

RESEARCH PAPER

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Research competence, exposure and attitudes toward scientific inquiry among senior high school teachers: Implications for scientific literacy**Abraham B. Bayron Jr.****College of Teacher Education, Jose Rizal Memorial State University-Katipunan Campus,
Katipunan, Zamboanga del Norte, Philippines***Key words:** Research competence, Research exposure, Research attitudes, Scientific literacy, Scientific inquiry, Senior high school teachers, Bioscience education, Sustainable development**Received:** June 11, 2026**Accepted:** June 25, 2026**Published:** June 29, 2026**DOI:** <https://dx.doi.org/10.12692/ijb/28.6.308-323>**ABSTRACT**

Strengthening teachers' research competence is essential for promoting scientific inquiry, evidence-based teaching, and scientific literacy among Senior High School learners. This study examined the research competence, research exposure, and attitudes toward research of Senior High School teachers in Katipunan, Zamboanga del Norte, and identified factors influencing their research engagement. A mixed-methods design was employed involving 48 teachers selected through total enumeration during the second semester of School Year 2023–2024. Quantitative data were collected using an adapted questionnaire based on the Attitudes Toward Research Scale and analyzed using descriptive and inferential statistics, while qualitative responses were examined through thematic analysis. The findings showed limited research preparation and exposure: 83.33% had not undertaken research-related subjects, 81.25% had not attended research-related seminars or training, 60.42% had no research development experience, 81.25% had never presented research, and 95.83% had no research publication experience. Despite these limitations, teachers strongly recognized the usefulness of research to their profession ($M = 4.60$) and demonstrated a positive attitude toward research ($M = 3.81$). However, they also experienced research anxiety ($M = 3.67$) and perceived research as difficult ($M = 3.49$). Their overall research competence was moderately competent ($M = 3.90$). Research competence was not significantly associated with demographic characteristics or research exposure, but it was significantly related to anxiety ($p = 0.023$), positivity ($p = 0.001$), and perceived difficulty ($p < 0.001$). Limited knowledge, inadequate training, insufficient resources, heavy workloads, and limited time were major barriers. The findings underscore the need for sustained training, mentoring, institutional support, and strategies that reduce research anxiety and strengthen teachers' capacity to promote scientific literacy.

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INTRODUCTION

The achievement of the Sustainable Development Goals (SDGs) requires societies to develop strong scientific capacity, evidence-based decision-making, and a scientifically literate population capable of responding to complex challenges affecting human health, ecosystems, food systems, and environmental sustainability. The biosciences are particularly important to this agenda because biological and environmental research provides essential knowledge for addressing disease prevention, public health, food security, biodiversity conservation, climate change, sustainable agriculture, ecosystem protection, and responsible management of natural resources. These concerns are closely connected with SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 6 (Clean Water and Sanitation), SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land). Achieving these goals requires not only scientific discoveries but also individuals who can understand scientific evidence, evaluate information critically, conduct systematic inquiry, and translate scientific knowledge into appropriate action.

Research is a fundamental process through which scientific knowledge is generated, validated, communicated, and applied to address problems affecting human life, health, society, and the environment. In education, teachers are not only consumers of scientific knowledge but also important mediators of evidence-based thinking among learners. Their ability to understand research processes, evaluate evidence, interpret data, and apply scientific information is therefore closely associated with the development of scientific literacy. However, many teachers encounter difficulties in engaging in research because of limited knowledge, inadequate methodological skills, lack of exposure, and perceptions that research is complex and demanding (Abinan, 2021; Biruk, 2013). These conditions may contribute to research anxiety and may influence teachers' confidence, motivation, and willingness to participate in research activities.

Scientific literacy is particularly important because contemporary societal issues increasingly require individuals to understand evidence related to human health, biological processes, environmental sustainability, disease prevention, nutrition, and other life-science concerns. Teachers who possess stronger research competence are better positioned to distinguish scientifically supported claims from unsupported information, interpret quantitative evidence, evaluate research findings, and communicate scientific concepts accurately. Thus, research competence should not be viewed solely as an academic or professional skill but also as a component of scientific literacy that supports informed decision-making and promotes evidence-based practices affecting human and environmental well-being (Cochran-Smith, 2005; Cunningham and Allington, 2003).

The continuing advancement of science and technology demonstrates the importance of systematic inquiry in improving quality of life. Scientific discoveries in medicine, biology, environmental science, agriculture, and technology are products of systematic observation, evidence collection, analysis, interpretation, and validation. Research enables scientists and professionals to establish reliable evidence, test explanations, identify relationships, and develop solutions to problems affecting individuals and communities. In the educational context, teachers play a critical role in translating these scientific processes into meaningful learning experiences. Their research competence can therefore influence not only their own professional productivity but also their capacity to cultivate students who can critically examine evidence and make scientifically informed decisions (Cochran-Smith, 2005; Mills, 2011).

In the Philippine education system, the importance of research and scientific inquiry is reflected in the K–12 curriculum established through Republic Act No. 10533, or the Enhanced Basic Education Act of 2013. Research is incorporated into the Senior High School curriculum to develop learners' abilities in inquiry,

investigation, critical thinking, problem-solving, and evidence-based decision-making. Consequently, teachers responsible for facilitating research-related learning need adequate competence in research methodology, data interpretation, ethical practices, and scientific communication. Their preparedness is particularly important because teachers serve as models of how evidence is generated, evaluated, and used in addressing real-world problems.

