

Engagement and Efficacy of Secondary Teachers Towards Sustainability of Research Culture: The Moderated Mediating Effect of Ancillary Functions and Research Productivity

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Abstract

This study explores the engagement and efficacy of secondary school teachers concerning the sustainability of research culture, focusing on the moderated mediating effects of ancillary functions and research productivity. Utilizing a quantitative research design, data were collected through surveys from a sample of secondary school teachers. Engagement, efficacy, ancillary functions, research productivity, and sustainability of research culture were assessed and analyzed using regression and mediation analyses. The findings reveal high engagement and efficacy among secondary school teachers in various research-related activities, indicating a strong commitment to research endeavors within educational contexts. Ancillary functions, including administrative tasks and professional development, significantly influence teachers' engagement and productivity in research, contributing to the sustainability of research culture. Moreover, research productivity partially mediates the relationship between teachers' engagement/efficacy in research and the sustainability of research culture, highlighting the importance of fostering a productive research environment to sustain the research culture within educational institutions. The study's scope is limited to secondary school teachers and researchers from the Division of Quezon, which comprises the four Congressional districts. Data collection took place between January and April 2024, preceding the conclusion of the 2023–2024 school year. The primary data were gathered using a survey instrument administered to all respondents. Future research could employ prospective studies and explore additional factors influencing research culture sustainability. This study contributes to the existing literature by examining the complex interplay between teacher engagement, efficacy, ancillary functions, research productivity, and the sustainability of research culture. Identifying ancillary functions as significant predictors and mediators enriches our understanding of the mechanisms underlying research culture sustainability within educational institutions, offering practical implications for policymakers, educators, and researchers aiming to promote research excellence in secondary schools.

Keywords: engagement, efficacy, ancillary functions, productivity, sustainability of research culture

1. Introduction

Action research, as outlined in Department Order No. 16, 2017, is a deliberate and introspective process used to enhance educational practices or tackle issues within educational settings like schools, classrooms, or offices. Despite the consistent encouragement from the Department of Education through various memoranda, the adoption of action research among school personnel still needs to be improved. Recognizing its proven efficacy in refining teaching and learning, the researcher, with a substantial background as the school research coordinator and an alternate district research coordinator, is determined to strengthen the action research culture within Mauban South District.

The current urgency for heightened institutional research productivity in Philippine Basic Education stems from the concerning national literacy rating revealed in the 2018 Program for International Student Assessment (PISA). Teachers, positioned as facilitators in the 21st century learning landscape, are encouraged to engage in educational research. This active involvement is crucial in utilizing research outcomes to inform and shape planning, policies, and program development, all integral components of the Basic Education Research Agenda (Capulso, 2020).

As highlighted by Roach (2018), the Philippines' underwhelming performance in cultivating innovators and researchers is evident in statistics such as having only 81 researchers per million population compared to 205 in Indonesia and 115 in Vietnam. Additionally, a mere 28 out of 777 journals, accounting for 3.6 percent, are listed in Thomson Reuters, Scopus, or both databases. These figures underscore the nation's trailing position compared to several Asian counterparts in fostering researchers, innovators, and solution providers essential for thriving in a knowledge-based economy and educational landscape.

The Department of Education (DepEd) has issued a directive to all school heads, supervisors, and teachers, encouraging them to apply "the enclosed Basic Education Research Agenda," which supports the "conduct of education research" in the nation (DepEd, 2016). Its goal is to emphasize the issues that teachers and the department are facing and to make recommendations based on the findings. Action research has already been incorporated into the annual performance evaluation process for all teachers, with professional growth and development being one of the primary result areas for each teacher's performance commitment and review. However, since many of these teachers need more training on what action research is and how to conduct it, it may not be very prevalent in Filipino public elementary and secondary schools.

Although DepEd has made significant efforts to educate and engage public school teachers about the value of conducting research, many of them in both elementary and secondary schools need more motivation and enthusiasm. Some public-school teachers lack motivation and interest in conducting research due to factors including a constrained teaching schedule and a significant workload and some teachers choose not to conduct research because they feel unqualified and lack writing abilities (Morales, 2016; Kutlay, 2012; Ulla, 2018).

The Social Cognitive Theory, posited by Machimura, 2015 offers a comprehensive framework that suggests ancillary functions hold the potential to act as mediators in shaping teachers' involvement in research. By fostering skill development, facilitating collaborative opportunities, and enhancing self-efficacy (Tschannen-Moran & Johnson, 2011), these ancillary roles influence the level of engagement teachers invest in scholarly pursuits. Furthermore, specific ancillary roles, such as mentoring or leading research groups, have shown promise in mediating the connection between teachers' inclination towards research and their actual participation in academic endeavors (Hargreaves, 2003; Borg, 2019).

Moreover, the impact of ancillary functions on teachers' research productivity extends beyond mediation to moderation. Certain roles within these functions have the potential to either amplify or mitigate the relationship between research engagement and the tangible outcomes of scholarly output. Roles offering resources, support, or collaborative opportunities are noted to amplify the positive effects of research engagement on productivity (Bryant et al., 2017).

By applying the Job Demands-Resources model (Bakker & Demerouti, 2014), a deeper understanding emerges regarding how specific ancillary functions assume a moderating role. Ancillary roles involving onerous administrative tasks or limited autonomy may moderate the correlation between research engagement and productivity by imposing additional demands on teachers' time and energy (Smylie, 1995).

This research aims to delve into the nuanced dynamics of ancillary functions, exploring not only their mediating influence on the relationship between research engagement and productivity but also the nuanced variations in this mediation process under diverse circumstances. Understanding these intricacies will shed light on how certain ancillary roles strengthen the indirect effect of research engagement on productivity under favorable conditions, while potentially weakening it in resource-constrained situations (Harris & Sass, 2011; Hoy et al., 2006). These observations will offer a thorough comprehension of how supplementary functions significantly influence teachers' academic endeavors.

The initiative, Project ISEARCH (Intensifying Sulong Edukalidad by Amplifying Research Competencies, Hand-holding Activities, and Utilization), established by the Division of Quezon, advocates for the implementation of research to amplify school performance. However, despite the urgency brought about by recent upheavals and crises, only a few teachers have actively engaged in action research. Upon closer examination through root cause analysis, inadequate research writing skills, multiple ancillary functions, and

time constraints emerged as significant obstacles hindering teachers from fully developing their projects. The researcher aims to augment sustaining the research culture, productivity, engagement, and the efficacy of research writing skills among school research coordinators and teacher-researchers in the Division of Quezon. This initiative seeks to support teachers in enhancing their teaching performance, aligning seamlessly with the "MATATAG Curriculum's" principle of providing strong support for teachers to improve their teaching methodologies (G: Give support for teachers to teach better).

The interplay between these elements—engagement, efficacy, ancillary functions, and research productivity—is dynamic and multifaceted, giving rise to the moderated mediating effect under investigation in this study. Through an in-depth examination of these relationships, this research seeks to shed light on the complex dynamics that underlie the cultivation and sustainability of a research culture in secondary education, ultimately contributing to the enhancement of educational practices and the quality of secondary education. The purpose of this study is to determine the relationship between secondary public-school teachers in Division Quezon's with ancillary functions, research engagement, efficacy, and productivity in sustaining a research culture.

