of educator research productivity. The management and retention of data were in accordance with data protection legislation, ensuring that access was limited to the research team and that the privacy of individual participants was protected. The ethics committee granted sanction for the study's design and methodology, guaranteeing adherence to ethical standards and guidelines for educational research. As a result, the study's ethical rigor was upheld throughout.

**Research Instrumentation**

In the quantitative portion of this investigation, a thorough survey consisting of forty items was distributed to evaluate a range of metrics pertaining to the participants' research productivity. The survey was structured into four distinct sections: eight items in the first section pertained to individual attributes; twelve items in the second section examined institutional factors; ten items in the third section explored leadership qualities; and ten items in the final section pertained to self-efficacy. By basing the structure and substance of this survey on seminal works by Hanover Research (2014), Bland et al. (2015), and Quimbo & Sulabo (2014), an all-encompassing analysis of the variables that impact research productivity was guaranteed. The survey instrument was constructed with three distinct sections. In the introductory letter of Part I, the researcher informed the participants that they were explicitly asked for their assent in adherence to data privacy standards and offered them the opportunity to refrain from providing feedback for research objectives. Additionally, fundamental demographic data was gathered in this segment, encompassing age, gender, educational attainment, occupation, years of service, and prior involvement in action research. Section II was specifically designed to collect comprehensive information regarding the research outputs of the participants. In contrast, Section III explored fundamental metrics of research productivity, including but not limited to personal attributes, organizational characteristics, leadership capabilities, and research self-efficacy. The responses of the participants were recorded on a continuum that extended from 1 (indicating the lowest) to 4 (indicating the highest).

To increase the validity of the survey, it was subjected to an evaluation by an expert and was subsequently modified in accordance with the feedback received. The reliability of the instrument was evaluated utilizing the Cronbach's alpha coefficient. It is worth noting that all sections of the survey exhibited satisfactory reliability, exceeding the Cronbach's alpha minimum threshold of 0.7. Ten individuals who were not part of the primary study group participated in an initial evaluation of the survey, which was administered through Google Forms. Ethical guidelines were rigorously followed; participants were duly apprised of their

rights to participate voluntarily and were guaranteed complete confidentiality, in accordance with the principles outlined by Wiles in Blair (2016). The data that was gathered was thoroughly examined utilizing SPSS software. The Cronbach's alpha coefficients obtained for each segment surpassed 0.7, thereby confirming the instrument's reliability.

**Data Analysis**

The investigation employed multinomial logistic regression analysis to examine the quantitative component in this study. By identifying the key predictors that influence study efficacy, this method was instrumental in accomplishing the second research objective of the study. When analyzing categorical outcomes that transcend the binary framework, multinomial logistic regression is especially applicable. This methodology provides an exhaustive system for examining, elucidating, and predicting the correlations between multiple-level categorical dependent variables and a variety of independent variables.In order to analyze categorical data consisting of more than two distinct categories, multinomial logistic regression is crucial, as emphasized by El-Habil (2012). In the case of nominal response variables, which have categories that do not possess an inherent order, or ordinal response variables, which adhere to a sequence, this aspect becomes especially critical. Multinomial logistic regression has one significant advantage over conventional logistic regression in that it can accommodate dependent variables consisting of more than two categories. According to Jaccard (2017), this approach obviates the necessity for data partitioning or modification of the dependent variable. By adopting this methodology, it guarantees the comprehensive capture of the entire range and fluctuations present in the data, thereby facilitating more profound and nuanced analyses. Additionally, this methodology permits a comprehensive examination of the relationship between the probabilities associated with each category of the dependent variable and the influence of various predictor variables. (Long & Freese, 2014) This comprehensive analysis facilitates a nuanced comprehension of the complex interrelationships and patterns present in the data. The study accurately identifies specific predictors that have a substantial impact on the different facets of study efficiency through the utilization of multinomial logistic regression.

