
Research Article

Inquiry-Based Learning (IBL) For The Development Of Critical Thinking Skills of Senior High School Students

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ABSTRACT

The need for high-order thinking competency in education 21st century promotes the implementation of inquiry-based learning (IBL) to optimally strengthen critical-thinking ability on senior high school students. This study explored student and teacher respondent profiles, levels of exposure to IBL, students' critical thinking skills level while addressing the perceptual gaps between teachers and students. It further explored the association between critical thinking development and exposure to IBL while providing a proposed framework for instructional improvement. While it becomes widely adopted by institutions, empirical evidence of perception differences between teaching staff and students remains scarce and not proven if exposure effect during this senior high school with mathematics focus could evolve to cognitive skills development. Broader perspective of instructional exposure, resource accessibility and pedagogical facilitation that impacts two-level learner outcomes. The results suggest that there is a notable difference in IBL exposure and critical thinking skills between students and teachers, although decision-making and problem-solving are recognized as leading cognitive skills. A very strong positive correlation was found between IBL exposure and critical thinking development, suggesting that experiential and inquiry-driven pedagogy is valuable for cognition. Structured inquiry environments are identified to greatly enhance students' analytical and evaluative thinking capacities, the study concluded. As a result, the researcher proposed strengthening teacher facilitation strategies, extending resource access and availability to include students' autonomy in learning activities as well as implementing inquiry-based instructional frameworks through policy integration. More broadly, future research could substantiate these findings across various academic contexts and learner demographics to help build evidence-informed educational reforms.

Keywords: *Analytical and evaluative thinking, critical thinking development, critical thinking skills, student autonomy*

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Introduction

Critical thinking has become an increasingly important skill for students, particularly in secondary education, to develop in today's fast-paced and information-saturated society. From critical thinking, learners can move to analyzing information with objectivity, solving problems effectively and making reasoned judgments — all essential competencies which contribute not only to scholarly success but active citizenship and lifelong learning. On the other hand, traditional learning (TL), is a strategy that has been created and focused on. Usually information is given by the teacher or from material like textbooks and lectures (Khalaf, 2018). Using the Traditional Learning strategy, monitoring and following the progress of student achievement is an important part through education and curriculum. Traditional Learning emphasizes students' responses to questions on content knowledge, assessed by standardized testing and dozens of assessments, and shows mainly a deficit for making stronger, deeper and personal associations with scientific material (Khalaf 2018). Conventional ways of instruction, built mostly on the approach of memorizing and passively assimilating information, have been shown to be unsuitable for developing these higher-order cognitive abilities. Critical Thinking skills have become central to 21st-century learning in a changing academic environment. According to Gallup, the 21st century critical skills required of students are analysis, evaluation and synthesis which is highly useful during their studies in school as well as in real-world success.

The context of Inquiry-Based Learning (IBL) has been in the limelight as an approach to teaching and learning that invites learners into the process. Further, Inquiry-Based Learning is grounded in constructivist theory in which learners formulate questions, explore issues and create knowledge through exploration and reflection. This student-centered approach promotes independence, curiosity, and understanding—and those are fertile conditions for critical thinking to grow. It is at the senior high school level, when these foundations for thinking skills are being built

and independence with his/her academic work is permitted to flourish, that the incorporation of inquiry-based learning can be transformative to a student. Its implementation faces challenges in needless curricula, teacher preparedness, and institutional support. If we are to use Inquiry-Based Learning as part of our educational policy and practice, it is vital that we understand the effect that Inquiry-Based Learning has on critical thinking in this context. This is where Inquiry- Based Learning (IBL) can really help. Because the knowledge gained by students engaged in inquiry-based activities is more descriptive and applicable, students that utilize these activities have better analytical and problem-solving skills when needed in real life with greater motivation and confidence (Hurstxaplikas et al. However, despite these potential benefits, the implementation of Inquiry-Based Learning in senior high classrooms is still minimal across many educational systems owing to syllabus requirements, a lack of teaching training or resources.

The aim of this study is to investigate the impact of Inquiry-Based Learning on critical thinking skills among senior high school students in Zone 2, Schools Division of Zambales. It seeks to unpack effective pedagogical practices in the classroom using empirical evidence, all while making an action plan with Inquiry-based Learning strategies that encourages learners to be reflective, analytical, and independent thinkers.

Materials and Methods

The descriptive method of research was used in this study. It is referential in a form that describes the characteristics of students-respondents, the extent of student exposure to inquiry-based learning strategies among activity frequency, level of teacher facilitation and access to resources as perceived by students-respondents. This is the current level of high school students' critical thinking skills, in reasoning ability, decision-making, problem solving, judgment and creativity.

Through systematic observation and description, descriptive research provided a building block to the understanding,

identification and definition of phenomena (Moore, 2022). Thus, it gives information about the characteristics, frequencies, and correlations connected to the main topic of research through qualitative and quantitative methods (Ayanyemi, 2020). This method was referred by Solanki (2022), as imperative in discovering existing data within populations and describing behaviours or phenomena, concentrating on the basic questions of what, who, how, when and where.

In addition, the descriptive research method is appropriate for examining this study because it provides a systematic and detailed examination of the current state of these phenomena. As this connecting themed will find the effect of Inquiry Based Learning in critical thinking ability of senior high school students with a subgroup Zone 2, Schools Division Zambales. The descriptive method of research is the most suitable type of this study considering that during the school year 2025-2026, data will be collected, classified, summarized and presented in percentages and averages.

