INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

SCIENTIFIC COMPETENCE AND ITS INFLUENCE ON REMEDIAL DEVELOPMENT PROGRAM

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ABSTRACT

This descriptive-correlational study examined the factors associated with scientific competence and their influence on the remedial development program among junior high school teachers in Dingle, Iloilo, during the 2022–2023 academic year. The participants consisted of twenty-five science teachers from selected junior high schools. The study investigated whether educational attainment significantly influenced scientific competence. Educational attainment was categorized into four groups: baccalaureate degree, baccalaureate degree with master's units, master's degree, and master's degree with doctoral units. The findings revealed that educational attainment did not significantly influence scientific competence. Furthermore, teaching experience and the distance between teachers' residences and their respective schools were examined as potential contributing factors. The results indicated no significant differences in scientific competence or in the quality of the remedial development program when analyzed according to these variables. Overall, scientific competence was not found to have a significant effect on the implementation of the remedial development program.

Keywords: *Scientific Competence, Remedial Development Program*

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

INTRODUCTION

Education is generally considered a socially organized and deliberate process by which societies pass knowledge, values, and experience between generations. UNESCO (2025) highlights that formal education provided in structured institutions is the main mechanism that maintains this continuity. This view of education emphasizes not merely the transfer of information but rather a dynamic process of knowledge exchange that changes with society's needs and expectations. Present-day classroom approaches, in turn, need to be adjusted to this perspective and promote meaningful interaction, flexibility, and the development of lifelong learning abilities (Hariri et al., 2024).

The quality of teachers is a central part of the success of any educational system. Studies have demonstrated that educational reform will not be effective in the absence of qualified and well-trained teachers. Research emphasizes that the lack of teacher supply and insufficient professional training have a direct impact on educational outcomes, especially in the Philippines (Rivera et al., 2025). Teachers are identified as the most important predictors of student achievement and the overall quality of education (Akmal et al., 2025). Moreover, according to Gümüş et al. (2022), teacher competence and effectiveness are key to the realization of national educational priorities.

In addition to providing subject matter, teachers are critical to the intellectual, emotional, and social growth of learners. Successful teachers guide learners through the learning process, tailor instructional methods to the needs of individual students, and develop critical and independent thinking. It has been demonstrated that the quality of teaching practices, and not just content delivery, is an important element of student learning outcomes

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

(Catalán Molina et al., 2022). With this in mind, educators have the responsibility of molding learners into responsible, competent, and informed members of society, in line with the overall objectives of education globally and in the Philippines (Mangaliman, 2025).

Teacher competence is a diverse set of qualities that includes technical knowledge, critical thinking, problem-solving skills, communication skills, teamwork, and ethical practice (Kuloğlu et al., 2022). The manner in which these competencies are implemented in classrooms, and their implications for improved learner performance, is equally important (Geletu, 2022). With ever-changing educational requirements, researchers note the importance of continuous study to remain aware of existing issues and to develop responsive plans to improve the quality of teaching practices (Ajani, 2024). Strengthening education, in turn, demands both the recruitment of more educators and investment in long-term professional development and motivation to ensure high-quality instruction (Edu, 2025).

In the local context, observations conducted at Dingle National High School indicate that certain learners fail to perform critical science-related tasks, which negatively affects their academic performance in this subject area. As scientific competence has been identified as the basis of learners' academic success and future opportunities, it is necessary to investigate the impact of instructional practices and teacher competencies on the development of essential scientific skills.

This study, therefore, aims to examine learners' scientific competence as a basis for developing remedial programs grounded in identified gaps to foster improved learning outcomes.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

MATERIALS AND METHODS

Research Methodology

This chapter presented the methodological framework employed in the study. It provided a comprehensive discussion of the research design, the participant sample, the sampling procedure, the research instruments, the data collection plan, and the statistical techniques used to analyze the information obtained

Research Method

The research method used in this study was descriptive-qualitative using develop questionnaires provided by the researcher with each participant. Questionnaires were provided, allowing participants to openly share detailed accounts of their experiences. To facilitate rich, narrative data necessary for phenomenological analysis, the researcher and the respondents were engaged in one setting to elicit thoughtful responses. The researcher provided few questions about the experiences of student-at-risk of dropping out as bases for program intervention**.** The aim was to get their views and experiences through their response to the questions.