**Results**

**Assessment on Leadership Characteristics**

Table 1 presents a comprehensive assessment of leadership characteristics in the context of a school environment. Each leadership attribute is accompanied by its mean score, standard deviation, verbal interpretation, and rank based on the mean scores. This assessment offers valuable insights into how participants perceive various aspects of their school leader's leadership roles. The grand mean of the leadership characteristics was calculated to be 3.255, reflecting an overall consensus among participants regarding the assessed leadership qualities. On average, participants viewed their school leader's leadership characteristics positively. Among the leadership characteristics assessed, the three highest-rated attributes, all with mean scores exceeding 3.30 and categorized as "Strongly Agree," emphasize the school leader's effectiveness in fostering a collaborative and goal-oriented environment. These attributes include the school leader's unwavering commitment to keeping the group's mission and shared goals prominently visible to all members, conducting frequent meetings with clear and well-defined objectives, and establishing formal mechanisms that involve all members in decision-making tasks. Conversely, the three lowest-rated attributes, though still within the "Agree" range, suggest areas for improvement. These aspects involve the school leader being recognized as a scholarly figure and serving as a sponsor, mentor, and role model for fellow group members, demonstrating a strong commitment to research and fully embracing the group's research-centric mission, and readily providing high-quality information to the group.

Recognizing these areas for enhancement can further bolster the school leader's overall effectiveness in educational settings.

Table 1. Assessment on Leadership Characteristics

| **Leadership Characteristics** | **Mean** | **Standard Deviation** | **Verbal Interpretation** | **Rank** |
|---|---|---|---|---|
| The school leader is recognized as a scholarly figure and serves as a sponsor, mentor, and role model for fellow group members. | 3.18 | 0.72 | Agree | 9 |
| The school leader demonstrates a strong commitment to research and has fully embraced the group's research-centric mission. | 3.13 | 0.72 | Agree | 10 |
| The school leader effectively manages both people and resources, excels as a fundraiser, and passionately advocates for the group. | 3.20 | 0.72 | Agree | 8 |
| The school leader ensures that the group's mission and shared goals remain prominently visible to all members. | 3.33 | 0.69 | Strongly Agree | 1.5 |
| The school leader diligently attends to the myriad of individuals and institutional aspects that enhance research productivity. | 3.21 | 0.72 | Agree | 7 |
| The school leader employs a robust and participatory leadership style marked by assertiveness. | 3.28 | 0.69 | Strongly Agree | 4 |
| The school leader conducts frequent meetings with clear and well-defined objectives. | 3.33 | 0.69 | Strongly Agree | 1.5 |
| The school leader establishes formal mechanisms and sets expectations to involve all members in decision-making tasks. | 3.27 | 0.69 | Strongly Agree | 5 |
| The school leader readily provides high-quality information to the group. | 3.32 | 0.68 | Strongly Agree | 3 |
| The school leader entrusts project ownership to members and values their innovative ideas. | 3.24 | 0.68 | Agree | 6 |
| Grand Mean | 3.255 | | Agree | |

Legend: 1.00-1.77 Strongly Disagree 2.51-3:25 Agree
1.76-2:50 Disagree 3.26-4:00 Strongly Agree

The assessment underscores the multifaceted nature of educational leadership and its pivotal role in shaping school culture and effectiveness. The findings indicate overall positive perceptions of the school leader's leadership characteristics, but they also highlight specific areas for targeted interventions and professional development. These insights align with the ongoing discourse on the importance of continuous leadership development and its influence on educational outcomes (Harris et al., 2013; Robinson et al., 2008). Educational institutions can use the strengths identified as examples of effective leadership practices and focus on improving areas that received lower ratings. This holistic assessment provides valuable feedback for ongoing enhancement in school leadership, emphasizing the crucial role of effective leadership in educational institutions.

**Assessment on Research Self-Efficacy**

The assessment of research self-efficacy among participants reveals valuable insights into their perceptions of their abilities in research-related tasks. The grand mean of these responses, calculated at 2.869, aligns with the "More True of Me" range on the provided scale. This signifies a moderate level of agreement among participants with the statements regarding their research self-efficacy. Collectively, participants possess a moderate degree of confidence in their capacity to perform various research-related tasks. They express belief in their ability to overcome challenges, achieve research goals, and adapt to unexpected circumstances while conducting research. This level of research self-efficacy is promising as it indicates a reasonable level of competence and belief in their capabilities. However, it's essential to note that this moderate level of agreement implies room for improvement in participants' self-efficacy concerning research. While they demonstrate confidence in several aspects, there are areas where their assurance may be less pronounced. Notably, participants may benefit from further development in terms of problem-solving skills and addressing complex research challenges.