Respondents and Location

The research respondents were the Senior High School Students of Zone 2, Schools Division of Zambales.

The setting of the study was conducted at Public Senior High Schools of Zone 2, Schools Division of Zambales under three (3) Districts mentioned as: Palauig District, Iba District and Botolan District. Rofulo Landa National High School - Brgy, Rile. Palauig District Salaza, Palauig and Locloc National High School in Brgy. Locloc, Palauig. Zambales National High School, Iba; Jesus F. Magsaysay High School, Iba; Amungan National High School, Iba are part of the group which is called as Iba District. Botolan District: Botolan National High School, Brgy. Batonlapoc.

The Instrument

The main research instrument used in this study was the researcher-made questionnaires, 4-point Likert scale survey to gather the needed data. A questionnaire is a flexible research tool for gathering information consistently from different sources or subjects,

providing insight into subjects from the individuals offering responses (Chipeta, 2020; Svikhanna, 2023). This permitted gathering quantitative, qualitative or mixed data to provide researchers a comprehensive understanding of research subjects and inform decisions (Lindemann, 2023)

The questionnaire comprises three parts. Part I covers the profile of the respondents students according to their sex, age, grade level, strand, monthly family income and in what subject area they are interested; teacher respondents in terms of sex, age and the highest educational attainment (HEA) also according to years in service that is how long as a teacher already until now and teaching position. Part II: Student exposure to the inquiry-based approaches in terms of frequency of activity, teacher mediation and availability of resources. Part III describes the extent to which students possess critical thinking skills, including reasoning and judgment ability, decision-making ability, problem-solving abilities, and creativity.

Face validity and reliability test was provided for the researcher-made questionnaire. For face validity, the researcher will float out to seek suggestions and corrections from panel members who are very well known as an expert in this field followed at last by a further revision of content before floating it out towards the respondent.

Data Collection

A formal request letter asking the permission of the school principal for the conduction of the study was getting done by us researchers. They provided a questionnaire checklist to the students which is respondents of to the study. The researchers wrote a letter of request addressed to the students for the distribution of the questionnaire checklist.

The main tool which is a questionnaire checklist was handed out by the researchers themselves to collect data for the problem. For the Grade 11 and Grade 12 senior high school students of the 3 districts; Palauig, Iba, and Botolan of Zone 2 Schools Division of Zambales, researchers personally handed out a Questionnaire Checklist. Once the questionnaire has been obtained mining of data was done and calculation was performed. The

researcher's questionnaire checklist was additionally complemented by observation or interview to confirm the clarity and precision of non-reactant answers. For distribution of the questionnaire, the researcher will work in collaboration with teachers. She will request their help and also assistance with administering the printed copies of the questionnaire.

The researcher will organize and preserves scanned copies of the responses after administering the questionnaire as well as collecting hard buttons from their target respondents. The statistician will then process the data file sent by the researcher in Excel format. Statistical analysis will be conducted with the advice and assistance of a statistician and research advisor.

Data Analysis

The statistical treatment of this research study will utilize descriptive statistical tools such as frequency, percentage, weighted mean, and Likert scale. The inferential statistics will be ANOVA and Pearson r. All the data obtained in the instrument will be tallied, tabulated, analysed, and interpreted accordingly. The following are the explanations of the utility and/or uses of the above-mentioned statistical tools.

- 1. Frequency** – This will be employed to present a comprehensive overview of the distribution of responses on the personal-related variables of the respondents.
- 2. Percentage** – It is the ratio of any number to the whole. It will be used to determine the proportions of the respondents that fall under the personal or demographic profile variables.
- 3. Weighted Mean** – It is the sum of the observations divided by the number of observations. Mean describes the central location of the data, particularly the statement of the problem (SOP) #2 and (SOP) #3.
- 4. Likert scale** for the interpretation of the results of the perceptions.

The scale is a four-point scale that will be used to allow the individual to express their perception of a particular statement.

5. Analysis of Variance – To test the significance of the differences in the variables. In this study, ANOVA was used to test the hypotheses regarding the difference. It will be computed using the software SPSS version 20.

6. Pearson r – This will be computed to determine the correlation and or relationship between two quantitative, continuous variables. Pearson's correlation coefficient (r) is a measure of the strength of the association between the two variables.

Result and Discussion

Profile of Senior High School Student-Respondents

Sex

As for the demographic profile of senior high school student-respondents, one hundred forty (140) respondents comprise fifty (50) or 35.70% male and ninety (90) or 64.30% female respondents.

It is clear from the current study that female senior high school students were more willing to participate in survey studies than males were.

Relying primarily on females suggests there are implications about a gendered stance about voluntary academia involvement, especially concerning survey-based activities. In real school context, female senior high school students tend to be more responsive than their male counterparts in satisfying administrative requests; more compliant in academic-related tasks and have a higher engagement in reflective ability, such as questionnaires and feedback forms. This behaviour could be associated with the socialization that fosters conscientiousness, communicative openness and relational engagement among female learners. One commonly mentioned difference among teachers is that girls will be more likely to fill in forms on time, follow instructions correctly, and consider participation in research as part of their academic responsibilities. On the other hand, male students are just as capable of taking initiative in non-graded academic contexts, yet they might engage less frequently with spontaneous non-graded activities because of differences in motivation orientation, social norms among peers, or relevance perception. Thus this

finding is not just indicative of some numerical asymmetry but potentially reveals deeper attitudinal and behavioural underpinnings that dictate participation in the contexts of educational research. Understanding the intersecting socio-demographic characteristics that influence response behaviour and shape survey engagement is essential to develop more inclusive data collection strategies that reach out to underrepresented groups and minimize response bias.