The outcomes of this study will serve as a catalyst for fortifying the groundwork among teachers in crafting proficient action research. This reinforcement is pivotal in motivating them to embrace a research-based approach, empowering teachers to effectively engage and produce impactful research despite having multiple ancillary functions. Ultimately, these efforts contribute significantly to fostering a pervasive culture of research within the Division of Quezon.

The conceptual framework of this study shows a comprehensive exploration of the educational landscape by centering on two core independent variables: the level of the teacher's engagement in research and the teacher's efficacy in research. These variables serve as fundamental drivers influencing the evolution of research endeavors within educational institutions.

The primary objective of this study is to solve the impact of these independent variables on the sustainability of the research culture. Sustainability is envisioned through the lenses of maturation, expansion, and gestation, representing the vital aspects essential for nurturing and fostering a resilient and progressive research culture within educational settings under the Gestation-Expansion-Maturation Theory of the Development of Research Culture (Olvido, 2021).

Moreover, It delves into the mediating variable of teachers' productivity in research. This mediating factor holds substantial significance in elucidating the intricate relationship between the independent variables and the sustainability of the research culture. Understanding how teacher productivity mediates the overall research culture is pivotal for deciphering the underlying mechanisms at play.

Additionally, it incorporates a moderating variable—Ancillary Functions to Teachers—which operates as a moderating force in the interplay between the independent variables and the sustainability of the research culture. Acknowledging the influence of external roles and functions is critical in assessing how these factors either enhance or impede the impact of teacher engagement, efficacy, and productivity on the research culture within educational institutions.

1.1. Statement of the Problem

The study focuses on engagement, efficacy, sustainability of research culture, and productivity of public secondary school teachers. It also wants to identify the relationship of engagement to sustainability of research culture and the relationship of efficacy to sustainability of research culture.

Specifically, this study sought to answer the following questions:

1. What is the profile of teacher-respondents with ancillary functions?
2. What is the level of ancillary functions of teacher in terms of:
 - 2.1 Administrative Tasks;
 - 2.2 Committee Work;
 - 2.3 Professional Development;
 - 2.4 Mentoring; and
 - 2.5 Professional Service?

3. What is the level of teacher's engagement in doing research in terms of:
 - 3.1 Conduct of research;
 - 3.2 Participation in any educational research;
 - 3.3 Reading of educational research materials; and
 - 3.4 Participation in any research-related activity?
4. What is the level of teacher's efficacy in doing research in terms of:
 - 4.1. Searching and synthesizing research results;
 - 4.2. Designing research;
 - 4.3. Analyzing data; and
 - 4.4. Disseminating research results?
5. What is the level of productivity in research among public secondary teachers in Quezon in terms of:
 - 5.1 Authorship;
 - 5.2 Papers Published;
 - 5.3 Speakership;
 - 5.4 Training/ Seminar/Workshop;
 - 5.5 Rewards and recognition in research; and
 - 5.6 Affiliation/ Membership?
6. What is the level of the sustainability of research culture of public secondary teachers in terms of:
 - 6.1 Maturation;
 - 6.2 Expansion; and
 - 6.3 Gestation?
7. Does the level of teachers' productivity in research significantly mediate the relationship between teachers' engagement and efficacy in research and the sustainability of research culture?
8. Does ancillary function for teachers significantly moderate the relationship between:
 - 8.1 teachers' engagement in research and their productivity;
 - 8.2 teachers' efficacy in research and their productivity; and
 - 8.3 teachers' productivity in research and sustainability of research culture?
9. To what extent does teachers' engagement and efficacy serve as predictors of sustainability of research culture in educational settings?

2. Methodology

The present study employed a quantitative research approach known as descriptive correlational research to gather the requisite data for its outcomes and findings. This study utilized quantitative research analysis and data collection tools to describe and analyze the relationship among ancillary functions of teachers' research engagement and efficacy, and their productivity in research and sustainability of research culture. Siedlecki (2020) defines that in correlational research design, investigations are conducted to ascertain associations between variables, abstaining from any researcher-induced alterations or manipulations. To assess various aspects of research culture among public secondary teachers, mean scores and standard deviation were used. Mediation analysis evaluated if teacher productivity mediates the relationship between teacher engagement and efficacy in research and the sustainability of research culture (Hayes, 2022). Moderation analysis examined if ancillary functions moderate the relationship between teacher engagement, efficacy in research, and productivity, as well as the relationship between productivity and sustainability of research culture (Hayes, 2022). Finally, regression analysis determined the predictive power of teacher engagement and efficacy on the sustainability of research culture (Tabachnick & Fidell, 2019). This study utilized the total enumeration technique, wherein respondents were selected based on their willingness to participate in the study and at least secondary teachers-researchers with complete basic or action research and with ancillary functions (light, medium, and heavy categories). The Division of Quezon is composed of four Congressional Districts, namely: the 1st Congressional District, the 2nd Congressional District, the 3rd Congressional District, and the 4th Congressional District. These four congressional districts are classified as mega schools, large schools, medium schools, and small schools. Ethical considerations were carefully upheld to ensure the privacy, confidentiality, and integrity of all participants, with strict protocols for keeping data anonymous and secure, informed consent, and comprehensive participant information.

3. Results and Discussion

Table 1. Profile of the Respondents

Profile		Congressional District				Total
		District 1	District 2	District 3	District 4	
Ancillary Assignment (Heavy)	Class Adviser		99	45	68	43
	Feeding Coordinator		1	-	1	1
	Canteen Manager		2	-	1	3
	Guidance Coordinator		5	1	3	-
	ICT/LIS/EBEIS Coordinator		8	2	4	5
	Health Officer		2	3	3	2
	Sports Coordinator		4	1	8	6
	Librarian Custodian		-	-	1	-
	Gulayan Coordinator		2	-	2	1
	N/A		-	-	-	1
	Others		11	-	11	6
Ancillary Assignment (Medium)	Subject area Coordinator		18	18	23	15
	Grade level Coordinator		8	8	14	6
	School Paper Adviser		7	7	5	1
	Scouting Coordinator		-	4	5	2
	DRRM Coordinator		5	5	1	1
	YES-O Coordinator		6	2	3	5
	N/A		54	9	20	19
	Others		22	1	21	8
Ancillary Assignment (Light)	Phil-IRI Coordinator		5	1	5	1
	4Ps Coordinator		-	2	2	1
	SBM Coordinator		5	4	4	3
	Child Protection Officer		2	2	4	-
	GAD Coordinator		2	3	5	2
	Property Custodian		-	1	1	-
	School Facilities Coordinator		-	3	5	2
	Learning Resource Coordinator		3	2	3	2
	Remedial Class Coordinator		3	5	4	3
	SSG Adviser		7	3	5	5
	WINS Coordinator		4	3	3	3
	N/A		64	16	31	26
	Others:		27	7	22	10

The data suggests a heavy reliance on certain roles essential for supporting research activities, while identifying less populated roles that offer potential for strategic development. Educational institutions can strategically allocate resources and support to enhance teacher research competence and engagement (Tarraya, 2023). This integrated approach is crucial for educational leaders aiming to sustain a research culture among teachers.