Table 2. Assessment on Research Self-Efficacy

| **Research Self-Efficacy Statement** | **Mean** | **Standard Deviation** | **Verbal Interpretation** |
|---|---|---|---|
| I can effectively address challenging research problems | 2.88 | 0.71 | More true of me |
| I consistently achieve my goals even in the face of challenges | 2.97 | 0.70 | More true of me |
| I find it easy to adhere to my research objectives and accomplish tasks | 2.76 | 0.72 | More true of me |
| I am confident in efficiently handling unexpected events in my research | 2.76 | 0.74 | More true of me |
| My resourcefulness allows me to adapt effectively to changing situations | 2.96 | 0.72 | More true of me |
| I can successfully resolve most research problems with sufficient effort | 2.95 | 0.73 | More true of me |
| I maintain composure when facing research challenges due to my coping skills | 2.92 | 0.69 | More true of me |
| I can readily find solutions when encountering research-related issues | 2.80 | 0.72 | More true of me |

| | | | | |
|---|---|---|---|---|
| | If I encounter difficulties in my research, I usually can devise a solution | 2.84 | 0.72 | More true of me |
| | I am generally capable of handling various aspects of my research | 2.83 | 0.76 | More true of me |
| | Grand Mean | 2.869 | | More True of Me |

Legend:
1.00-1.77 rarely true of me 2.51-3:25 more true of me
1.76-2:50 less true of me 3.26-4:00 highly true of me

Among the individual items assessed, three key aspects related to research self-efficacy garnered higher agreement from participants, suggesting that these areas are particularly strong for them. Firstly, participants expressed a significant level of confidence in their ability to achieve research objectives despite challenges, with a mean of 2.97 for the statement, "I can always get my goals despite some challenges." Secondly, the statement "Thanks to my resourcefulness, I know how to make the necessary adjustments when the situation warrants it" received a mean of 2.92, indicating that participants believe they can adapt and make necessary changes when needed. Thirdly, the statement "I can solve most problems in my research if I invest the necessary effort" earned a mean of 2.95, reflecting participants' confidence in their problem-solving abilities when they dedicate sufficient effort. Conversely, participants demonstrated lower agreement in three other aspects of research self-efficacy, suggesting areas where they may have less confidence. The statement "When I am confronted with a problem in the conduct of my research, I can easily find solutions" received a mean of 2.76, indicating that participants may feel less assured in their ability to swiftly find solutions to research-related challenges. Furthermore, "I can usually handle whatever comes my way in the conduct of my research" obtained a mean of 2.79, suggesting that participants might have slightly lower confidence in their overall capacity to manage various aspects of research. Lastly, the statement "I can always manage to solve difficult research problems if I try hard enough" had a mean of 2.84, indicating that participants may perceive more substantial research challenges as requiring increased effort to overcome. These responses indicate that while participants exhibit strengths in certain aspects of research self-efficacy, there exist areas where additional support or training could be beneficial, especially in the realms of problem-solving and navigating complex research challenges. Addressing these specific areas presents an opportunity for educational institutions and instructors to assist individuals in bolstering their research self-efficacy, thereby potentially enhancing their research productivity. These findings hold considerable significance for professional development initiatives in research contexts, enabling educators and institutions to tailor interventions and provide resources in areas where participants may have lower confidence. Acknowledging the pivotal role of self-efficacy in shaping research outcomes, these insights can guide the development of strategies aimed at cultivating a more conducive and productive research environment. Rooted in the extensive body of literature on self-efficacy, these findings underscore the importance of nurturing and strategically enhancing educators' beliefs in their research capabilities. In today's dynamically evolving global educational landscape, institutions equipped with educators possessing strong self-efficacy are poised to drive innovation, contribute valuable insights, and exert a positive influence on the future of education.

**Significant Predictors of Research Productivity**

Table 4 presents the significant predictors of research productivity classification, indicating the observed and predicted values, as well as the percentage of correct classifications. The table provides valuable insights into the accuracy of the model in predicting research productivity

among educators. The observed values in the table represent the actual classifications of research productivity for the participants, categorized as 1.0, 4.0, and 12.0. These categories likely denote different levels of research productivity, with 1.0 being the lowest, 4.0 intermediate, and 12.0 the highest. The predicted values represent the classifications assigned by the model based on the variables of leadership and self-efficacy. The model's predictions are then compared to the observed values to assess the accuracy of the model. The table reveals that the model achieved an overall percentage of 68.8% in correct classifications. This means that the model accurately predicted the research productivity level for nearly 69% of the participants. Specifically, the model achieved an accuracy rate of 93.3% for participants classified as 1.0, indicating a high level of accuracy in identifying those with lower research productivity. However, the accuracy drops to 27.3% for participants classified as 4.0 and 12.0, suggesting that the model had more difficulty distinguishing between intermediate and higher levels of research productivity.