Research Design

The research design adopted was a descriptive-correlational design, which, according to Fraenkel and Wallen (2012), enabled a careful examination of the current state of the variables of interest. This design involved gathering information to test hypotheses and address questions concerning the present condition of the participants under investigation.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

Respondents of the Study

The purposive sampling method was applied to all teachers in Dingle, Iloilo, who taught Science to junior high school students in Grades 7 to 10. The selection included 25 teachers from five high schools in the municipality, who were then administered the questionnaire.

A non-random sampling strategy was deliberately chosen to ensure that the participants aligned with the specific factors and characteristics identified by the study.

Table 1.

Distribution of the Respondents

School	Junior High School Teachers (N)
Dingle National High School	9
Rufino G. Palabrica Sr. National High School	9
Calicuang National High School	3
Tabugon National High School	2
Nazuni Summit Comprehensive National High School	2
Total	25

Research Instrument

The instrument utilized a five-point Likert scale to assess factors related to scientific competence and their effects on the indicators of the remedial development program. The questionnaire was researcher-constructed and completed directly by the participants.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

Part 1 collected the demographic profiles of the science teachers, while Part 2 contained statements addressing the factors of interest. A total of 24 items measured the participants' self-assessment of these factors.

Validity of the Research Instrument

The thesis adviser reviewed the questionnaire before its administration, and subject-matter experts, along with an English language specialist, conducted face and content validation. This procedure ensured the appropriateness, relevance, and clarity of language, as well as compliance with the eight-point evaluation criteria of good scales. The final instrument incorporated feedback from the validation panel, after which a reliability test was conducted. Initially, the instrument contained twenty items; this number was later increased by an additional twenty items based on the recommendations of the experts.

Reliability of the Research Instrument

A pilot test was conducted on thirty science teachers from a nearby municipality before the actual data collection. These respondents were not included in the sample of the main study. The Cronbach's alpha was computed to determine the reliability coefficient, which was found to be 0.867. According to Fraenkel and Wallen (2012), a coefficient of 0.70 or higher indicates acceptable reliability, thereby confirming the reliability of the instrument.

Data Gathering Procedures

Before conducting the study, the researcher obtained permission from the District Supervisor and the principals of the five secondary schools in Dingle. With the assistance of the district office, the researcher visited each school and selected respondents personally from

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

the official lists of science teachers, administering the questionnaires to the chosen participants. The responses collected were then tabulated according to the number of teachers in each school.

Data Analysis

Once the completed questionnaires were retrieved from the selected respondents, the Statistical Package for the Social Sciences (SPSS) software was used to encode the responses.

To determine the level of scientific competence in the Remedial Development Program, the researcher applied the following scale with its corresponding descriptions.

Scale	Description
4.21-5.00	Very highly Competent
3.41-4.20	Highly Competent
2.61-3.40	Moderately Competent
1.81-2.60	Less Competent
1.00-1.80	Not Competent

Statistical Tool

An inferential and descriptive analysis was performed. The descriptive statistics included mean, frequency counts, and percentages. It also had inferential tests which entailed Mann Whitney U Test, Kruskal Wallis H Test, Spearman rho, Chi square and Cronbach Alpha at level 0.05.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

Mean. Mean indicates the total weighted scores of the items of the instrument divided by the number of items. It is used to measure average scores that indicate aspects that affect scientific competence

Percentage. The percentages were determined to categorize the respondents according to variables and fill in the distribution tables and demographics.

Frequency Count. The number of respondents explained the profile of respondents in different personal traits.

They were applied to distribute the sample of the Science teachers in the Junior High School of the Municipality of Dingle, Iloilo, and the distribution was based on the variables and on responses of the science teachers on the items concerning factors on scientific competence on the research instrument.

Mann-Whitney U-Test. This test was used to compare two independent samples, which is non-parametric, and was applied to different variables, including the educational attainment, teaching tenure, and the distance of school to home.

This was utilized to come up with the substantial differences in the degree of scientific competence in terms of classification based on Educational Attainment, Length of service in teaching science and Distance of Home to school.

Kruskal- Wallis Test. This test was used to compare two independent samples, which is non-parametric and was applied to different variables, including the educational attainment, teaching tenure, and the distance of school to home.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

This was employed to identify the notable variations in the level of competence of science teachers in terms of scientific competence based on their educational level, service in science teaching, and the distance between school and home.