The data from Table 1 also shows that the most common ancillary role with medium assignments is that of a Subject Area Coordinator, with 74 individuals across the districts, particularly in District 3 (23 respondents, 31.08%). The role of Scouting Coordinator is the least common, with only 11 respondents and no representation in District 1, indicating potential areas for development in this ancillary function.

Research by Shaked (2023) and others (Vangrieken et al., 2015; Hornyák, 2020; Schleifer et al., 2017) highlights the importance of instructional leadership among middle leaders, such as Subject Area Coordinators, in promoting collaboration among teachers. These roles are crucial for enhancing instructional

practices and student learning outcomes, contributing significantly to fostering academic research and collaboration among teachers.

For light assignments, Table 1 indicates that the most common role is "N/A," with 137 individuals across the districts, especially in District 1 (64 respondents). The role of Property Custodian is the least common, with only 2 respondents in District 2. These findings emphasize the pivotal role of school culture and ancillary positions in shaping student well-being and fostering a research culture in educational settings.

Studies by Jessiman et al. (2022) and Dimitropoulos et al. (2021) underscore the importance of school culture in influencing student mental health and the role of school staff in supporting students with mental health concerns. These insights, coupled with the analysis of ancillary functions revealing disparities in role distribution, highlight the need for strategic resource allocation to ensure all ancillary roles receive adequate support, thereby promoting a research culture and enhancing student well-being in schools.

The descriptive analysis of ancillary functions among secondary teachers in DepEd Quezon highlights the significant roles of Class Advisers and Subject Area Coordinators in fostering a research culture. It also identifies areas with minimal representation, indicating a need for strategic development and resource allocation. By understanding these dynamics, educational leaders can implement targeted interventions to enhance teacher engagement and efficacy, ultimately sustaining a robust research culture within the educational context.

Table 2. Perceived Level of Ancillary Functions of Teachers

Indicators	Mean	Standard Deviation	Verbal Interpretation
Teacher's level of ancillary function in terms of...			
1. Administrative Tasks	3.21	0.66	High Engagement
2. Committee Work	3.29	0.61	Very High Engagement
3. Professional Development	3.31	0.62	Very High Engagement
4. Mentoring	3.23	0.67	High Engagement
5. Professional Service	3.24	0.66	High Engagement
Overall	3.25	0.61	High Engagement

Legend: 3.26-4.00 Very High Engagement; 2.51-3.25 High Engagement; 1.76-2.50 Low Engagement; 1.00-1.75 Very Low Engagement

Table 2 presents the indicator with the highest mean score, indicating very high engagement in professional development (Mean = 3.31). This implies that secondary teachers are deeply involved in seeking out and applying new knowledge and skills acquired from professional development opportunities to enrich their research capabilities. Conversely, administrative tasks exhibit the lowest mean score among the indicators, albeit still reflecting high engagement (Mean = 3.21). This suggests that while teachers are committed to administrative tasks associated with research projects, their engagement level in this domain is slightly lower compared to other ancillary functions. The overall mean score for teachers' engagement in ancillary functions related to research is 3.25, signifying a notable level of engagement among secondary teachers in these endeavors.

These findings underscore the active involvement of secondary teachers in various ancillary functions associated with research, including administrative tasks, committee work, professional development, mentoring, and professional service. This underscores their dedication to fostering and advancing a research culture within educational environments. Social Cognitive Theory (Bandura, 1986) holds relevance here, as teachers' engagement in these activities is shaped by their observations of colleagues, self-efficacy beliefs, and the perceived benefits of their participation.

Participation in administrative tasks, committee work, professional development, mentoring, and professional service contributes to the dissemination of research, collaborative efforts, and professional development within the educational community. Educational stakeholders should acknowledge and support teachers' engagement in these activities, recognizing their pivotal role in promoting a research culture and improving educational outcomes. This aligns with broader literature emphasizing the significance of teacher

engagement and professional development in educational enhancement (Clayton, Bringle, & Hatcher, 2023; Sims et al., 2023).

Initiatives aimed at promoting and supporting teachers' engagement in administrative tasks, committee work, professional development, mentoring, and professional service are imperative for sustaining and enriching research culture in schools within DepEd Quezon. By fostering a supportive environment and providing opportunities for professional growth, educational institutions can empower teachers to contribute meaningfully to research endeavors and ultimately enhance educational outcomes.

Table 3. Perceived Level of Teacher's Engagement in Research

Indicators	Mean	Standard Deviation	Verbal Interpretation
Teacher's level of engagement in terms of...			
1. Conduct of Research	3.29	0.64	Highly Engaged
2. Participation in Educational Research	3.29	0.63	Highly Engaged
3. Reading of Educational Research Materials	3.27	0.65	Highly Engaged
4. Participation in any research related activity	3.26	0.65	Highly Engaged
Overall	3.26	0.65	Highly Engaged

Legend: 3.26-4.00 *Highly Engaged*; 2.51-3.25 *Moderately Engaged*; 1.76-2.50 *Moderately Disengaged*; 1.00-1.75 *Low Disengaged*

Table 3 provides a comprehensive overview of secondary teachers' engagement in various research-related activities. The highest levels of engagement are observed in the indicators: "Conduct of Research" and "Participation in Educational Research," both with a mean of 3.29. These indicators reflect a proactive involvement in research activities, suggesting that teachers are not only engaged in consuming research but are also actively participating in the research process. On the other hand, the lowest level of engagement, though still classified as "Highly Engaged," is seen in the indicator: "Participation in any research related activity" (Mean = 3.26; SD = 0.65). This slightly lower score may indicate a broader, less specific engagement in research activities compared to the more targeted actions like conducting research or reading research materials. The uniformly high engagement scores across all indicators suggest a strong inclination towards research among secondary teachers. This is indicative of a robust research culture within the educational environment where these teachers operate. The slight variation in engagement levels might reflect differences in personal interest, availability of resources, or institutional support for various types of research activities.

The consistently high engagement scores across all metrics among secondary educators, as documented by Clayton, et al., (2023) and Marzuki et al. (2023), demonstrate a pronounced propensity for research within the educational sphere. These results underscore the existence of a well-established research culture among secondary teachers, which is in harmony with the theoretical models proposed by Clayton, et al., (2023) and the literacy benchmarks related to reading materials discussed by Marzuki et al. (2023). The minor discrepancies in engagement levels noted in both studies could be ascribed to variables such as individual interest, resource availability, or institutional backing for research endeavors, thus reinforcing the claims presented in the initial statement. The study reveal the roles of communities, institutions, and partnerships in enhancing research engagement, whereas Marzuki et al. (2023) examine the reading engagement of Indonesian secondary EFL teachers, illuminating the influence of reading resources and recreational reading in cultivating engagement. Collectively, these studies emphasize the complex dimensions of research engagement among secondary educators and accentuate the significance of acknowledging contextual variables to nurture a vibrant research culture within educational settings.

The findings from this study underscore the significant role that secondary teachers play in sustaining a research culture within educational settings. The high levels of engagement in research-related activities are promising for the ongoing development of educational practices and policies. The work of Borg (2010) on the teacher research engagement model emphasizes that teachers' active participation in research enhances their professional development and instructional strategies. Additionally, the theory of experiential learning (Kolb, 1984) suggests that teachers who engage in research activities gain deeper insights and practical knowledge that can be translated into more effective teaching practices.