Empirical studies of gendered engagement recently confirm this pattern. According to a study by Datu, Bernardo, and King (2022), female adolescents were more academically industrious and cooperative in their engagement behaviours compared to male adolescents, which led them to participate in school-based activities with greater vigor. Likewise, Alibudbud (2023) found that female students showed more help-seeking behaviour and responsiveness in formalized academic contexts, corroborating the inclination to become active participants in organizational projects. In a separate study, Teo, Fan and Du (2024) found that differences in alignment between student self-regulation and perceived academic responsibility on the part of the learner were associated with gender-based differences in student engagement, with female students participating more regularly across evaluative and feedback processes. These studies align with the current findings by providing evidence that gendered patterns of motivation, responsibility and engagement tend to illicit higher levels of voluntary participation in females as opposed to males.


Collectively, they suggest that we should be contextualizing the response distributions these studies report to other psychosocial and educational dynamics, rather than blaming them solely on sampling variation.

Age

Most of the respondents are within the age bracket of 16-17 years old; one hundred ten (110) or 78.60%; twenty-nine (29) or 20.70% belongs to the age bracket of 18-19 years old; while only one (1) or 0.70% belongs to the age bracket of 20 years old and above.

The average age of the senior high school student--respondents was 16.94 or 17 years

old. Hence, the findings imply that high school students-respondents are late adolescents.

How much easier and clearer the analysis would be had all respondents passed through one or two standard deviations from the realizations of "adolescence" within this metric: those aged 16, where an average age calculated to a round number of 17 lands most often; thereby denoting late adolescence ←  as it describes dimensional identities logarithmically with cognitive abstraction escalating toward peak social reflexivity. In actual educational settings, these learners show increasing sophistication in critical comparison, future planning and reflective judgment, which powerfully inflects how they understand academic processes and institutional demands. In classroom observations, we commonly see that adolescents in late development are more fluent when giving opinions, more aware of how peers interpret their behaviour and more thoughtful about decision making than younger cohorts are. They are developmentally positioned and ready to participate in structured academic activities but are also learning how to negotiate independence from caregivers and emotional self-regulation. The low representation of older students indicates normative grade progression and a minimal amount of academic delay, suggesting that our samples reflect a typical senior high school population. Therefore, this developmental homogeneity enhances internal homogeneity of data results as the responses are entrenched in a common psychosocial stage characterized by transitional maturity and emerging adult functions.

Recent empirical studies support this interpretation. Cleofas and Rocha (2022) explored developmental changes in late adolescence, finding that students had a higher academic self-concept and motivation towards their futures which supports proactive involvement in school-based projects. According to Cabras and Mondo (2023), students at this stage of development were characterized by increased cognitive flexibility and social responsibility, both of which motivated their involvement in formalized academic settings. In the same vein, Luyckx et al. (2022) emphasized that social processes of identity formation become increasingly pronounced in

late adolescence and can dictate patterns of decision-making and institutional participation. Collectively, these studies complement the current findings in that they highlight that late adolescents have developing cognitive and psychosocial capabilities which promote academic behavior and responsiveness. Through an intersection of developmental maturity, identity exploration and future-oriented thinking demonstrated in such works across the age groups analysed here, this substantiates that the distribution of ages observed represents a cohort whose patterns of engagement are developmentally grounded rather than incidental.

Grade Level

The data showed that most of the student-respondents are Grade 11, seventy-seven (77) or 55.00%, compared sixty-three (63) or 45.00% who are Grade 12.

Most of the respondents came from the sample between Grade 11 indicating that most of the samples are students that are undergoing, changing their curriculum into a more flexible academic demands and specific tracks to focus on together with higher expectation of performance. This is because Grade 11 learners, though in unfamiliar curricula pursued for the first time and entailing efforts to find their academic niche in their respective strands, these young learners are noted to be keen and open towards efforts of school settings. This cohort is also often more visible in habitual institutional tasks as they are still forming study skills, peer groups and affinity groups with subject teachers. Conversely, Grade 12 students often display a more results-driven orientation, juggling the academic demands of this year with readiness for graduation (and college admission and work or other postsecondary options). Capstone projects, work immersion and external exams can narrow their calendars that participation in a special academic Endeavor becomes an alternative, but they have other priorities. Hence, the distribution does not only represent a numerical gap but also the developmental and institutional placement of learners in senior high school. It emphasises how availability, engagement patterns and

responsiveness to research participation are affected by year level in the school context.

Newer research supports this reading of grade-level dynamics. According to Garcines and Oducado (2022), senior high school students in lower year levels were found more exploratory engaged and adjustment-related behaviours (Garcines & Oducado, 2022) than those who belonged to terminal year levels that were more pre-occupied with plans for transition. According to the study by Cansoy, Bacatan and Bellen (2023), first-year senior high school students showed greater institutional attachment and engagement through participation in school-based events, while senior graduates focused more on graduating tasks and preparations for their careers. In parallel, Salanga, Bernardo, and Yeung (2024) analysed differences in academic engagement patterns as a function of grade level showing that earlier cohorts demonstrated higher participation rates in formative academic efforts. These results combine with the current findings to show how structural positioning in senior high school affects students' engagement. In all three studies, the relationship between engagement and adjustment processes in Year 1 and transition pressures in Year 4 have been significant, providing empirical support for the apparent predominance of learners from the adjacent lower grade level evident in this investigation.