The development of future scientists in the Philippines should begin with a strong appreciation for science, scientific inquiry, and evidence-based thinking among learners. Teachers play a fundamental role in cultivating this appreciation by creating learning environments where students are encouraged to ask questions, investigate phenomena, analyze evidence, and develop solutions to real-world problems. When teachers themselves possess adequate research competence and positive attitudes toward scientific inquiry, they are better positioned to inspire learners to view science not merely as a school subject but as a meaningful way of understanding life, health, biodiversity, agriculture, environmental sustainability, and technological development. Strengthening teachers' research capabilities may therefore contribute to the formation of scientifically literate learners who are capable of critical thinking, innovation, ethical decision-making, and scientific problem-solving. In the long term, nurturing these competencies from the Senior High School level can help build a stronger pipeline of future scientists, researchers, innovators, and science professionals who can contribute to national development and address emerging challenges in health, biosciences, agriculture, climate change, and environmental sustainability (Republic Act No. 10533, 2013; Mills, 2011).

The challenge is not simply the availability of aspiring scientists but the creation of an environment in which scientific talent can be developed, retained, and supported. DOST has identified the need for greater investment in human capital and research and development, while recent DOST initiatives continue

to provide substantial funding for research and innovation. For example, DOST-PCIEERD allocated approximately ₱800 million for 207 research projects in 2024, demonstrating the government's continuing effort to strengthen the national research ecosystem. Nevertheless, concerns regarding insufficient research funding remain evident, with DOST Region VII reporting that inadequate financial support can constrain research activities and affect the quality and development of research outputs. These realities reinforce the importance of developing scientific interest and research capability as early as Senior High School. If learners are exposed to authentic inquiry, supported by research-competent teachers, and encouraged to appreciate the value of science, the country can develop a stronger and more sustainable pipeline of future scientists who are prepared to pursue advanced scientific training and contribute solutions to national and global challenges.

Research competence also has implications for human cognitive and psychological processes. Conducting research requires sustained attention, analytical reasoning, interpretation of information, decision-making, and problem-solving. When teachers perceive research as highly difficult or threatening, research-related anxiety may interfere with their confidence and engagement. Conversely, positive attitudes toward research may encourage greater persistence and willingness to develop research skills. These dimensions are important because professional learning is influenced not only by access to knowledge and resources but also by cognitive and affective factors that shape how individuals process and apply information. Understanding the relationship between research attitude and competence may therefore provide insight into how teachers can be supported in developing more effective scientific inquiry practices.

Teacher research competence is likewise important to health and well-being. Research activities can influence teachers' professional confidence, workload, stress, and psychological responses to academic demands. Persistent research anxiety, inadequate

support, and excessive workload may create barriers to meaningful engagement in research. On the other hand, appropriate mentoring, training, institutional support, and manageable research opportunities may strengthen teachers' self-efficacy and promote healthier professional engagement. Addressing these factors is therefore important not only for increasing research productivity but also for supporting the well-being and sustainable professional development of teachers.

Action research provides an important mechanism through which teachers can apply scientific inquiry to classroom and school-based problems. Through systematic observation, data collection, analysis, reflection, and intervention, teachers can investigate learning difficulties, instructional practices, learner behavior, and other educational concerns. Such processes parallel the broader scientific method and encourage teachers to become reflective practitioners who use evidence rather than assumptions when making professional decisions (Mills, 2011; Relucio, 2019). Developing this capacity can strengthen the research culture within schools while simultaneously promoting scientific literacy among teachers and learners.

Despite the recognized importance of research in education, many Senior High School teachers continue to experience limited research exposure and competence. Previous studies have identified lack of research knowledge, insufficient training, inadequate resources, limited funding, heavy workloads, and negative perceptions of research as barriers to teacher participation (Abinan, 2021; Biruk, 2013). These barriers are particularly important in the Senior High School context because teachers are expected to guide learners in research-related subjects while simultaneously performing instructional, administrative, and other professional responsibilities. A mismatch between these expectations and teachers' actual research preparation may affect the quality of research instruction and the development of students' scientific inquiry skills.

Although previous studies have examined teachers' research exposure, attitudes toward research, and research competence, most have investigated these variables independently or within general educational contexts. Limited attention has been given to how research competence, research exposure, and research attitudes collectively influence teachers' capacity to function as facilitators of scientific literacy within the Senior High School setting. Furthermore, empirical evidence from the Philippine Senior High School context remains limited, particularly regarding the relationships among teachers' demographic characteristics, research exposure, research attitudes, and research competence. This gap is especially important in an era characterized by the rapid dissemination of health, environmental, technological, and scientific information, where teachers are expected to guide learners in evaluating evidence and distinguishing credible scientific information from misinformation.

Accordingly, this study aimed to examine the research competence, research exposure, and attitudes toward research among Senior High School teachers in Katipunan, Zamboanga del Norte. Specifically, it sought to determine teachers' research competence, research exposure, and attitudes toward research; examine the relationships between research competence and teachers' demographic characteristics, research exposure, and research attitudes; and identify the factors that influence teachers' engagement in research. By situating teacher research competence within the broader concepts of scientific literacy, evidence-based reasoning, cognitive processes, psychological well-being, and health-related decision-making, the study provides a more interdisciplinary perspective on teacher research development. The findings may serve as a basis for capability-building programs designed not only to improve research productivity but also to strengthen teachers' capacity to model scientific thinking and cultivate scientifically literate learners.

METHODOLOGY

This study employed a mixed-methods research design, integrating quantitative and qualitative approaches to provide a comprehensive

understanding of Senior High School (SHS) teachers' research competence, research exposure, and attitudes toward research. The quantitative component examined teachers' demographic characteristics, research exposure, attitudes toward research, and research competence, while the qualitative component explored the factors influencing teachers' ability to conduct research effectively through thematic analysis.