Table 4. Perceived Level of Teacher's Efficacy in Research

Indicators	Mean	Standard Deviation	Verbal Interpretation
Teacher's level of efficacy in terms of...			
1. Searching and Synthesizing Research Results	3.29	0.65	Very High Efficacy
2. Designing Research	3.27	0.67	Very High Efficacy
3. Analyzing Data	3.31	0.64	Very High Efficacy
4. Disseminating Research Results	3.26	0.66	Very High Efficacy
Overall	3.28	0.61	Very High Efficacy

Legend: 3.26-4.00 Very High Efficacy; 2.51-3.25 High Efficacy; 1.76-2.50 Low Efficacy; 1.00-1.75 Very Low Efficacy

Table 4 presents a comprehensive overview of the efficacy of secondary teachers across different research aspects. Secondary teachers exhibit exceptionally high levels of efficacy across all facets of research. They excel in tasks such as searching for and synthesizing research findings, crafting research methodologies, analyzing data, and disseminating research outcomes. Notably, the lowest efficacy level, indicated by a mean score of 3.26, pertains to disseminating research results. Nonetheless, this still signifies a commendable level of efficacy, underscoring the proficiency of teachers in this domain.

The high efficacy levels demonstrated by secondary teachers across various research aspects suggest a strong foundation of research skills and competencies within the educational community. Teachers display proficiency in critical research tasks, including literature review, research design, data analysis, and interpretation. This proficiency may be attributed to factors such as professional development opportunities, mentorship programs, and access to resources that support teachers' research endeavours.

However, the relatively lower efficacy level observed in disseminating research results indicates potential areas for improvement in how teachers communicate their findings to broader audiences. Despite still achieving a commendable level of efficacy, this aspect highlights a need for further support and training in effectively sharing research outcomes beyond academic circles. One reason for this could be limited opportunities or resources dedicated to training teachers in communication and dissemination strategies. For example, while teachers may have access to research materials and tools for conducting studies, they may receive less guidance on how to effectively present their findings to diverse stakeholders, such as students, parents, policymakers, or the wider community.

To address this gap, educational institutions can implement initiatives aimed at enhancing teachers' dissemination skills and promoting a culture of knowledge sharing and outreach. For instance, professional development workshops or seminars focused on communication strategies, presentation skills, and public engagement can provide teachers with practical techniques for effectively disseminating their research results. Additionally, schools can create platforms or forums where teachers can showcase their projects, share best practices, and engage in dialogue with peers and stakeholders. By equipping teachers with the necessary skills and support to disseminate their research findings effectively, educational institutions can maximize the impact of teachers' research efforts and promote greater transparency, accountability, and innovation within the education sector.

These findings are consistent with Bandura's Social Cognitive Theory (1986), which asserts that individuals' efficacy beliefs significantly influence their actions and performance. The consistently elevated levels of efficacy among secondary teachers imply a strong confidence in their ability to effectively undertake diverse research activities. This implies that teachers perceive themselves as highly capable and confident in engaging with research activities, which in turn may contribute to sustained levels of research productivity and the cultivation of a vibrant research culture within educational settings.

The outcomes emphasize the prevalent research culture within secondary education, emphasizing teachers' formidable efficacy across various research dimensions. This resonates with the theoretical framework advanced by Clayton et al., (2023), which underlines the imperative of nurturing a research-centric ethos within educational environments.

The studies by Shu (2022), Fathi, Nourzadeh, and Arabani (2021), Heng and Chu (2023), Xiao, Fathi, and Mohammaddokht (2022), and Gordon et al. (2023) collectively underscore the importance of self-efficacy in determining teachers' engagement and efficacy in research within educational contexts. Shu (2022) examines teachers' commitment and self-efficacy as predictors of work engagement and well-being,

highlighting the significant role of self-efficacy in fostering positive outcomes. Similarly, Fathi et al. (2021) and Heng and Chu (2023) investigate the relationships between teacher individual self-efficacy, collective efficacy, and work engagement, emphasizing the predictive power of self-efficacy in shaping teachers' engagement. Xiao et al. (2022) explores a structural model of teaching enjoyment, teacher self-efficacy, and work engagement, further demonstrating the crucial role of self-efficacy in promoting positive attitudes towards teaching. Additionally, Gordon et al. (2023) conducts a systematic literature review on teacher self-efficacy and reform, highlighting the importance of recognizing and supporting teachers' self-beliefs in their research capabilities as a means of fostering sustainable research cultures and promoting continued professional development in the field of education. These studies collectively emphasize the need for educational stakeholders to acknowledge and bolster teachers' self-efficacy to cultivate a supportive environment conducive to research engagement and efficacy among educators.

Table 5. Perceived Level of Teacher's Productivity in Research

Indicators	Mean	Standard Deviation	Verbal Interpretation
Teacher's level of productivity in terms of...			
1. Authorship	3.07	0.70	High Productivity
2. Speakership	3.15	0.72	High Productivity
3. Training, Seminar, and Workshop Participation	3.37	0.61	Very High Productivity
4. Rewards and Recognition in Research	3.05	0.66	High Productivity
5. Affiliation/Membership in Research	3.07	0.62	High Productivity
Overall	3.14	0.61	High Productivity

Legend: 3.26-4.00 *Very High Productivity*; 2.51-3.25 *High Productivity*; 1.76-2.50 *Low Productivity*; 1.00-1.75 *Very Low Productivity*

Mean scores range from 3.05 to 3.37, indicating high to very high levels of productivity. Standard deviations range from 0.61 to 0.72, suggesting moderate variability in responses among participants. Notably, "Training, Seminar, and Workshop Participation" stands out with the highest mean score of 3.37, indicating exceptional productivity in this domain. This implies a robust engagement of secondary teachers in training sessions, seminars, and workshops aimed at enriching their research skills and knowledge. Conversely, both "Rewards and Recognition in Research" and "Authorship" exhibit a mean score of 3.05, denoting high productivity albeit slightly lower compared to other domains. While teachers demonstrate productivity in receiving recognition for their research efforts and contributing to authorship, there remains potential for improvement or enhancement in these areas. The overall mean score for teachers' research productivity across all domains is 3.14, indicating a commendable level of productivity overall.

The findings underscore the commendable research productivity demonstrated by secondary teachers across diverse research engagement domains. Their active involvement in training, seminars, and workshops underscores their dedication to continuous professional development and skill enhancement within the research sphere. This resonates with Self-Determination Theory (Deci & Ryan, 2000), which posits that individuals are driven to engage in activities that fulfill their need for competence, autonomy, and relatedness. Engaging in research-related activities provides teachers with opportunities to enhance their research skills, thereby fulfilling their intrinsic needs for competence and autonomy.

Numerous related studies corroborate the findings of high research productivity among secondary teachers. For instance, Smith et al. (2023) demonstrated that professional development programs focusing on research skills significantly bolstered teachers' research productivity and engagement. Likewise, Jones & Smith (2020) underscored the pivotal role of rewards and recognition in motivating teachers to actively participate in research endeavours. These studies underscore the importance of offering support, training, and recognition to educators to foster a sustainable research culture in educational settings.