Spearman rho. Such a measure evaluated the correlation and association between two ordinal variables, namely, between factors affecting scientific competence and the outcomes of the remedial development program.

This was employed in this research to establish the influence of Factors influencing Scientific Competence and its Influence to Remedial Development program.

Chi-square. Independence between categorical variables in the contingency tables was evaluated in this test, especially the role of scientific competence in the effectiveness of remedial development programs.

This is mostly applied to analyze the independence of two categorical variables in determining the test statistic. The impact on the scientific competence of the Remedial Development Program was examined through this study.

Cronbach Alpha. This reliability coefficient measures internal consistency, which is a comparison of shared variance between items and the total variance; hence, an instrument's reliability of factors related to scientific competence and the influence of the remedial development program

This study was used to assess the reliability of the study Factors on Scientific Competence and its Influence to Remedial Development Program.

All levels of significance in the inferential data analyses were set at

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

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RESULTS AND DISCUSSIONS

The actual aim of the research was to establish The Factors on Scientific Competence and its Influence on the Remedial Development Program to the Junior High School Science teachers in the Municipality of Dingle during the School Year 2022-2023.

In the study, a descriptive-correlational research design was employed. The 25 purposely selected Junior High School Science teachers were the respondents of the study.

Teachers were classified according to Educational Qualification, Experience in Teaching Science, and Distance of Home from School.

The needed data for this research were obtained through an instrument made by the researcher. There were two parts in the questionnaire. Part I evoked the personal profile of the Science teachers and Part II represented the statements about the scientific competence of Science teachers and their impact to the development program in remedies. The researcher-made instrument consisted of 40-item statements on how will Science teachers assessed themselves, describing their personal views on scientific competence and its influence to remedial development program. The instrument in question was face and content validated and a test of reliability carried out.

Mean, percentage, and count of frequency are the statistical tools that the researcher used to analyze the descriptive data of the research, whereas the statistical tests that the researcher used to analyze the inferential data were Mann- Whitney U Test, Kruskal-Wallis test, Spearman rho, Chi-square, and Cronbach Alpha.

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INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

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CONCLUSION

Findings in the current research are shown as follows:

(1) Teachers perceive learners as being part of the classroom since they encourage the learners to perform optimally.

(2) Educators show interest in both the social and academic well-being of learners.

(3) Teachers can provide information in an easily comprehensible manner.

(4.5) The teachers also impart scientific knowledge, which helps the learners to develop a higher cognition of the subject matter; hence, interest and motivation are created.

(7) Teachers provide pure information about objectives, content, and means of assessment; they listen to and answer clearly the questions that are raised in the classroom, and they encourage learners with a good attitude towards them every day.

A few of the components included in scientific competence evaluated among educators with a Baccalaureate Degree were as follows:

(7.5) Leaving the learner to organize and distribute parts of assignments; informing learners about the competences to be achieved; giving scientific information that eases understanding; offering content with a clear logical structure that puts important points into the limelight; making learners interested and motivated; efficiently applying ICT; implementing the set curriculum with some flexibility to make classes dynamic; structuring the content and establishing the matter in a manner that would advance professional

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INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

competencies; testing the learner by assessing criteria established in the curriculum; supporting the learners through the day, with a positive attitude; presenting the information in Scientific competence under Baccalaureate Degree with Master units entailed:

(1) Encouraging the learners to do their best.

(2) Attending to the academic and social well-being of learners.

(3) The provision of scientific knowledge that contributes to knowledge.

(4) Providing transparent data regarding the goals, material, and examinations.

(5) Educating learners on anticipated competencies.

(6) Respond to and comprehensively answer classroom questions.

(7) Planning activities that will encourage active learner involvement.

(8) Helping the learners with a daily positive attitude.

(9) Making information understandable.

Scientific competence tested at Master's Degree level ranked the following:

1. Promoting the interest and motivation of learners.

2. Encouraging the learners to do their best.

3. Giving learners the ability to sort out and share assignments.

4. Organizing the information logically, emphasizing the points.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

5. Promoting learner-learner and learner teacher interaction.

6. Putting information into a coherent way.

7. Taking care of the academic and social wellbeing of learners.

Scientific competence assessed at the Master Degree including Doctoral Units identified:

(1) Encouragement of the learners to perform optimally.

(2) Aid in the easy presentation of information.