The study was conducted among 48 Senior High School teachers in Katipunan, Zamboanga del Norte, during the second semester of the 2023–2024 school year. Because the target population was relatively small, a total enumeration sampling technique was employed, allowing all eligible SHS teachers to participate in the study.

Data were collected using an adapted survey questionnaire based on Papanastasiou's (2005) Attitudes Toward Research Scale. The questionnaire consisted of four sections. The first section gathered respondents' demographic information, including age, gender, specialization, length of service, highest educational attainment, research-related subjects undertaken, and research-related seminars or training attended. The second section assessed teachers' attitudes toward research across four dimensions: usefulness to the profession, anxiety, positivity, and perceived difficulty. The third section measured teachers' research competence based on competencies and performance standards outlined in the Senior High School curriculum guide. The final section comprised open-ended questions that enabled participants to describe the factors that facilitate or hinder their engagement in research.

Quantitative data were analyzed using descriptive statistics, including frequencies, percentages, weighted means, and standard deviations to summarize respondents' demographic characteristics, research exposure, attitudes toward research, and research competence. Inferential statistical analyses were subsequently performed to determine the relationships between research competence and

teachers' demographic characteristics, research exposure, and research attitudes.

The qualitative responses obtained from the open-ended questions were analyzed using thematic analysis. The analysis followed a systematic process consisting of five stages: (1) familiarization with the data through repeated reading of participants' responses; (2) generation of initial codes by identifying meaningful patterns within the data; (3) development of broader themes by grouping related codes; (4) review and refinement of the themes to ensure they accurately represented participants' experiences; and (5) interpretation of the findings to explain the major factors influencing teachers' research competence and engagement.

Ethical considerations were strictly observed throughout the study. Permission to conduct the research was obtained from the appropriate school administrators and relevant educational authorities before data collection commenced. Participants were informed of the purpose of the study, and their participation was voluntary. Confidentiality and anonymity were maintained throughout the research process, and all information provided by the respondents was treated with the utmost confidentiality and used solely for research purposes.

Questionnaires were distributed and retrieved through both online and face-to-face modalities. Online data collection was conducted using email, Google Forms, and social media platforms, while printed questionnaires were administered personally in accordance with the prevailing health and safety protocols. Official communication letters were likewise sent to the Department of Education (DepEd), municipal officials, school administrators, and other concerned authorities to secure the necessary permissions before the conduct of the study.

RESULTS AND DISCUSSION

Age

Table 1 shows the profile of the Senior High School teachers in terms of age. Most of the teachers belong

to the age range 22-27 with a frequency of 33 or 68.75%. This distribution suggests that a significant proportion of Senior High School teachers are relatively young, with the majority being in the early stages of their careers. This aligns with broader trends in the education workforce, where younger, millennial teachers are increasingly entering the field. According to Headden (2014), a growing number of millennial teachers are joining the workforce, bringing fresh perspectives and new pedagogical approaches to education. This influx of younger teachers may also reflect factors such as the rising demand for teachers in developing education systems and the increasing availability of teacher training programs. Furthermore, as younger teachers are often more technologically adept, there may be a greater opportunity to integrate digital tools into the curriculum, potentially improving educational quality and student outcomes.

Table 1. Profile of the senior high school teachers in terms of age

Age	Frequency	Percent
22-27	33	68.75
28-33	5	10.42
34-39	6	12.50
40-45	4	8.33
Total	48	100

Gender

Table 2 presents the profile of the Senior High School teachers in terms of gender. The most significant proportion of the teachers by gender category came from the female population with a frequency of 33 or 68.8%. The gender distribution in this sample reflects broader trends in the teaching profession, particularly in the context of the Philippines, where teaching has traditionally been viewed as a "feminine" profession. The predominance of female teachers is consistent with the cultural perception that teaching, especially at the primary and secondary school levels, is inherently nurturing and requires a caring, empathetic approach. In the Philippines, as in many other countries, this gendered perception has historically influenced the decision-making of individuals entering the teaching profession.

Table 2. Profile of the senior high school teachers in terms of gender

Sex	Frequency	Percent
Female	33	68.8
Male	12	25.0
LGBTQ	3	6.2
Total	48	100

Specialization

In Table 3, there were 10 (20.83%) taught Mathematics subject, 9 (18.75%) taught ABM subjects, 7 (14.58%) taught English, 6 (12.5%) taught Science, 5 (10.42%) who taught Filipino subject, 3 (6.25%) taught ESP, and 2 (4.17) taught Social Sciences. Moreover, the rest of the specializations such as TLE, Physical Education, Electrical, and Business Administration gained a frequency of 1 (2.08%), This indicates that most of the SHS teachers taught Mathematics subject. From this distribution, it is clear that Mathematics and ABM subjects dominate the teaching load in this Senior High School setting, with Mathematics being the most taught subject (20.83%). This is consistent with the broader educational trend where STEM (Science, Technology, Engineering, and Mathematics) subjects tend to attract more educators, given their perceived importance for student preparation in fields that drive national economic growth. The relatively lower representation of subjects like TLE, Physical Education, and ICT could reflect the specialized nature of these fields, which may require more specific training or qualifications.