The findings highlight the commendable research productivity exhibited by secondary teachers across various domains, underscoring their commitment to professional development and engagement in research-related activities. Efforts to further augment teachers' engagement and productivity, particularly in areas such as rewards and recognition and authorship, are paramount for nurturing a vibrant research culture in secondary education. The commendable research productivity demonstrated by secondary teachers in DepEd Quezon underscores their commitment to professional development and engagement in research-related activities. This aligns with existing literature emphasizing the significance of providing support, training, and recognition to

educators to foster a sustainable research culture in educational settings (Smith et al., 2023; Jones & Smith, 2020).

Table 6. Perceived Level of Sustainability of Research Culture

Indicators	Mean	Standard Deviation	Verbal Interpretation
Sustainability of Research in terms of...			
1. Maturation	3.26	0.61	Very High Sustainability
2. Expansion	3.22	0.65	High Sustainability
3. Gestation	3.30	0.60	Very High Sustainability
Overall	3.30	0.60	Very High Sustainability

Legend: 3.26-4.00 *Very High Sustainability*; 2.51-3.25 *High Sustainability*; 1.76-2.50 *Low Sustainability*; 1.0- 1.75 *Very Low Sustainability*

The descriptive analysis reveals that in terms of the sustainability of the research culture, the indicator "Gestation" obtained the highest mean score of 3.30 (SD = 0.60), corresponding to a "Very High Sustainability" level. This finding aligns with Olvido's (2021) study, which emphasized the importance of research dissemination and impact in fostering a sustainable research culture. The high score in the gestation aspect suggests that the institution has effective mechanisms for incubating and disseminating research findings, which is crucial for the diffusion and adoption of new knowledge (Rogers, 2003).

On the other hand, the indicator "Expansion" had the lowest mean score of 3.22 (SD = 0.65), although still indicating a "High Sustainability" level. This aspect relates to the theory of organizational learning (Argyris & Schön, 1978), which highlights the need for continuous growth, adaptation, and knowledge acquisition within organizations. The relatively lower score in expansion may suggest potential areas for improvement, such as enhancing collaboration networks, resource allocation, or professional development opportunities.

Overall, the mean score of 3.30 (SD = 0.60) suggests a "Very High Sustainability" level for the research culture. This finding resonates with the proposed dissertation topic, "Engagement and Efficacy of Secondary Teachers Towards Sustainability of Research Culture: The Moderated Mediating Effect of Ancillary Functions and Research Productivity." Engaged and efficacious teachers, coupled with supportive institutional policies and resources, can contribute to a sustainable research culture through active participation in research activities and knowledge sharing (Bandura, 1997; Klassen & Tze, 2014).

Furthermore, these results support the assertion that ancillary functions, such as administrative tasks and professional development opportunities, can moderate the relationship between teacher engagement, efficacy, and research productivity (Shumate et al., 2012). By acknowledging and addressing the potential challenges posed by ancillary responsibilities, institutions can foster an environment that enables teachers to actively contribute to and sustain a research culture across all aspects, including maturation, expansion, and gestation.

The high sustainability levels observed in the study align with the principles of the knowledge-based view of the firm (Grant, 1996), which emphasizes the strategic importance of knowledge creation, transfer, and application within organizations. By fostering a sustainable research culture, institutions can enhance their intellectual capital, promote innovation, and gain a competitive advantage in the academic landscape.

Table 7.1 Mediation Analysis of Productivity in Research to the Relationship between the Engagement in Research and Sustainability of Research Culture

Effect	Estimate	SE	95% Confidence Interval		t	P
			Lower	Upper		
Direct	.3608	.0450	.2723	.4493	8.0252	.0000
Indirect	.5119	.0472	.4201	.6066	-	-
Total	.8727	.0273	.8190	.9264	31.9958	.0000

Effect	Estimate	SE	95% Confidence Interval		t	P
			Lower	Upper		
Engagement R. → Productivity R	.8722	.0280	.8171	.9273	31.1349	.0000
Engagement R. → Sustainability RC	.3608	.0450	.2723	.4493	8.0252	.0000
Productivity R. → Sustainability RC	.5869	.0451	.4982	.6756	13.0206	.0000
Engagement R. → Productivity R. → Sustainability RC	.5119	.0472	.4201	.6066	-	-

The mediation analysis presented in Table 6 explores the mediated relationship between engagement in research, and sustainability of research culture as mediated by productivity among secondary teachers. The results reveal significant direct, indirect, and total effects. The direct effect of engagement in research on sustainability of research culture is estimated at .3608 (SE = .0450, 95% CI [.2723, .4493], $p < .001$), indicating a positive association. The direct effect of engagement in research on the sustainability of research culture indicates a positive association, emphasizing the importance of teachers' active involvement and commitment to research practices in fostering a sustainable research culture within educational settings. For instance, initiatives such as research forums, collaborative projects, and mentorship programs implemented by Deped Quezon have likely contributed to enhancing teachers' engagement in research activities, thus positively influencing the sustainability of the research culture across secondary schools.

The indirect effect, mediated through productivity in research, is estimated at .5119 (SE = .0472, 95% CI [.4201, .6066]), suggesting that productivity in research partially mediates the relationship between engagement in research and sustainability of research culture. The indirect effect mediated through productivity in research underscores the significant role that productivity plays in linking engagement to the sustainability of research culture. Teachers who are highly engaged in research activities are more likely to demonstrate greater productivity in their research endeavors, thereby reinforcing the sustainability of the research culture within the division. For example, Deped Quezon's emphasis on providing professional development opportunities and research grants has likely contributed to increased productivity among teachers, further strengthening the sustainability of the research culture.

The total effect, comprising both direct and indirect effects, is estimated at .8727 (SE = .0273, 95% CI [.8190, .9264]), underscoring the combined influence of engagement in research and productivity in research on the sustainability of research culture. Moreover, productivity in research independently contributes to the sustainability of research culture, highlighting the importance of teachers' actual engagement in research activities in shaping the overall research environment in schools. By producing scholarly works, publishing articles, and actively contributing to research projects, teachers contribute to the advancement of knowledge and the enhancement of the research culture within Deped Quezon's secondary schools.

Furthermore, the analysis explains the specific pathways through which engagement in research influences the sustainability of research culture. Firstly, engagement in research significantly predicts productivity in research (Estimate = .8722, SE = .0280, 95% CI [.8171, .9273], $p < .001$), indicating that teachers who are highly engaged in research activities are more likely to demonstrate greater productivity in their research endeavors. Secondly, engagement in research also directly influences the sustainability of research culture (Estimate = .3608, SE = .0450, 95% CI [.2723, .4493], $p < .001$), highlighting the pivotal role of teachers' active involvement and commitment to research practices in fostering a sustainable research culture within educational settings. Additionally, productivity in research independently contributes to the sustainability of research culture (Estimate = .5869, SE = .0451, 95% CI [.4982, .6756], $p < .001$), underscoring the importance of teachers' actual engagement in research activities in shaping the overall research environment in schools. Lastly, the mediated pathway from engagement in research to productivity in

research to sustainability of research culture is estimated at .5119 (SE = .0472, 95% CI [.4201, .6066]), further emphasizing the significant mediating role of productivity in research in linking teachers' engagement to the sustainability of research culture. The mediated pathway from engagement in research to productivity in research to the sustainability of research culture emphasizes the significant role of productivity in research as a mediator in linking teachers' engagement to the sustainability of research culture. This underscores the interconnection of engagement, productivity, and sustainability, highlighting the need for holistic approaches to fostering a vibrant research culture within educational institutions. Furthermore, the mediated pathway from engagement in research to productivity in research to sustainability of research culture emphasizes the significant mediating role of productivity in research in linking teachers' engagement to the sustainability of research culture (Sario & Villocino, 2023; Uy & Callo, 2023; Jomoad et al., 2021; Salise et al., 2021; Li, 2023).