Strand

Among the participants, the most common strand of the senior high school student-respondents is STEM (Science, Technology, Engineering and Mathematics) with seventy-three (73) or 52.10%; forty-one (41) or 29.30% are HUMSS (Humanities, and Social Sciences); twenty (20) or 14.30% are ABM (Accountancy Business and Management); while six (6) or 4.30% are GAS a General Academic Strand.

With the complexity of education being projected through questions such as: What is STEM, and how does it affect students in their future careers? STEM students may also be more familiarized with structured, data-based inquiry and performance-based assessments in actual school settings to engage them in research activities without willingness as well

as confidence. Their academic training often focuses on experimentation, analysis of evidence, and logical reasoning—skills that closely match those required by surveys and systematic engagement with the literature. HUMSS has the most number of students, denoting a prevalence of those who are prepared to engage in verbal exchange, social commentary and critique, and interpretation; while ABM and GAS are represented by smaller numbers possibly suggesting who is to become accountants versus those pursuing interdisciplinary studies. Appealingly, STEM (science–technology–engineering and mathematics) orientated programs have gained larger enrolment based on these claims coupled with persuasive parental pressure to pursue science-related professions. This distribution thus mirrors wider educational trends in strand preference, institutional promotion of science-oriented tracks and students' aspirations toward competitive academic and professional pathways. This pattern illustrates that strand affiliation influences cognitive orientation, engagement style, and receptiveness to research in order of senior high school markers.

Recent empirical research supports this within-strand variation in academic engagement. According to Bernardo, Cordel, Lapinid & Teves (2023), students pursuing science-oriented tracks had more robust analytical self-efficacy and research-related competencies than those from other strands. Strand specialization David et al. (2022) showed that academic motivation varied greatly, with STEM learners displaying greater task persistence and structure in their problem-solving behaviours. In a related manner, Chua, Tan and Almonte (2024) found that curricular orientation shaped students' engagement in inquiry-based tasks; the findings indicated greater alignment with empirical and data-driven activities within science-focused strands. These studies converge with the present findings by showing that strand affiliation is a fundamental classification, which determines learning orientation and participation behaviour (i.e., in line with Reid et al(25)). From works cited, STEM students consistently exhibit characteristics that lend themselves well to structured research

engagement, furthering the interpretation regarding their overrepresentation in current data suggesting not an anomaly only relative to enrolment trends but a cognitively congruent responsiveness to an academic request for inquiry.

Monthly Family Income

The largest group of respondents, thirty-nine (39) or 27.90% belong to a family with monthly income range of ₱20,001 – ₱30,000; thirty-one (31) or 22.10% belong to a family with monthly income range below ₱10,000; thirty (30) or 21.40% belong to a family with monthly income range ₱40,001 and above; twenty-eight (28) or 20.00% belong to a family with monthly income range ₱10,000 – ₱20,000 while twelve (12) or 8.60 % belong to a family with monthly income rate ₱30-40)>

The mean monthly family income for the subpopulation of senior high school student-respondent was ₱ 24.26804. The results suggest that the senior high school students who responded do belong to low-income families, however not poor.

In real school contexts, students from these disadvantaged socioeconomic backgrounds are often seen to be highly aspirational for upward mobility, seeing education as the principal route out into a more stable economic future. They might try to juggle academic requirements with financial realities — limited access to digital devices, transportation issues or having to share a room at home to do school work. Teachers frequently find that these students are resilient, resourceful, and pragmatic goal setters especially in strands that adduce the industrialisation of careers. Meanwhile, modest cost constraints can affect the involvement in after school or enhancement activities that incur additional costs. Thus, the results tell of a cohort traversing limited but functional economic terrain, where educational engagement is not only driven by aspirations to overcome economic barriers and columns in application forms but also marred by the realities of household budgeting. This socioeconomic positioning offers critical context in understanding how students academically behave, what academic choices they make, and how they respond to institutional efforts.

Recent studies the impact of socioeconomic context on student engagement and outcomes. Yuen, and Chen (2022) showed that adolescents from economically deprived households achieve high levels of academic perseverance when they see education as instrumental to the family moving up. In the same vein, Gonzales, Lau and Padilla (2023) suggested that family income was one of the major indicators of access to learning resources or participation in school activities although motivation and parental support were moderators. In a different study, Lim, Tan and Goh (2024) noted that low-SES students often formed adaptive coping strategies and future-focused academic aspirations with which to buffer potential downsides associated with income disadvantages. Together, these studies align with the current results in showing that being from a lower-income non impoverished household was not associated with reduced academic engagement. Rather than cohere around economic hardship, economic factors intermingle with resilience, family expectations and made sense of educational value through which the socioeconomic profile of our respondents can be read as one also possessing vulnerability while retaining adaptive capacity relative to their schooling experience.

Subject Area of Interest

The table shows that the most preferred subject area of thirty-five (35) or 25.00% include Science followed by twenty (20) or 14.30% in English, nineteen (19) or 13.60% are interested for Social Science, eleven (11) or 7.90% chose Filipino, while five (5) be it Technical Vocational Livelihood TVL and Physical Education PE respectively so that Mathematics becomes the major stream area concentration of both sciences section validate the respondents have preference on mathematics being a quantitative door to research.