Table 3. Profile of the senior high school teachers in terms of specialization

Specialization	Frequency	Percent
Social Sciences	2	4.17
English	7	14.58
TLE	1	2.08
Mathematics	10	20.83
ESP	3	6.25
Filipino	5	10.42
Science	6	12.50
Physical education	1	2.08
Electrical	1	2.08
Business administration	1	2.08
ABM	9	18.75
ICT	1	2.08
MAPEH	1	2.08
Total	48	100

Length of service

In Table 4, it is seen that the majority of the respondents served one year below 3 years with a frequency of 19 or 39.58%. Followed by 4 years to 6 years with a frequency of 13 (27.08%) then, 7 years to 9 years with a frequency of 10 (20.83%), and lastly, 10 years to 12 years of service with a frequency of 6 (12.5%). This distribution reflects the relatively recent establishment of the Senior High School (SHS) program in the Philippines, which was introduced in 2016 as part of the K-12 education reform. The large number of teachers with fewer than 3 years of experience suggests that many educators in this sample are relatively new to teaching at the Senior High School level, which aligns with the broader trend of a younger and less experienced teaching workforce in this specific educational setting. The SHS program is still in its developmental stages, and a significant portion of teachers who have joined are likely to be early-career educators or those transitioning from other educational levels (Tamanu, 2017, cited by Abinan, 2021).

Table 4. Profile of the senior high school teachers in terms of length of service

Years of service	Frequency	Percent
1 year below-3 years	19	39.58
4 years-6 years	13	27.08
7 years-9 years	10	20.83
10 years-12 years	6	12.50
Total	48	100

Highest educational attainment

Table 5 presents the profile of the Senior High School teachers in terms of highest educational qualification. Generally, most of the Senior High School teachers pursue a graduate study with a master's degree with a frequency of 31 or 64.58%. This distribution suggests that the Senior High School teaching staff is relatively well-qualified, with a large majority having pursued graduate studies. The emphasis on graduate-level education indicates a focus on professional development and higher academic standards within the Senior High School system. In the Philippines, as indicated by the DepEd Merit Selection Plan (2022), holding a graduate degree is a key criterion for promotion within the Department of Education

(DepEd), and it is also a vital factor in improving overall professional competence. This trend of pursuing advanced education helps improve the quality of instruction in Senior High Schools, as teachers with Master's Degrees are often better equipped to handle the diverse and complex needs of senior high school students.

Table 5. Profile of the senior high school teachers in terms of highest educational attainment

Degree	Frequency	Percent
Master's degree	31	64.58
Baccalaureate	16	33.33
Master's degree with units	1	2.08
Total	48	100

Research-related subjects undertaken

Table 6 presents the profile of the Senior High School teachers in terms of research-related undertaken. It is seen in the table that the majority of the respondents did not teach research-related subjects with a frequency of 40 (83.33%). There were only 6 or 12.5% undertake Practical Research 1 and 2. One or 2.08% handling Research 1 and 1 or 2.1% teaching Research Crash Course. This distribution suggests that most Senior High School teachers have limited involvement in teaching research-related subjects, with the majority of them not engaged in these types of courses at all. This finding may point to the relatively underdeveloped integration of research skills in the Senior High School curriculum or the lack of training and support for teachers to deliver research-oriented content. The fact that most teachers have limited experience teaching research could point to a need for further professional development and support in this area, particularly in equipping teachers with the necessary skills to integrate research-based learning in their instruction.

Table 6. Profile of the senior high school teachers in terms of research-related subjects undertaken

Research-related subjects	Frequency	Percent
None	40	83.33
Research 1	1	2.08
Practical Research 1 & 2	6	12.50
Research Crash Course	1	2.08
Total	48	100

Seminar/Training attended

Table 7 shows the Senior High School teachers' profile in terms of seminars attended. As presented, most of the respondents did not attain any seminars/training related to research with a frequency of 39 (81.25%). On one hand, the seminar "3-day District Training on Technical Writing in Educational Research with Statistical Treatment of Data" got a frequency of 3 (6.25%) as well as the "Technical Writing for Research" obtained a frequency of 3 or 6.25%. Moreover, the seminar "Crash Course on the Statistical Treatment of Data in Research" got a frequency of 2 (4.17%) and 1 or 2.1% for "District-based Research Congress. This pattern suggests limited participation in research-related professional development, which may impact teachers' ability to effectively teach research subjects or conduct research themselves. The high percentage of teachers who have not participated in any research-related seminars highlights a gap in professional development opportunities, particularly in research skills. This lack of training can affect the quality of research education provided to Senior High School students, as teachers may not be fully equipped with the latest research methodologies and statistical tools. As Abinan (2021) points out, a common barrier to attending seminars is the lack of funding for professional development, forcing teachers to either forgo these opportunities or pay out of pocket, which can be financially burdensome.

Table 7. Profile of the Senior high school teachers in terms of seminar/Training attended

Seminar	Frequency	Percent
Crash course on the statistical treatment of data in research	2	4.17
3-day district training on technical writing in educational research with statistical treatment of data	3	6.25
District-based research congress	1	2.08
Technical writing for research	3	6.25
None	39	81.25
Total	48	100

Research development

Table 8 shows the profile of the Senior High School teachers in terms of research exposure. It is seen

that 29 or 60.42% of the respondents were not exposed to research. Six or 12.5% were exposed to an undergraduate thesis, 4 or 8.33% were exposed to action research, 3 or 6.25% were exposed to a Master's thesis and undergraduate thesis, another 3, or 6.25% were exposed to a Master's thesis, undergraduate thesis and action research. Further, only 1 or 2.08% was exposed to institutional research. This distribution shows that a majority of teachers have limited or no exposure to research, and those who have engaged in research activities are primarily involved in thesis or dissertation-level work, often as part of academic requirements rather than ongoing research practice. The high percentage of teachers with no research exposure reflects a significant gap in research engagement among Senior High School teachers. The result may also reflect the more traditional role of teachers in the classroom, where research activities are often secondary to instructional duties. Thus, DepEd highlights the need for more structured and accessible professional development programs, particularly in research, to ensure teachers are equipped with the skills to guide students in research-based education, (DepEd, 2022).