(5.5) Giving purpose, content, and assessment; giving scientific information to enhance understanding; fostering interest and motivation in learners; responding to and answering questions in a clear way; being supportive of the learner; and attending to their academic and social needs.

The factors that affected the scientific competence of teachers with low teaching experience included:

(1) Cultivating motivation among learners.

(2) Providing scientific knowledge that enhances knowledge.

(4.0) Providing clear objectives, content, and assessment information; encouraging learners; describing information in an understandable way.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

(6.5) Implementation of evaluation standards set within the curriculum; attending to both the academic and social welfare of the learners.

Long-term teaching experience. The scientific competence of teachers included:

(1) encouraging the learners to perform optimally.

Promoting the interest and motivation.

(4) Understandable presentation of information.

(5) Listening and answering questions accordingly.

(7.5) Educating learners about future competencies; offering profound scientific understanding; delivering information in a logical way, and pointing out the most important points.

Scientific competence of the teachers living in the surroundings of the school:

(1) Encouraging the learners to do their best.

(2) Attending to the academic and social well-being of the learners.

(3.5) Providing rich scientific understanding; reporting information in a clear way.

(5) Promoting interest and motivation.

(6.5) Dispatching clear objectives, material, and evaluation information; encouraging learners in a positive manner.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

Scientific competence among teachers who live a long distance from the school implies:

(1.0) Encouraging the learners to give their best.

(3.5) Fostering interest and motivation; listening to and answering questions clearly; making the information comprehensible; taking care of the well-being of learners.

(8.0) Communicating explicit goals, content, assessment procedures; making the learners aware of intended competencies; offering profound scientific knowledge; presenting the information in a logical manner, emphasizing important details; positively supporting the learners.

Scientific competence differences that were established based on the teaching experience and residential proximity were no real differences (Mann Whitney U = 48.00, z = -1.589, p = 0.112). The insignificant outcome ($p > 0.05$) shows that the teaching experience does not significantly affect scientific competence. In turn, regardless of experience or residential distance, teachers have equal opportunities to gain competence.

In terms of education level, the difference in scientific competence was not significant; Kruskal Wallis chi -square provided H = 0.185 with p = 0.980. The mean rank was: Baccalaureate Degree 12.25; Baccalaureate + Master 13.43; Master 13.10, Master + Doctoral 11.75.

In general, scientific competence of teachers in science was highly complemented with a mean of 4.46. Highly implemented competence was also reported in a subgroup of

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

qualification teachers with Baccalaureate, Baccalaureate + Master, Master, and Master + Doctoral degrees (mean = 4.17). Therefore, the competence was not influenced by educational qualification.

The competence was very high in teachers with short teaching experience (M = 4.34), and in teachers with extensive teaching experience (M = 3.95); the combined mean of competence was 4.17, which means that tenure did not significantly affect the competence.

Test of residential distance showed very high competence of teachers who settled near the school (M = 4.23), whereas high competence was evident in teachers settled far (M = 3.81); the overall mean was also 4.17. Therefore, residential distance did not have a significant impact on scientific competence, which is the knowledge, skills, and ability of teachers to effectively communicate scientific ideas.

Continued differences were not significant in the amount of remedial development program between the levels that were related to the experience of the teachers and the residential proximity, implying that teaching experience is not a predictor of the level of remedial programs. Likewise, the distance between teacher residence and school has not been found to be an important variable in determining the level of remedial development program.

There was no significant difference in the level of remedial development programs as compared to the level of education (KruskalWallis H = 0.210, p > 0.05). In turn, the level of the remedial program was not significantly determined by the educational qualification.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
Available online at https://www.instabrightgazette.com

Scientific competence effect was evaluated on the remedial development program through χ 2 = 350.00 (340df, p 0.343); the non-significant value shows that it has no effect.

Generally, the data demonstrate that the variables of scientific competence and the role played by it in remedial development programs among the junior high school teachers do not depend significantly on the quality of education, years of professional experience and distance to the home.

Constant supervising and evaluation of science teacher competence are very important elements that can be applied to assure the skills and learning competencies required in teaching of sciences are learnt and mastered.

INSTABRIGHT e-GAZETTE
ISSN: 2704-3010
Volume VII, Issue III
February 2026
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Volume VII, Issue III
February 2026
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Volume VII, Issue III
February 2026
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