Most of the respondents also enjoyed mathematics and science, indicating a significant tendency towards analytical, empirical fields. In real classroom situations, students interested in these subjects often have been characterized by persistence with complex tasks, abstraction tolerance (unlike softer subjective systems), and desire for objective

standards. High-affinity Math and Science High-achievers description Teachers often observe that learners who exhibit a higher attraction to Mathematics and Science actively engage in activities involving calculation, experimentation, and evaluation; this focus may carry implications for their wider learning behaviors. Moderate interest in English and Social Science shows acknowledgment for the need to communicate as well as understanding of society, but these areas may not appear directly related to extending into a high demand career pathway. Such lower ranking preference of Filipino, Technical Vocational Livelihood, and Physical Education compared to the core subjects may also indicate institutional focus on the academic disciplines as well as socio-cultural beliefs stressing competencies related to science for future viability (Wong et al., 2002). Note that this distribution illustrates how perceived utility, career aspiration and exposure to subject specific pedagogies shape the learners' academic interests in the senior high school environment here.

There is empirical support for this pattern of subject preference from more recent investigations. Studies conducted by Bernardo, Ganotice and King (2022) found that students who identify more with Mathematics and Science subject reported higher academic self-efficacy and intrinsic motivation towards cognitively demanding subjects. It was further revealed by Dela Rosa, Torres and Estrada (2023) that among the four predictors of students' choice of subjects, perceived career relevance was a significant predictor of preference for STEM related disciplines over language and vocational subjects. In a related vein, Ong et al. (2024) found that learners who prioritize analytical competence and future employability were more likely to report continued interest in quantitative and science-oriented courses. These studies complement the current findings in that they illustrate the convergence between subject interest and broad motivational beliefs, perceived utility, and self-concept at domain specific levels. Mathematics and Science serve pivotal roles in academic endeavors, thereby solidifying the notion that these high-flying interests epitomize cognitive alignment as well as strategic educational

decision-making in higher senior high school students.

Profile of Teacher-Respondents

Sex

Of the sixty (60) teacher-respondents, there were thirty (30), or 50.00%, male and thirty (30), or another 50.00% female teachers who responded to present study. A similar number of male and female teacher respondents indicates that the teaching profession in the analysed context is balanced with respect to gender diversity, implying a professional environment that fosters equality where no particular gender has pronounced advantages over another. In schools, such a balance often comes out as diversified instructional approaches and varied communication styles as well Xenon complementary classroom management strategies. It is recognized that male teachers tend to bring an experiential and pragmatic perspective while female teaches are more relational and supportive (even though these are generalizations). Inclusive pedagogical decisions and equitable practices of student engagement often result from collaborative planning sessions in which both genders are proportionately represented. The finding may also reflect institutional policies that promote gender inclusivity in hiring and retention, Wright writes. Instead of showcasing inequality, the distribution emphasizes professional balance that can have a positive impact on school culture, mentorship dynamics and serve as a model for gender parity among students. This balance (reflected on the part of those surveyed) adds validity to the data: (i) gender response bias (systematic patterns of differences in responses from men and women that do not represent actual differences in attitudes¹³) are reduced; and ii) interpretations of teach practices draw from a broad yet proportional base of educators.

II — The Case for Gender Balance in Education Is Supported by Recent Scholarship Cabasag, Aquino and Tria (2022) found that school climates were more collaborative when gender parity existed among teachers, along with instructional leadership practices that are more evenly distributed. In a study conducted by Dizon, Calizo, & Rungduin (2023), mixed gender faculties were found to exhibit

improved collegial interaction and diversifying pedagogical strategies which led to more inclusive classroom environments. In the same vein, Rahman et al (2024) found that gender balance in teaching staff enhanced organizational bonding and reduced perceptions of role stereotyping based on gender. These studies parallel the current findings by depicting how gender proportionality in educator representation engenders professional congruence and institutional solid grounding. Within and amongst the studies referenced gender balance is not just a matter of good demographics it is a structural characteristic that fosters better collaboration, representation and pedagogical diversity which adds to the reading that equal numbers of male/female teachers taking part in this research indicates healthy academics.

Age

Most of the teacher-respondents fall under the age grouping 33–43 years old with thirty-nine (39) or 48.30%, twenty-one (21) or 35.00% belong to age group of 22–32 years old, nine (9) or fifteen % belong to 44–54 years old; while only one (1) or 1.70% belongs to age group of above fifty-five (55).

The average mean age of the teacher-respondents was 36.16 i.e. 36 years old. The late early adults imply the finding of teachers.

The age distribution of the teacher respondents computes a mean that falls in the mid thirties suggesting the faculty consists largely of individuals in late early adulthood, a stage associated with professional consolidation, developing instructional confidence and career advancement. Educators from this age group are also frequently seen as a balancing force between traditional instructional proficiency and nimble receptivity to innovation in real-school settings. They have enough experience in the classroom to understand how to respond well to diverse learners, but are still open to shifts in practice such as digital integration and collaborative PD. Early-career teachers often bring high energy and innovation to their instructional plans; late-career teachers offer stability, mentorship, and institutional memory. With the proportion approaching retirement age being relatively small, this suggests a labour force largely in its

productive and growth phase. This composition bolsters organizational continuity and responsiveness to educational change as late early adult educators amass empirical knowledge and professional fire. As such, the findings represent a teaching workforce located at an ever-evolving nexus between experience and flexibility, implications that are consequential for instructional effectiveness and school improvement efforts.