Table 8. Research exposure of the senior high school teachers in terms of research development

Research development	Frequency	Percent
Action research	4	8.33
Undergraduate thesis	6	12.50
None at all	29	60.42
Undergraduate thesis, action research	2	4.17
Institutional research	1	2.08
Master's thesis, undergraduate thesis	3	6.25
Master's thesis, undergraduate thesis, action research	3	6.25
Total	48	100

Research presentation

Table 9 shows the profile of the Senior High School teachers in terms of research presentation. It is seen that the majority of the respondents were not exposed to any research presentation with a frequency of 39 (81.3). Only 8 or 16.7% presented in the local and 1 or 2.1% presented in the National forum. This indicates that most Senior High School

teachers have limited exposure to presenting their research in academic or professional settings, whether at local or national events. A study by Biruk (2013) found that many teachers reported limited involvement in research due to lack of time, skills, and institutional support. This is consistent with findings from Abinan (2021), who noted that the lack of exposure to formal research activities hinders teachers' ability to present at conferences, thus missing opportunities for professional recognition and feedback.

Table 9. Research exposure of the senior high school teachers in terms of Research presentation

Research presentation	Frequency	Percent
None at all	39	81.25
Local	8	16.67
National	1	2.08
Total	48	100

Research publication

Table 10 presents the profile of the Senior High School teachers in terms of research publication. It is seen that the majority of the respondents were not exposed to any research publication with a frequency of 46 (95.83%). There were only 1 or 2.08% published in local and 1 or 2.8% published in National publication. It implies that most of the SHS teachers were not exposed to any research publication. A study by Biruk (2013) found that many teachers in Ethiopia struggled with publishing research, often due to a lack of time, resources, and institutional support. Similarly, Abinan (2021) noted that teachers' heavy teaching loads and limited access to professional development opportunities were key factors hindering publication. The scarcity of publications among the teachers reflects the broader issue of limited research involvement in the Senior High School sector.

Table 10. Research exposure of the senior high school teachers in terms of research publication

Research publication	Frequency	Percent
None at all	46	95.83
Local	1	2.08
National	1	2.08
Total	48	100.00

Research attitude

Usefulness of research to the profession

Table 11 presents the research exposure of the SHS teachers in terms of usefulness to the profession. The highest weighted mean obtained by the respondents is 4.69 under the indicator "Research is useful to the career." with a verbal description of "strongly agree" and the indicator "Research is useful to every professional" got the lowest mean of about 4.4 with the description of "Strongly agree". The rest of the indicators got a verbal description of "strongly agree" Such indicators, "The skills acquired in research will be helpful in the future" and "Research is beneficial because it improves critical thinking" both got a mean of 4.67, "Research should be indispensable in professional training" and "Knowledge in research is as useful as writing" both got a mean of 4.63, "Research is very valuable." and "Research is as useful as writing" both got a mean of 4.6, "Research approaches can be employed in the profession." with a mean of 4.58, "Research is connected to the field study" with a mean of 4.56, and "Research is useful to every professional" with a mean of 4.4. The grand weighted mean of all of the indicators is 4.6 with a verbal description of "Strongly Agree". This implies that SHS teachers claimed that doing research is useful in their profession. The data demonstrates a strong consensus among Senior High School teachers about the usefulness of research to their professional development. Teachers clearly recognize the value of research in improving their careers, enhancing critical thinking skills, and applying research methodologies to practical classroom situations. This attitude reflects an understanding that research is not only beneficial for academic purposes but also directly applicable to solving problems in educational settings and refining teaching practices. It is supported by the Stringer (2008) conceded that educators need to be aware of the usefulness of research in their profession, for it provides practitioners with new knowledge and understanding about how to improve educational practices or resolve significant problems in classrooms and schools.

Table 11. Research attitude of the senior high school teachers concerning usefulness of research to the profession

	Weighted mean	Description
1. Research is useful to the career.	4.69	Strongly Agree
2. Research is connected to the field study	4.56	Strongly Agree
3. Research should be indispensable in professional training	4.63	Strongly Agree
4. Research is useful to every professional	4.4	Strongly Agree
5. Research is very valuable.	4.6	Strongly Agree
6. Research approaches can be employed in the profession.	4.58	Strongly Agree
7. The skills acquired in research will be helpful in the future	4.67	Strongly Agree
8. Knowledge in research is as useful as writing	4.63	Strongly Agree
9. Research is beneficial because it improves critical thinking	4.67	Strongly Agree
10. Research is as useful as writing	4.6	Strongly Agree
Average Weighted Value	4.60	Strongly Agree

Table 12. Research attitude of the senior high school teachers concerning anxiety in research

Anxiety	Weighted mean	Description
1. Research induces nervousness.	3.63	Agree
2. Research is stressful.	3.71	Agree
3. Research developed anxiousness.	3.52	Agree
4. Research is scary.	3.25	Agree
5. Research is a complex task.	3.84	Agree
6. Research is complicated	3.73	Agree
7. Research is difficult.	3.73	Agree
8. The analysis of data builds up insecurity	3.4	Agree
9. Research is time-consuming	3.94	Agree
10. Research requires too much analysis.	3.98	Agree
Average weighted value	3.67	Agree

Table 13. Research attitude of the senior high school teachers concerning to positivity in research