Table 4. Significant Predictors of Research Productivity Classification

| | **Predicted** | | | |
|---|---|---|---|---|
| **Observed** | 1.0 | 4.0 | 12.0 | **Percent Correct** |
| 1.0 | 279 | 10 | 10 | 93.3% |
| 4.0 | 48 | 24 | 16 | 27.3% |
| 12.0 | 50 | 14 | 24 | 27.3% |
| Overall Percentage | 79.4% | 10.1% | 10.5% | 68.8% |

Note. *** The table shows the accuracy level of the model at 68.8%

These findings have important implications for understanding the predictive power of the model and its limitations. While the model excels in identifying educators with lower research productivity, it faces challenges in differentiating between intermediate and higher levels. This limitation may be attributed to the complexity of factors influencing research productivity, beyond leadership and self-efficacy alone. In the context of the literature, these results align with the notion that research productivity is a multifaceted construct influenced by various factors (Blackburn et al., 2018). While leadership and self-efficacy play significant roles, they do not provide a complete picture of research productivity. Future research should explore additional variables and their interactions to enhance predictive models. The model's accuracy rate of 68.8% signifies its potential utility in identifying educators with lower research productivity. However, it also highlights the need for a more comprehensive approach to capture the nuances of intermediate and higher research productivity levels. This study contributes to the ongoing discourse on research productivity prediction models and calls for further refinement and exploration of additional factors.

**Discussion**

The assessment of leadership characteristics within the context of a school environment revealed several important insights. The participants, on average, viewed their school leader's leadership characteristics positively. This suggests a general agreement among participants regarding the effectiveness of school leaders in various dimensions of their leadership roles. The top-rated leadership attributes, such as keeping the group's mission and shared goals visible to all members, holding frequent meetings with clear objectives, and creating formal mechanisms for inclusive decision-making, underscore the importance of effective communication and goal alignment in educational leadership. These findings align with the extensive literature on effective educational leadership, emphasizing the role of shared vision and collaborative decision-making in improving school culture and effectiveness (Alanya et al,

2021, Charernnit, et al, 2021, Filipkowski, 2023 Liu, Bellibaş, & Gümüş, 2021, & Magulod Jr, 2017). However, the lower-rated attributes related to the school leader's role as a mentor, sponsor, and peer model, as well as their research orientation and information-sharing, highlight areas where there is room for improvement. These findings reflect the multifaceted nature of educational leadership, where leaders need to balance various roles and responsibilities (Chatzipanagiotou & Katsarou, 2023). The study's results can serve as a guide for targeted interventions and professional development programs to enhance leadership effectiveness in these specific areas.

The assessment of research self-efficacy among participants shed light on their perceptions of their abilities in research-related tasks. The moderate level of agreement among participants suggests that they possess a reasonable degree of confidence in their research capabilities. This level of research self-efficacy is promising, indicating that participants believe in their ability to overcome challenges, achieve research goals, and adapt to unexpected circumstances in their research endeavors. The findings identified specific strengths in participants' research self-efficacy, such as their confidence in achieving research objectives despite challenges, their resourcefulness in adapting to changing situations, and their problem-solving abilities when investing sufficient effort. These strengths serve as a foundation for enhancing overall research productivity. Conversely, participants expressed lower confidence in swiftly finding solutions to research-related challenges, managing various aspects of research, and overcoming substantial research challenges without increased effort. These areas signify potential areas for improvement in participants' research self-efficacy. The importance of research self-efficacy in educational contexts finds strong support in Bandura's social cognitive theory (1997), which suggests that individuals' confidence in their abilities shapes their decision-making, level of effort, and determination when facing difficult tasks. Since educators hold a central role in driving research and innovation within educational institutions, elevating their research self-efficacy can have a positive impact on creating an environment that is more favorable and productive for research activities.