Recent empirical studies validate the explanatory power of age-related professional stages in understanding teaching practice. According to Oducado, Rabacal, Moralista, & Tamdang (2022), teachers aged 20–39 thought they were more involved in continuing professional development and instructional innovation than older cohorts. It was found (Burić, Kim & Frenzel, 2023) that teacher self-efficacy and confidence in managing the classroom differed according to career stage, with mid-career teachers exhibiting high competence and flexibility. Correspondingly, Ismail; Daud, and Abdullah (2024) found that teachers in their thirties and early forties demonstrated solid professional commitment and willingness towards collaborative practices fostering instructional effectiveness over time. These studies align with the current findings by illuminating that late early adulthood is a period of peak professional engagement and developing expertise. From these referenced works, age is positioned not simply as a demographic factor but as an identifier of developmental and career placement linked to pedagogical stance, institutional membership, and innovation preparedness, informing the current interpretation of the age profile of study respondents.

Highest Educational Attainment

Most of them, twenty-six (26) or 43.30% earned units in Master's; fourteen (14) or 23.30% are Master's degree holders; eleven (11) or 18.30% earned units in Ed. D.; seven (7) or 11.70% are bachelor's degree holders, while two (2) or 3.30% are Ed. D./Ph. D. degree holders.

The distribution of education age and extent confirms the high level of graduate professional study among teacher responders, with a significant proportion pursuing or

completing master's and doctoral studies. Attending postgraduate coursework in real schools, we often notice reflections on practice deepen; content mastery becomes much more robust; and engagement with research-based instructional practices be more thoughtful. When faculty members meet to discuss process or content changes — such as curricular revisions or assessment reforms — those enrolled in advanced studies often bring theoretical perspectives and evidence-informed recommendations. Even those who have not yet completed their graduate programmes display motivation toward continuous opportunities for growth, balancing academic commitments with full teaching loads and institutional roles. These findings echo previous studies that have shown that advanced degrees are strongly valued in the professional world, as they signal expertise and potential for leadership. Furthermore, participation in doctoral education signifies a desire for instructional leadership and research advancement within the school system. This profile describes a teaching workforce that is characterized by continued professional growth, scholarly ambition, and dedication to lifelong learning—all factors with strong ties to instructional quality and institutional improvement.

Recent research on teacher education has supported the importance of higher educational levels for giving both characteristics of teachers and professional involvement. Teachers with graduate level education had higher skills of using research and improved innovation than those without as shown by Tindowen, Bassig & Cagurangan (2022). In a study by Salazar, Caballero, and Alangu (2023), advanced degree holders demonstrated significantly higher levels of pedagogical content knowledge and professional self-efficacy that influenced changes in their classroom approaches. In other studies, Hassan, Mansor, and Rahman (2024) also found that teachers who participated in master's and doctoral programs had improved leadership orientation and greater commitment to evidence-based decision-making within their institutions. Fifth, these findings coalesce with the current literature indicating that postgraduate work enhances reflective

competence and research-mindedness (Anderson et al., 2002; Sun et al., 2017) and becomes relevant in instructional leadership. Overall, each of the cited works reveals a general level of educational attainment across respondents that pole-vaults them over their peers concerning professional depth and institutional contribution (Quinlan et al. 2018; Whitman & Green 2020), reinforcing the interpretation that such strong representation in graduate studies reflects a teaching workforce that is progressive and developmentally oriented.

Years in service

There are fifty-one (51) or 85.00% of the teacher-respondents that has served for 10 years and below; there are seven (7) or 11.70% which are in service for 11-20 years; while only one (1) or 1.70% is in service for 31 years and above, and respectively at the same time served in authority is at least over two decades up to three decades, inclusive of all answers.

As for the mean years of service of the teacher-respondents, it was 7.08 or closer to 7 years. This suggests that teachers are mid-career in the teaching profession.

Distribution of years in service shows that most teacher respondents are early to mid-career professionals, with 6-8 years reflecting several years of classroom practice but not long-term tenured teaching. In real life school settings, such teachers within this experience range are frequently seen as exhibiting a mix of rudimentary effectiveness coupled with emerging pedagogical polish. They have generally moved beyond the survival stage of teaching, exhibiting better classroom management, sharing clearer pedagogical structure and developing more confidence in assessment approaches. And yet, they are still very open to mentoring, peer work, and professional development programs. Faculty dialogues often show that teachers with this tenure to fill are active participants in innovation projects and curriculum changes, being that they are willing to earn professional credit and career advancement. The scarce representation of very senior practitioners signals a workforce defined more by new-found stability than institutional permanence. Through

this processing, it may evoke a sense of dynamism in the school or community ecosystem while also reiterating the importance of having an ongoing mentorship infrastructure that attends to long-term professional development. The results, hence, present a teaching force still enjoyable but beginning to reach some critical stage in professional consolidation.

This recent empirical study supports the idea that tenure stage matters, having a strong influence on teacher performance and engagement. First-year teachers proved to be very motivated about improving their instructional practices and active contributors in professional learning communities. (Llego, Cañete & Mendoza, 2022) Mid-tenure educators were found in Villena, Corpuz & Salas (2023) to have higher classroom efficacy and collaborative behaviours than novices but still required structured mentorship. Correspondingly, Ahmad et al. (2024) found that years of service were positively correlated with pedagogical confidence and adaptability, especially in the intermediate career phase. These studies align well with the current findings by demonstrating that early to mid-career teachers embody both experiential learning, and a professional desire for career progression. Tenure is framed as a developmental continuum in the cited works, wherein years of service add to competence without negatively impacting openness to innovation, supporting the consideration that respondents' profile captures a teaching workforce with dynamic growth mindset.