	Weighted mean	Description
1. The teachers are interested in research.	3.81	Agree
2. Research-acquired knowledge is as useful as arithmetic	4.14	Strongly Agree
3. Research is interesting	4.04	Strongly Agree
4. Most faculty benefit from research	4.27	Strongly Agree
5. The teachers are inclined to study the details of the research	4.02	Strongly Agree
6. Sharing research results with other academics is very self-satisfying.	4.29	Strongly Agree
7. The teachers want to build a reputation as academic scholars through research.	4.23	Strongly Agree
8. Academic research has value.	4.5	Strongly Agree
9. The teachers enjoy reading academic research papers	3.96	Agree
10. The intellectual challenge of academic research gives the motivation to work harder.	4.14	Strongly Agree
Average Weighted Value	3.81	Agree

Anxiety in research

Table 12 presents the research exposure of the SHS teachers in terms of anxiety. It is glimpsed that the highest mean obtained by the respondents is 3.98 under the statement "Research requires too much analysis." with a description of "agree" and the lowest mean is 3.25 with a description of "agree", this falls under the statement "Research is scary." On one hand, the rest of the indicators got a verbal description of "agree", such as "Research is time-consuming" with a mean of 3.94, "Research is a

complex task." with a mean of 3.84, "Research is complicated" and "Research is difficult." got a same mean of about 3.73, "Research is stressful." obtained a mean of 3.71, "Research induces nervousness." with a mean of 3.63, "Research developed anxiousness." got a mean of 3.52 and the statement "The analysis of data builds up insecurity" got a mean of 3.4. The grand weighted mean of all of the indicators is 3.67 with a verbal description of "Agree". This implies that SHS teachers felt anxious about doing research. Wei *et al.* (2015) cited by Abinan (2021), said that anxiety

toward research affects one's attitudes or behavior toward research productivity. The teachers' anxiety towards research could be attributed to various factors, including lack of experience, insufficient training in research methods, time constraints due to heavy workloads, and the perception of research as a high-stakes activity requiring significant intellectual and emotional effort. This anxiety may also be exacerbated by the pressure to produce high-quality research outputs.

Positivity in research

Table 13 presents the research exposure of the SHS teachers in terms of positivity. It is glimpsed that the highest mean obtained by the respondents is 4.5 under the statement "Academic research has value." with a description of "strongly agree" and the lowest mean is 3.81 with a description of "agree", this falls under the statement "The teachers are interested in research." On the other hand, the rest of the indicators got a verbal description of "strongly agree", such as "Sharing research results with other academics is very self-satisfying." with a mean of 4.29, "Most faculty benefit from research" with a mean of 4.27, "The teachers want to build a reputation as academic scholars through research." with mean of 4.23, "Research acquired knowledge is as useful as arithmetic" and "The intellectual challenge of academic research gives the motivation to work harder." got a same mean of about 4.14, "Research is interesting." obtained a mean of 4.04, "The teachers are inclined to study the details of the research." with a mean of 4.02, and "The teachers enjoy reading academic research papers." got a mean of 3.96. The grand weighted mean of all of the indicators is 3.81 with a verbal description of "Agree". This implies that SHS teachers have a positive outlook on doing research. This table indicates that Senior High School teachers hold a largely positive view of research. However, the lower interest in research participation suggests that although they acknowledge its value, barriers such as time constraints, heavy workloads, and limited opportunities for research often prevent them from actively engaging in it. This phenomenon has been

highlighted in various studies (Krokfors *et al.*, 2011; Mills, 2011; Biruk, 2013), which emphasize that while teachers appreciate the significance of research, external constraints hinder their involvement.

Difficulty in research

Table 14 presents the research exposure of the SHS teachers in terms of difficulty. It is seen that the highest mean obtained by the respondents is 3.73 under the statement "It takes too much time to integrate legal basis to support research theoretical ground." with a description of "agree" and the lowest mean is 3.33 with a description of "agree", this falls under the statement "The teachers are not good enough in forming appropriate conclusions extracted from the results of the analysis." The rest of the indicators got a verbal description of "agree", such as "The teachers have trouble crafting a statement of the problem." and "The teachers have trouble crafting a statement of the problem." both got a mean of 3.6, "The teachers find it hard to comprehend the interrelationship of variables in the conceptual framework." with mean of 3.54, "The teachers find it difficult to understand the concept of research." with a mean of about 3.5, "Doing the implication based on the results of the data is irritating." obtained a mean of 3.48, "The teachers do not appropriately know the ability to synthesize related literatures and studies." with a mean of 3.38, "It's hard to decipher appropriate statistical tests and tools to measure data." and "The teachers have a problem when it comes to the interpretation of data." both got a mean of 3.35 and the statement "The teachers are not good enough in forming appropriate conclusions extracted from the results of the analysis" got a mean of 3.33. The grand weighted mean of all of the indicators is 3.49 with a verbal description of "Agree". This underscores the common difficulties teachers face in research activities. These include both cognitive and technical challenges, which can make the process of conducting research overwhelming and stressful. It is important to note that research, especially in educational settings, involves multiple complex stages-each of which requires different sets of skills and knowledge. The difficulties highlighted in the

table align with common barriers identified in research literature, such as insufficient research training, lack of statistical knowledge, and challenges with the theoretical foundations of research (Papanastasiou and Zembylas, 2008). The fact that teachers find it challenging to form appropriate conclusions, synthesize related

literature, and identify suitable statistical tests for analysis indicates a gap in their research training. This is consistent with findings from other studies which suggest that teachers may not always have the necessary skills or support to engage in research effectively (Abinan, 2021; Papanastasiou and Zembylas, 2008).