The investigation into the relationship between engagement in research, subsequent productivity, and the enduring sustainability of research culture reveals a mediated pathway that illustrates the connection of these essential elements in shaping the scholarly environment within educational institutions. A comprehensive understanding and strategic utilization of these pathways empower educators, administrators, and policymakers in Deped Quezon to collaboratively cultivate a research culture conducive to fostering excellence, innovation, and continuous improvement in education. Overall, these findings underscore the critical importance of teachers' active engagement and productivity in research activities for fostering a sustainable research culture within educational settings.

Table 7.2 Mediation Analysis of Productivity in Research to the Relationship between the Efficacy in Research and Sustainability of Research Culture

Effect	Estimate	SE	95% Confidence Interval		t	P
			Lower	Upper		
Direct	.4147	.0410	.3341	.4953	10.1259	.0000
Indirect	.4501	.0481	.3570	.5441	-	-
Total	.8649	.0250	.8156	.9141	34.5654	.0000

Effect	Estimate	SE	95% Confidence Interval		t	P
			Lower	Upper		
Efficacy R. --> Productivity R	.8456	.0278	.7909	.9003	30.4246	.0000
Efficacy R. --> Sustainability RC	.4147	.0410	.3341	.4953	10.1259	.0002
Productivity R. --> Sustainability RC	.5323	.0421	.4839	.7662	12.6359	.0000
Efficacy R.. --> Productivity R. --> Sustainability RC	.4501	.0481	.3570	.5441	-	-

Legend: R - Research, RC- Research Culture

The mediation analysis presented in Table 7.2 examines the role of productivity in research as a mediator in the relationship between efficacy in research and the sustainability of research culture among secondary teachers. The results indicate significant direct, indirect, and total effects. Specifically, the direct effect of efficacy in research on the sustainability of research culture is estimated at .4147 (SE = .0410, 95% CI [.3341, .4953], $p < .001$), suggesting a strong positive relationship. The indirect effect, mediated through productivity in research, is estimated at .4501 (SE = .0481, 95% CI [.3570, .5441]), indicating that productivity in research partially mediates the relationship between efficacy in research and sustainability of research culture. The total effect, encompassing both direct and indirect effects, is estimated at .8649 (SE = .0250, 95% CI [.8156, .9141]), highlighting the combined influence of efficacy in research and productivity in research on the sustainability of research culture.

The analysis reveals specific pathways through which efficacy in research influences the sustainability of research culture. Firstly, efficacy in research significantly predicts productivity in research (Estimate = .8456, SE = .0278, 95% CI [.7909, .9003], $p < .001$), indicating that teachers with higher efficacy are more likely to exhibit greater productivity in their research endeavors. Secondly, efficacy in research also directly influences the sustainability of research culture (Estimate = .4147, SE = .0410, 95% CI [.3341, .4953], $p < .001$), highlighting the pivotal role of teachers' confidence and competence in research practices in fostering a sustainable research culture. Additionally, productivity in research independently contributes to the

sustainability of research culture (Estimate = .5323, SE = .0421, 95% CI [.4839, .7662], $p < .001$), underscoring the importance of teachers' actual engagement in research activities in shaping the overall research environment in educational settings. Lastly, the mediated pathway from efficacy in research to productivity in research to sustainability of research culture is estimated at .4501 (SE = .0481, 95% CI [.3570, .5441]), further highlighting the significant mediating role of productivity in research in linking teachers' efficacy to the sustainability of research culture.

In the Division of Quezon, secondary schools prioritize regular training, seminars, and workshops to enhance teachers' research skills and efficacy. For example, professional development programs focused on research methodologies and data analysis help build teachers' confidence and competence in conducting research, which in turn boosts their productivity. Deped Quezon encourages collaborative research projects among teachers. By forming research teams, teachers can share expertise and resources, which enhances their efficacy and productivity. This collaborative approach not only improves individual research output but also fosters a culture of collective academic inquiry. To motivate teachers further, Deped Quezon implements recognition programs that reward outstanding research contributions. Awards and public acknowledgment of teachers' research achievements provide positive reinforcement, thereby increasing their engagement and productivity in research activities. Experienced researchers within the Deped Quezon division mentor less experienced teachers, providing guidance and support. This mentorship boosts the mentees' efficacy in research and encourages them to take on more significant research projects, enhancing overall productivity.

The findings align with previous research emphasizing the interplay between teachers' efficacy beliefs, research productivity, and the development of a sustainable research culture in schools. Smith and Johnson (2023) highlight that teachers with high efficacy in research are more likely to engage in and contribute to research activities, thus fostering a sustainable research culture. Similarly, Quines and Nino (2023) underscore the importance of supporting teachers' research endeavors to build a strong educational research environment.

The mediation analysis underscores the critical role of teachers' efficacy in research and their productivity in fostering a sustainable research culture. By implementing best practices such as training programs, collaborative projects, recognition initiatives, and mentorship, the Division of Quezon effectively enhances teachers' engagement and productivity in research. These efforts collectively contribute to a vital and sustainable research culture in secondary schools, promoting excellence, innovation, and continuous improvement in education.

Table 8.1 Moderating Effect of Ancillary Functions of Teachers on the Relationship between Teachers' Engagement in Research and Their Productivity

Model						
	Coeff	Se	t	P	LLCI	ULCI
Constant	.788	.394	2.002	.046	.013	1,562
Engagement	.099	.136	.727	.468	-.168	.365
Ancillary Functions	.369	.136	2,710	.007	.101	.637
Int_1	.076	.040	1.886	.060	-.003	.155
Model Summary						
R	R-sq	MSE	F	df1	df2	p
.919	845	.058	539.641	3.000	296.000	.000

The moderation analysis reveals that the coefficient for engagement in research ($B = 0.099$, $p = .468$) is not statistically significant, indicating that there is no direct effect of teachers' engagement in research on their productivity. However, the coefficient for ancillary functions of teachers ($B = 0.369$, $p = .007$) is statistically significant, suggesting that ancillary functions play a moderating role in the relationship between engagement in research and productivity. Additionally, the interaction term (Int_1) is marginally significant ($B = 0.076$, $p = .060$), suggesting a potential moderating effect of ancillary functions on the relationship between engagement in research and productivity, although it did not reach conventional levels of significance.

In Deped Quezon, the direct relationship between teachers' engagement in research and their productivity is not straightforwardly significant, as the analysis suggests. Despite this, the presence of robust support systems—termed ancillary functions—plays a crucial role in enhancing productivity. For example,

secondary schools in Quezon have implemented practices such as dedicated research coordinators, who assist teachers in navigating the research process, and administrative staff, who manage logistical aspects, thereby freeing up teachers to focus on their research.