The study also examined the relationship between leadership characteristics, self-efficacy, and research productivity. The model achieved an overall accuracy rate of 68.8% in classifying research productivity levels. Notably, it excelled in identifying educators with lower research productivity but faced challenges in differentiating between intermediate and higher levels. These results suggest that while leadership characteristics and self-efficacy are significant predictors of research productivity, there are other complex factors at play. Research productivity is a multifaceted construct influenced by various elements, including institutional support, research resources, and individual motivation (Bello, Azubuike, & Akande, 2023 , Karadag & Ciftci, 2023). This study aligns with the existing literature, emphasizing the need for a more comprehensive approach to capture the nuances of research productivity.

This research offers valuable insights into the intricate relationship between leadership, self-efficacy, and research productivity within educational settings. The results highlight the multifaceted nature of educational leadership and its pivotal role in shaping the culture and effectiveness of schools. Furthermore, they underscore the significance of research self-efficacy in fostering productive research environments. These findings can serve as a foundation for targeted interventions and professional development initiatives tailored to enhance leadership qualities and research self-efficacy among educators. Nevertheless, it's important to acknowledge that research productivity is influenced by various factors, and future studies should explore additional variables to refine predictive models further. Ultimately, this study contributes to the ongoing discourse on educational leadership and research productivity,

emphasizing the continuous need for improvement in leadership practices and the cultivation of educators' self-efficacy beliefs to drive innovation and positively influence the future of education.

**Conclusion**

This comprehensive study provides valuable insights into the intricate interplay between leadership characteristics, research self-efficacy, and research productivity within educational settings. While participants generally perceive their school leaders positively, identifying key strengths in communication and goal alignment, there is room for improvement in mentorship, research orientation, and information-sharing aspects of leadership. The moderate level of research self-efficacy among participants indicates a reasonable degree of confidence in their research capabilities, with notable strengths in goal achievement and adaptability, yet areas requiring enhancement in swift problem-solving and managing complex research challenges. The study's predictive model demonstrates a notable ability to identify educators with lower research productivity, albeit facing challenges in distinguishing between intermediate and higher levels. This underscores the multifaceted nature of research productivity, influenced by diverse factors beyond leadership and self-efficacy alone. Consequently, while the findings offer valuable guidance for targeted interventions and professional development, they highlight the need for a more holistic approach to understand and enhance research productivity in educational contexts. Ultimately, this research reinforces the significance of effective leadership and self-efficacy beliefs in fostering a conducive research environment, calling for ongoing efforts to shape the future of education through continuous improvement in these critical domains.

**Recommendations, Limitations, and Future Research Directions**

Based on the findings of this study, several recommendations can be made to enhance leadership effectiveness and research self-efficacy among educators in educational settings. First, school leaders should focus on strengthening their mentorship, sponsorship, and peer modeling roles, as well as their research orientation and information-sharing practices. Targeted training and professional development programs can help school leaders develop these specific leadership attributes. Second, educators can benefit from interventions that enhance problem-solving skills and their ability to address complex research challenges. Institutions should offer workshops and resources to support educators in these areas. To gain a more holistic grasp of research productivity, it's imperative to adopt a comprehensive approach that considers additional variables beyond leadership and self-efficacy, such as institutional support and the availability of research resources. This study has some noteworthy limitations that warrant acknowledgment. Firstly, the research productivity classification model achieved an accuracy rate of 68.8%, indicating the potential presence of unaccounted factors influencing research productivity not addressed in the study. Secondly, relying on self-reported data may introduce social desirability bias, suggesting the need for future research to incorporate objective measures for a more precise assessment. Thirdly, the study's focus on educators within a school environment may limit the generalizability of the findings to other contexts or professions. Subsequent research endeavors could explore additional dimensions impacting research productivity, encompassing institutional support, access to research resources, and individual motivation, thus fostering a more comprehensive understanding. Longitudinal studies could shed light on the evolution of leadership characteristics and self-efficacy beliefs over time, ultimately affecting research productivity. Furthermore, investigating the effectiveness of specific leadership development programs and interventions in augmenting research self-efficacy and productivity offers a promising avenue for future research. Lastly, delving into the relationship between leadership and research productivity in diverse educational settings, such

as higher education institutions or non-profit organizations, holds the potential to yield valuable insights regarding the transferability of these findings.

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