Table 14. Research attitude of the senior high school teachers concerning to difficulty in research

	Weighted mean	Description
1. The teachers have trouble crafting a statement of the problem.	3.6	Agree
2. The teachers find it difficult to understand the concept of research.	3.5	Agree
3. The teachers find it hard to comprehend the interrelationship of variables in the conceptual framework	3.54	Agree
4. The teachers do not appropriately know the ability to synthesize related literature and studies.	3.38	Agree
5. It's hard to decipher appropriate statistical tests and tools to measure data.	3.35	Agree
6. The teachers have a problem when it comes to the interpretation of data.	3.35	Agree
7. Doing the implication based on the results of the data is irritating.	3.48	Agree
8. The teachers are not good enough in forming appropriate conclusions extracted from the results of the analysis	3.33	Agree
9. It takes too much time to integrate a legal basis to support research theoretical ground	3.73	Agree
10. To craft recommendations is always a challenge.	3.6	Agree
Average Weighted Value	3.49	Agree

Table 15. Level of competence of the senior high school teachers in doing research

	Weighted Mean	Description
1. Knowledge on the formulation of a clear statement of the problem	3.85	Moderately Competent
2. Selection, citation, and synthesis of properly related literature	3.83	Moderately Competent
3. Knowledge of quantitative and qualitative research and the kinds of research across fields	3.6	Moderately Competent
4. Usage of sources according to ethical standards	3.98	Moderately Competent
5. Description of qualitative and quantitative research designs, data collection, and analysis procedure	3.88	Moderately Competent
6. Gathering of relevant information with intellectual honesty	4.02	Competent
7. Formation of logical conclusions	4	Competent
8. Illustration and explanation of the conceptual framework	3.98	Moderately Competent
9. Construction of instruments and establishment of validity and reliability	3.83	Moderately Competent
10. Selection of sampling techniques and statistical tools	4	Competent
Average Weighted Value	3.90	Moderately Competent

Level of competence in doing research

Table 15 presents the level of competence of the Senior High School teachers in doing research. It is seen that the highest mean obtained by the respondents is 4.02 under the indicator "Gathering of relevant information with intellectual honesty." with a description of "competent" and the lowest mean garnered is 3.6 with a description of "agree", this falls under the statement "Knowledge on quantitative and qualitative research and the kinds of research across fields." The indicators

"Formation of logical conclusions" and "Selection of sampling techniques and statistical tools" got a mean of 4.0 with a description of "Competent". Moreover, indicators "Usage of sources according to ethical standards" and "Illustration and explanation of the conceptual framework" got the same mean of about 3.98 with a description of "Moderately Competent. On one hand, indicator "Description of qualitative and quantitative research designs, data collection, and analysis procedure" has a mean of 3.88 and a description of

"Moderately Competent". The indicator "Knowledge on the formulation of a clear statement of the problem" has a mean of 3.85. And the statements "Selection, citation, and synthesis of properly related literature" and "Construction of instruments and establishment of validity and reliability" got the same mean of 3.83 with a verbal description of "Moderately Competent". The grand weighted mean of all the indicators is 3.90 with a verbal description of "Moderately Competent". The findings suggest that SHS teachers possess a foundational understanding of research but may lack advanced expertise or confidence in certain areas of research practice. Abinan (2021), found out that many Senior High School teachers possess only moderate competence in research, often due to limited exposure to advanced research training or a lack of continuous professional development opportunities. Teachers may have a basic understanding of research processes but may not fully engage in all stages of research with expertise, particularly in the areas that require specialized knowledge, such as quantitative analysis or methodological rigor.

Level of competence Vs Profile

Table 16 shows the significant relationship between the level of competence of the Senior High School teachers in research in terms of "Profile". It can be seen that *p*-values are greater than 0.05 level of significance. Thus, failure on the rejection of the null hypothesis. Hence, there is no significant relationship between the level of competence of the Senior High School teachers in research in terms of profile. This means that there is no statistically significant association between profile and the level of competence in research among SHS teachers. The lack of significant relationships could imply that research competence among SHS teachers is not strongly influenced by common demographic or professional variables. Hazelkorn (2004, 2008) emphasized that teachers' and academics' research competence and productivity are strongly influenced by institutional support, including access to mentoring, research resources, infrastructure, and opportunities for professional development. Moreover, the limited impact of formal education and research-related training on research competence suggests that additional interventions are needed to help teachers translate theoretical knowledge into practical research skills.

Table 16. Significant relationship between the level of competence of the senior high school teachers in research in terms of profile

Variables	Statistic	df	p-value	Interpretation
Age * level of competence	1.17	3	0.327	Not significant
Gender * level of competence	2.24	2	0.267	Not significant
Specialization * level of competence	0.20	9	0.189	Not significant
Length of Service * level of competence	2.98	3	0.059	Not significant
Highest educational attainment * level of competence	1.43	2	0.290	Not significant
Research-related subjects undergone * level of competence	0.870	3	0.448	Not significant
Seminars/Training along Research attended* level of competence	0.786	4	0.476	Not significant

Table 17. Significant relationship between the level of competence of the senior high school teachers in research in terms of research exposure

Variables	Statistic	df	p-value	Interpretation
Research development * level of competence	1.17	3	0.327	Not significant
Research presentation * level of competence	2.24	2	0.267	Not significant
Research publication * level of competence	0.20	9	0.189	Not significant

Level of competence Vs Research exposure

Table 17 presents the significant relationship between the level of competence of the Senior High School teachers in research in terms of "Research Exposure". It can be gleaned that *p*-values are greater than 0.05 level

of significance. Thus, failure on the rejection of the null hypothesis. Hence, there is no significant relationship between the level of competence of the Senior High School teachers in research in terms of "Research Exposure". This means that there is no statistically

significant association between research exposure and level of competence in research among SHS teachers. Thus, teachers' exposure has nothing to do with their competence in doing research. The findings suggest that simply being exposed to research activities such as participating in research development, presenting at conferences, or publishing papers does not necessarily translate to higher competence in research. Hazekorn (2004, 2008) emphasized that teachers' and academics'

research competence and productivity are strongly influenced by institutional support, including access to mentoring, research resources, infrastructure, and opportunities for professional development. Moreover, the limited impact of formal education and research-related training on research competence suggests that additional interventions are needed to help teachers translate theoretical knowledge into practical research skills.