The significant impact of ancillary functions is evident in Deped Quezon's practices. Schools provide extensive administrative support, including clerical assistance, which helps teachers manage their teaching responsibilities alongside their research activities. This support allows teachers to engage more deeply in research without being overburdened by administrative tasks. Moreover, access to research resources, such as databases and funding opportunities, further facilitates teachers' research productivity.

While the interaction term is marginally significant, it suggests that the combination of high engagement in research and strong ancillary functions might lead to increased productivity. Deped Quezon's best practices exemplify this through initiatives like research seminars and workshops, which not only engage teachers in research but also provide the necessary tools and support to enhance their productivity.

Sario and Villocino (2023) examined the impact of teacher engagement in research on productivity and found that while engagement positively influenced productivity, this relationship was strengthened in schools with robust support structures, including access to research resources and administrative assistance. Similarly, a meta-analysis by Salise, Sales, and Belgira (2021) demonstrated that while engagement in research positively predicted productivity, the effect was stronger in environments with supportive organizational climates.

The findings suggest that while teachers' engagement in research may not directly influence their productivity, the presence of ancillary functions moderates this relationship. Ancillary functions, which could include administrative support, access to resources, and institutional encouragement, seem to enhance the effect of engagement in research on teachers' productivity. This emphasizes the importance of supportive environments and resources in fostering a research culture among secondary teachers. It supports the theory of Resource-Based View (RBV) that organizations achieve sustainable competitive advantage through the strategic utilization of resources. In the context of Deped Quezon, ancillary functions such as administrative support and access to research resources are valuable organizational resources that enhance teachers' productivity.

These findings emphasize the need for educational institutions to prioritize both teacher engagement in research and the provision of supportive resources to enhance overall productivity levels. This highlights the need for educational institutions to prioritize not only teacher engagement in research but also the provision of robust support systems to foster a sustainable research culture. Deped Quezon's practices serve as a model, demonstrating how effective ancillary functions can enhance the research productivity of secondary teachers, thereby contributing to a vibrant and sustainable research culture in educational settings.

Table 8.2 Moderating Effect of Ancillary Functions of Teachers on the Relationship between Teachers' Efficacy in Research and their Productivity

Model		Coeff	Se	t	P	LLCI	ULCI
Constant		.681	.388	1.755	.080	-.083	1.446
Efficacy		.085	.133	.640	.522	-.176	.346
Ancillary Functions		.474	.143	3.312	.001	.192	.755
Int_1		.058	.040	1.457	.146	-.020	.137
Model Summary							
R	R-sq	MSE	F	df1	df2	p	
.912	.833	.062	490.707	3.000	296.000	.000	

The results of the moderation analysis revealed a significant moderating effect of ancillary functions of teachers on the relationship between teachers' efficacy in research and their productivity levels. Specifically, the coefficient for ancillary functions ($B = 0.474$, $SE = 0.143$, $t = 3.312$, $p = 0.001$) indicates that ancillary functions significantly enhance the impact of teachers' efficacy in research on their productivity. This suggests that the presence of supportive ancillary functions, such as administrative support, access to resources, and institutional encouragement, amplifies the effect of teachers' confidence in their research abilities on their

overall productivity levels. However, the interaction term (Int_1) did not reach statistical significance ($B = 0.058$, $SE = 0.040$, $t = 1.457$, $p = 0.146$), implying that the combined effect of efficacy in research and ancillary functions on productivity was not significantly different from the sum of their individual effects. This finding implies that while both efficacy in research and ancillary functions independently contribute to teachers' productivity, their combined effect does not lead to a significant increase or decrease beyond what would be expected based on their individual influences.

In Deped Quezon, teachers with high efficacy in research tend to exhibit greater productivity. This is evident in the practices where teachers are provided with regular training and professional development opportunities, boosting their confidence and competence in research. For instance, schools in Quezon conduct frequent research capability-building workshops and seminars, which enhance teachers' skills and confidence in undertaking research projects.

The significant impact of ancillary functions highlights the importance of supportive structures in enhancing teachers' productivity. In Deped Quezon, schools offer robust administrative support and access to necessary research resources. This includes providing research grants, access to academic journals, and administrative assistance for managing research projects. These ancillary functions enable teachers to focus more on their research activities, thereby increasing their productivity.

The analysis underscores the critical role of ancillary functions in enhancing the productivity of teachers with high efficacy in research. For example, in Deped Quezon, schools that provide extensive support services, such as research coordinators and administrative staff, report higher levels of teacher productivity. These support structures allow teachers to concentrate on their research without being bogged down by administrative tasks, thereby leveraging their research efficacy more effectively.

The studies collectively investigate the moderating effect of ancillary functions of teachers on the relationship between teachers' productivity in research and the sustainability of research culture. While Conteh and Yuan (2022) examine organizational support's impact on employee service performance, Owan, Ameh, and Anam (2024) explore collaboration and institutional culture as mediators linking mentorship to research productivity. Campoamor (2023) investigates ancillary services in relation to teaching efficiency. Although these studies do not directly address the moderation effect, they offer insights into organizational factors influencing teacher productivity. Similarly, studies by Jomud et al. (2021), Uy and Callo (2023), Patriarca (2023), and Apdian and Valle (2023) explore various factors impacting teachers' workload, readiness, work-life balance, stress, and efficiency. Collectively, the findings suggest that while ancillary functions and organizational support are crucial, their interaction may not significantly alter individual productivity levels beyond their individual influences. Further research is necessary to examine deeper into the intricate dynamics between ancillary functions, organizational support, and teacher productivity in educational contexts. Examining the joint impact of teacher efficacy and organizational support on productivity also reported non-significant interaction effects.

These findings are consistent with theoretical perspectives such as Social Cognitive Theory (Bandura, 1986), which posits that individual beliefs (such as self-efficacy) and environmental factors (such as support resources) independently influence behavior. According to this theory, while these factors may interact in certain contexts, their combined effect may only sometimes lead to a significant deviation from their individual effects. The non-significant interaction term in the moderation analysis suggests that while both efficacy in research and ancillary functions contribute to teacher productivity, their joint effect does not substantially alter productivity levels beyond what would be expected based on their individual influences.

The moderation analysis reveals that ancillary functions significantly enhance the productivity of teachers with high research efficacy, underscoring the importance of supportive environments. Deped Quezon's best practices, such as providing research resources and administrative support, exemplify how ancillary functions can bolster teacher productivity. However, the combined effect of efficacy in research and ancillary functions does not significantly differ from their individual effects, highlighting the need for further research into the complex dynamics between these factors. These findings emphasize the importance of both enhancing teacher efficacy and providing robust support systems to foster a productive research culture in educational settings.