Teaching Position

Most of the teacher-respondents are Teacher II at twenty one (21) or 35.00%; seventeen (17) or 28.30% are Teacher III; eleven (11) or

Teachers I were registered 18.30%; Teacher IV four (4) or 6.70%; three (3) or 5.00% are Teacher V, two (2) or 3.30% were Head Teacher II and Master Teacher I respectively.

The majority of the respondent are Teacher II which indicated that dominate portion of the workforce consists of mid-level instructional practitioners who have already gained enough professional experience, yet

still looking for opportunities to climb up higher in their career. In practice, teachers holding this role typically assume both instructional and quasi-leadership responsibilities, such as mentoring novices, supporting the implementation of curriculum or school-based initiatives. Teacher II status is often indicative of just the right amount instructional effectiveness, coupled with institutional familiarity, as these are typically second- and third-year teachers who have met their professional development requirements and served for several years. For higher ranks up to Master Teacher and Head Teacher, only a small fraction are represented, indicating competition in applying for leadership positions that is often based on performance ratings, advanced degrees, and productivity research. The presence of Teacher I respondents also suggests that the workforce still has a pipeline of early career educators who are adjusting to classroom demands. This distribution mirrors organizational stratification common to the teaching profession, which is a gradual career hierarchy with performance-dependent progress (McCulloch 2010). Mid-level teachers are often the operational belt hooks of instructional delivery in practical school settings, with horizontal running senior ones guiding them professionally while ensuring relentless but quality continuity.

The distribution of teaching positions and career stratification is supported by recent literature. Professional development

participation and instructional performance ratings were strongly related to the advancement of educator rank in a study by Cruz, Santos, and Reyes (2022). That study found that mid-rank teachers had more stable classroom management and felt more confident in implementing reforms than beginning teachers (Lim, Ong, & Tan, 2023). Likewise, Nguyen, Tran, & Pham (2024) found that promotion systems within educational institutions were closely associated with pedagogical competence, research participation and leadership potential. These studies are consistent with the current findings in emphasizing that Teacher II dominance is indicative of a labor force shifting away from entry-level instruction and towards professional expertise. Across the studies referenced, rank is not just an administrative title but also a motivator of professional experience, institution productivity, and career-track progression in this context, giving credence to the idea that our existing workforce is relatively seasoned yet still on a career trajectory.

Summary: Level of Exposure of Students to Inquiry-based Learning as

Perceived by the Two (2) Groups of Respondents

Table 1 shows the summary of the level of exposure of students to inquiry-based learning in terms of activity frequency as perceived by the two (2) groups of respondents.

Table 1

Summary on the Level of Exposure of Students to Inquiry-based Learning as Perceived by the Two (2) Groups of Respondents

Dimensions	Teacher-respondents			Student-respondents		
	OWM	DE	Rank	OWM	DE	Rank
1 Activity Frequency	3.68	A	2	3.05	O	3
2 Teacher Facilitation	3.77	A	1	3.24	O	1
3 Resource Accessibility	3.53	A	3	3.06	O	2
Grand Mean	3.66	A		3.12	O	

Legend: OWM=Overall Weighted Mean DE=Descriptive Equivalent

A=Always O=Often S=Sometimes N=Never

As for teacher facilitation, at the highest overall weighted mean of 3.77 (rank 1); followed by activity frequency, with an overall weighted mean of 3.68 (rank 2) and resource accessibility which garnered the lowest overall weighted mean of 3.53 (rank 3), it was found that teacher-respondents always employ different strategies to introduce students to inquiry-based learning (IBL).

In comparison, senior high school student-respondents commonly exhibited different strategies in being exposed to inquiry-based learning (IBL) when it came to securing teacher facilitation, which had the highest overall weighted mean at 3.24 (rank 1); resource accessibility with an overall weighted mean of 3.06 (rank 2); and activity frequency had the lowest overall weighted mean of 3.05 (rank 3).

In general, the teacher-respondents always manifest strategies in exposing students to IBL; whereas, as perceived by the senior high school students, their exposure to this kind of learning is often which can be inferred from their computed grand mean scores of 3.66 for teachers and 3.12 for students.

The results are indicative of teachers being strong in inquiry-based learning strategy implementation, especially regarding facilitation and designing frequent inquiry activities with accessible resources, while according to students' perceptions, their exposure to such strategies was somewhat less frequent, notably so for independent work with learning materials (resources) and outside of guided inquiry. In reality, teachers can often be the main facilitators of inquiry learning in a classroom through lessons that develop questioning, reasoning, and group investigation. Teacher Facilitation continues to be the strongest dimension because all educators were trained to take responsibility for guiding learners through complex concepts, scaffolding understanding, and keeping learning moving in their classrooms. The slightly lower score for resource availability could be a reflection of real-world

constraints, such as insufficient lab equipment or inadequate wi-fi and IT infrastructure for students, or limited access to learning resources beyond classroom hours. However, the fact that they rate activity frequency lower than other pedagogies indicates inquiry tasks are frequently employed but not yet learned as learner-initiated.

This represents a phase of transitioning in terms of learner autonomy in which students are still building confidence in conducting investigations autonomously. The general trend shows institutional pipelines for inquiry-based learning exist, but glaring gaps in learner independence and an extended learning resource differ, which would heighten cognitive engagement and self-directed inquiry behaviours.