Table 18. Significant relationship between the level of competence of the senior high school teachers in their attitude toward research

Variables	Statistic	df	p-value	Interpretation
Usefulness to profession*level of competence				
Anxiety * level of competence	2.73	9	0.023	Significant
Positivity * level of competence	4.73	9	0.001	Significant
Difficulty * level of competence	5.89	9	<0.001	Significant

Level of competence Vs Research attitude

Table 18 shows the significant relationship between the level of competence of the Senior High School teachers in research in terms of "attitude towards research". It can be glimpsed that p-values are lower than 0.05 level of significance. Thus, accept the rejection of the null hypothesis. Hence, there is a significant relationship between the level of competence of the Senior High School teachers in research terms of "attitude towards research". This means that SHS teachers' attitude towards research was affected by anxiety, positivity, and difficulty. The significant relationships between attitude and research competence highlight the importance of psychological factors—such as anxiety, positivity, and perceptions of difficulty—in shaping teachers' abilities to conduct research. Teachers who experience high levels of anxiety may find it harder to navigate the research process effectively, potentially hindering their research output and competence. Conversely, teachers with a positive outlook on research are likely to engage more proactively with research tasks, leading to greater competence. The significant relationships between attitude and research competence highlight the importance of psychological factors, such as anxiety, positivity, and perceived difficulty, in shaping teachers' engagement in research. Papanastasiou and Zembylas (2008) reported that

research anxiety can negatively influence individuals' experiences and confidence in conducting research-related tasks. Similarly, Ajzen (2001) emphasized that attitudes and perceived behavioral control influence individuals' intentions and engagement in a particular behavior. These findings suggest that reducing research anxiety and fostering positive attitudes toward research may enhance teachers' research competence and encourage greater participation in research activities.

CONCLUSION

This study examined the research competence, research exposure, and attitudes toward research among Senior High School teachers in Katipunan, Zamboanga del Norte. The findings revealed that although the teachers generally recognized the value and usefulness of research and demonstrated positive attitudes toward it, their overall research competence was moderately competent, accompanied by limited research exposure in terms of research development, presentation, and publication. Teachers also reported experiencing research anxiety and perceived research as moderately difficult.

The study further found that teachers' demographic characteristics and research exposure were not significantly associated with research

competence. In contrast, research attitudes—particularly anxiety, positivity, and perceived difficulty—showed significant relationships with research competence, highlighting the importance of affective factors in teachers' research engagement. Qualitative findings likewise identified limited research knowledge, inadequate training opportunities, insufficient institutional support and resources, heavy workloads, limited time, and negative perceptions of research as major barriers to conducting research.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

1. Strengthen research capability-building programs. Higher education institutions, particularly Jose Rizal Memorial State University (JRMSU), in collaboration with the Department of Education (DepEd), should implement sustained research capability-building programs focusing on research design, methodology, statistical analysis, academic writing, research ethics, and publication. These programs should include mentoring and hands-on workshops to enhance teachers' research competence and confidence.
2. Expand opportunities for research engagement. Schools and educational institutions should provide structured opportunities for teachers to participate in research development, conference presentations, and scholarly publication through collaborative research projects, research mentoring, and institutional research forums.
3. Enhance institutional support for research. School administrators and DepEd should strengthen institutional support by allocating adequate research funding, providing access to research resources and statistical software, establishing research mentoring systems, and allowing dedicated time for research activities within teachers' workloads.
4. Address research anxiety and promote positive research attitudes. Professional development initiatives should incorporate strategies that

reduce research anxiety and improve teachers' confidence through continuous coaching, peer support, and practical research experiences, thereby fostering a more positive research culture within schools.

5. Conduct further studies. Future research should include larger and more geographically diverse samples across different educational settings to improve the generalizability of the findings. Additional studies may also examine the effectiveness of research capability-building interventions and explore other organizational and psychological factors influencing teachers' research competence and productivity.

IMPLICATIONS

Biosciences and scientific literacy

The findings highlight the importance of strengthening teachers' research competence to enhance scientific literacy in Senior High School education. Although teachers recognized the value of research, their moderate competence and limited research exposure may constrain their ability to facilitate scientific inquiry and evidence-based learning. Strengthening competencies in research methodology, data analysis, literature synthesis, and scientific communication can better prepare teachers to guide learners in addressing bioscience- and sustainability-related issues through systematic inquiry.

Scientific literacy and evidence-based decision-making

The significant relationships between research competence and research attitudes indicate that developing scientific literacy requires attention to both technical and affective dimensions of research. Enhancing teachers' confidence while reducing research anxiety may improve their engagement in evidence-based practice. Strengthened research competence can enable teachers to model critical evaluation of evidence, promote informed decision-making, and help learners distinguish credible scientific information from misinformation in an increasingly information-rich environment.

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