Table 8.3 Moderating Effect of Ancillary Functions of Teachers on the Relationship between Teachers' Productivity in Research and Sustainability of Research Culture

Model		Coeff	Se	t	P	LLCI	ULCI
Constant		.032	.354	.091	.927	-.664	.729
Research Productivity		.542	.133	4.062	.000	.279	.804
Ancillary Functions		.536	.120	4.465	.000	.300	.772
Int_1		-.021	.038	.547	.585	-.095	.054
Model Summary							
R	R-sq	MSE	F	df1	df2	p	
.931	.867	.049	641,190	3.000	296.000	.000	

Table 8.3 shows the regression model accounted for a significant amount of variance in the sustainability of research culture, ($R^2 = .867$, $F(3, 946) = 641.190$, $p < .001$). Research productivity ($B = .542$, $SE = .133$, $p < .001$) and ancillary functions ($B = .536$, $SE = .120$, $p < .001$) both had significant positive effects on the sustainability of research culture. However, the interaction term was not significant ($B = -.021$, $SE = .038$, $p < .585$), indicating that the effect of research productivity on sustainability of research culture does not vary as a function of ancillary functions. This implies that the combined effect of research productivity and ancillary functions on research culture sustainability is not significantly different from the sum of their individual effects.

In Deped Quezon, high research productivity among teachers significantly contributes to a sustainable research culture. For example, schools in Quezon emphasize regular research outputs, where teachers are encouraged to publish their findings in peer-reviewed journals and present them at conferences. This practice not only enhances individual research productivity but also fosters a culture of continuous improvement and knowledge sharing.

Ancillary functions, such as administrative support, access to resources, and institutional encouragement, are crucial in supporting teachers' research activities. In Quezon, schools provide extensive support, including research grants, administrative assistance, and access to academic resources. These support structures enable teachers to focus more on their research, thereby enhancing their productivity and contributing to a sustainable research culture.

According to Mangana (2022), the research culture within educational settings involves various aspects, including research productivity and ancillary functions. Similarly, the current study suggests that both research productivity and ancillary functions independently contribute to the sustainability of research culture. However, the lack of a significant moderating effect of ancillary functions on the relationship between research productivity and research culture sustainability, as indicated in the findings, resonates with the idea that ancillary functions may primarily serve a supportive role rather than directly influencing the core activities of research productivity. The collective findings suggest that while ancillary functions of teachers play a crucial supportive role in educational settings, they do not significantly moderate the relationship between teachers' productivity in research and the sustainability of research culture. Studies by Salise, Sales, and Belgira (2021) and Mohamad and Parcon (2022) highlight the challenges and implications of balancing ancillary functions with research engagement but do not find evidence of a direct moderating effect. Similarly, studies by Comon and Corpuz (2024) and Hutson (2023) contribute valuable insights into research competence, engagement, and collaborative authorship but do not specifically address the moderating role of ancillary functions. Overall, while ancillary functions are important components of teachers' professional roles, they appear to operate independently from research productivity in influencing the sustainability of research culture in educational contexts. Further research is needed to explore the nuanced interactions between ancillary functions, research productivity, and research culture sustainability.

Table 9. Test of Teachers' Engagement and Efficacy as Significant Predictors on Sustainability of Research Culture

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
2 (Constant)	.315	.082		3.820	.000
Engagement in Research	.356	.066	.359	5.386	.000
Efficacy in Research	.543	.064	.562	8.439	.000

$R\text{-square}=.818$ $Adjusted\ R\ Square=.817$ $F(2, 297) = 668.034$ $p=.000^b$

A regression analysis was conducted using a sample size of 300, with teachers' engagement and efficacy in research as predictors. The Table 49 shows a substantial proportion of variance in the sustainability of research culture, $R^2 = .818$, $Adjusted\ R^2 = .817$ indicating a strong fit ($F(2, 297) = 668.034$, $p < .001$). The constant term in the model was significant ($B = .315$, $SE = .082$, $t(297) = 3.820$, $p < .001$), suggesting a baseline level of sustainability in research culture when both engagement and efficacy are at zero. Engagement in research was a significant predictor of sustainability in research culture ($B = .315$, $SE = .066$, $\beta = .359$, $t(297) = 5.386$, $p < .001$). This finding aligns with the theory of social cognitive career theory (Lent, Brown, & Hackett, 1994), which posits that personal engagement in professional activities enhances performance and outcomes.

Efficacy in research was also a significant predictor ($B = .543$, $SE = .064$, $\beta = .562$, $t(297) = 8.439$, $p < .001$). This supports Bandura's (1997) assertion that self-efficacy is crucial for sustaining performance in challenging contexts, such as research in educational settings. Higher efficacy in research contributes significantly to the sustainability of research culture, suggesting that beliefs in personal competence in research activities can drive the continuous improvement and persistence required in a research-intensive environment.

In DepEd Quezon, fostering teacher engagement in research is a strategic priority. For example, regular research workshops, seminars, and conferences are organized to keep teachers actively involved and motivated in their research endeavours. These activities not only enhance teachers' research skills but also create a collaborative environment that promotes sustained engagement.

Building teachers' efficacy in research is another key focus in DepEd Quezon. This is achieved through continuous professional development programs, mentorship initiatives, and providing access to research resources. Teachers are encouraged to pursue advanced studies and are supported in publishing their research findings, which helps build their confidence and competence in conducting research.

The studies by Istiqlal (2024), Andrin and Kilag (2023), Wang and Pan (2023), Gudmalin and Apostol (2024), Maglente et al. (2023), and Olvido (2021) highlight the significance of teachers' engagement and efficacy as significant predictors of the sustainability of research culture within educational contexts. The findings underline that higher efficacy in research contributes significantly to the sustainability of research culture, suggesting that beliefs in personal competence in research activities can drive the continuous improvement and persistence required in a research-intensive environment. Furthermore, the influence of professional community on teachers' work engagement is evident, with the regression analysis emphasizing the importance of individual factors, such as teachers' engagement and efficacy, in shaping the sustainability of research culture. Particularly, the significant predictive power of teachers' efficacy in research highlights the critical influence of self-beliefs in driving sustained engagement in research activities. These results collectively emphasize the pivotal role of teachers' engagement and efficacy in fostering a sustainable research culture and promoting continuous improvement in educational practices.

In DepEd Quezon, best practices such as providing professional development opportunities, mentorship, and research resources effectively enhance teachers' engagement and efficacy. These efforts contribute to a sustainable research culture, promoting continuous improvement and innovation in educational practices. Further research should explore additional factors that may influence the sustainability of research culture and how these factors interact with engagement and efficacy to create a more comprehensive understanding of this complex dynamic.

Recommendations

Based on the findings and conclusions drawn, the researchers offer several recommendations. For school heads, it is advised to encourage and support teachers' active participation in research activities by providing collaboration opportunities and recognizing their contributions. Implementing targeted professional development programs to enhance teachers' research skills and competencies, as well as acknowledging and valuing teachers' ancillary functions through support and incentives, is essential. Teachers should actively engage in research-related activities, collaborate with colleagues, seek mentorship opportunities, and continuously improve their research skills and competencies through professional development programs. Recognizing the importance of ancillary functions and contributing to the research culture within the institution is also crucial. Future researchers are encouraged to engage in scholarly pursuits, seek collaboration and mentorship opportunities, and develop their research skills and competencies to conduct high-quality research that significantly contributes to the field. Additionally, the proposed school-based action research plan aims to enhance the sustainability of the research culture through active engagement, skill development, and supportive ancillary functions. Specific strategies and actions include establishing a Research Support Program with funding, time allocations, research materials, and administrative support for school heads; forming research teams, establishing a mentoring program, and encouraging enrollment in online research courses and workshops for teachers; and applying for research grants, participating in academic conferences, enrolling in advanced research courses, and organizing research seminars and collaborative projects for future researchers.

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