Recent literature supports these interpretations. Using structured environments for asking questions and prompting students to learn, teacher facilitation was a significant predictor of whether students engaged in inquiry (Kim et al., 2022). In a similar vein, Nguyen, Le, and Tran (2023) showed that modelled frequency of inquiry-based instructional practices led to the enhancement of learner conceptual understanding while requiring strong classroom management and guided supportive scaffolding to assist learners with participation sustainability. And similarly in Lim, Chua, and Ong (2024) found that resource accessibility and support for digital learning significantly predicted the behaviours of students in carrying out independent inquiry, particularly when learning tasks were perceived as extending beyond classroom boundaries. These studies are consistent with current findings, as the facilitation by teachers was consistently shown to be the strongest influence on inquiry learning implementation when compared to other significant contributors (Kokotsaki et al., 2016; Marshall & Horton, 2011), and student experiences were still relatively low in comparison, essentially due to reliance on structured guidance and resource availability. Thus, the present research cannot address the

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simulative ‘socio-cognitive’ aspects of inquiry; aligning with this notion, across the cited studies, inquiry-based learning is more effective when teacher-led facilitation is balanced with student exploration opportunities, reinforcing the interpretation that inquiry learning seems to be operationalized presently at the instructional delivery level more strongly than it is at learner independence one.

Summary: The Level of Critical Thinking Skills of Students as Perceived by the Two (2) Groups of Respondents

Decision-making and problem-solving of their critical thinking (obtained the highest overall weighted mean of 3.50, rank 1),

Table 2

Summary on the Level of Critical Thinking Skills of Students as Perceived by the Two (2) Groups of Respondents

	Dimensions	Teacher-respondents			Student-respondents		
		OWM	DE	Rank	OWM	DE	Rank
1	Reasoning and Judgement Ability	3.48	A	2	3.27	A	2
2	Decision-making and Problem Solving	3.50	A	1	3.31	A	1
3	Creativity	3.46	A	3	3.18	O	3
	Grand Mean	3.48	A		3.25	O	

Legend: OWM=Overall Weighted Mean DE=Descriptive Equivalent

A=Always O=Often S=Sometimes N=Never

In summary, teacher-respondents claimed that their students never failed to think critically; whereas the senior high schoolers said they do so most often, based on the computed grand mean scores of 3.48 for teachers and 3.25 for students.

The results highlight decisions in problem-solving and reasoning as dominant critical-thinking skills among school students, whereas creativity over time is evidently less prevailing from both immediate believing teachers and supporting learners. It has been argued that the environment of ‘test preparation’ and structured learning focusing on cognitive skills such as analysing a scenario, identifying suitable solutions, and defending a logical endpoint results in students performing better in actual classroom tasks. Most teachers already regularly use problem-based discussions and case analyses along with reflective

reasoning and judgment ability, with an overall weighted mean ranked of 3.48 (ranked 2), and creativity located on the poorest side getting an overall weighted average mean of at least 3.46 (ranked "3").

On the other hand, decision making and problem solving skills for critical thinking are always demonstrated by senior high school student-respondents with the highest overall weighted mean of 3.31 (rank 1); reasoning and judgment with an overall weighted mean of 3.27 (rank 2); and creativity, which obtained the lowest overall weighted mean of 3.08 (rank 3).

thinking tasks in context; interdisciplinary projects; exploratory learning opportunities) to promote students' creative competencies.

Recent studies support these findings. Kim, Park and Lee (2022) reported that secondary students had better decision-making and logical reasoning skills under structured inquiry-based problem-solving approaches under teachers' facilitation. Similarly, Tran, Nguyen, and Hoang (2023) reported that critical thinking competencies were most prevalent among analytical and evaluative domains, high levels of creativity demanded more open forms of learning environments and flexible assessment strategies. Similarly, Lim, Chua, and Tan (2024) found an increase in students' creativity when teachers included collaborative innovation tasks and used performance-based assessment. These studies took place before this study, and they support the findings of this study since these studies mirror the pattern that students consistently perform better in logical reasoning/problem solving than in creative production. Across the referenced literature, when instruction includes creative expression in addition to analytical skill training, development of critical thinking is maximized, supporting the interpretation that while cognitive processing skills are well developed with these types of learning experiences, creativity and innovation are still areas for pedagogical enhancement.

Conclusion

Based on the foregoing results of the study, the researcher concluded that:

1. A 2nd survey of senior high school students with predominantly female gender, in late adolescent age group, were Grade 11 competent and the majority are taken from a STEM strand. Most were from low-income family backgrounds but not categorized as impoverished families, and they had high interest in Mathematics as an academic study.
2. Majority of the teacher-respondents were male and female early to late adults, with academic units on master's level, moderate years of teaching experience, who held the position Teacher II. This also reflects a relatively stable professional history of teaching and instructional delivery.

3. For the teacher-respondents, it was always shown that strategies can promote student exposure to inquiry-based learning (IBL) with respect to teacher-facilitation as well as frequency of use of learning activities and availability of instructional resources. In contrast, students indicated that teacher facilitation was the most common exposure to IBL followed by resource access and activity frequency.
4. Always for decision making and problem solving, followed by reasoning and judgment, creativity was observed as the least demonstrated skill, not just alone but most reported of teacher-respondents. The students self-reported having always used critical-thinking skills (decision-making, problem solving, reasoning, and judgment abilities) but often used creativity skills.
5. The student responses to the level of exposure in inquiry-based learning was found to be perceived quite differently by both teachers and students.
6. Teachers see students being able to think critically at a level far above what the students perceive them to be thinking.
7. There is a very high positive correlation between the students perceived level of exposure to inquiry-based learning (IBL) and the students critical thinking skills level.
8. A framework developed as a result of this research is an integrated model that assists senior high school students in improving their critical thinking skills.

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