INTEGRATING LITERACY AND NUMERACY TO STRENGTHEN SCIENCE LEARNING

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A solid foundation in language and numeracy abilities is essential for effective science education, which goes beyond a simple understanding of scientific facts. While numeracy gives students the skills to analyze data, interpret quantities, and apply mathematical models to real-world occurrences, language helps students to read complicated scientific publications, formulate hypotheses, and decode technical lingo. When combined, these abilities create a crucial link that turns intangible scientific ideas into understandable information. Teachers can enable students to think critically, solve issues, and interact with the scientific community in a meaningful way by incorporating literacy and numeracy into science instruction. The necessity of interdisciplinary techniques to promote better understanding in STEM fields is shown by this synergy.

Science education is essential in the Philippines because it gives students the tools they need to tackle both domestic and international issues. Understanding complicated scientific concepts requires a solid foundation in language and math. While numeracy gives us the means to examine data and solve issues, language helps us understand and communicate scientific concepts. In the Filipino environment, where socioeconomic and linguistic variety present significant educational problems, the integration of these skills is especially important. These multidisciplinary abilities are crucial for enhancing students' scientific literacy and encouraging critical thinking, according to recent studies.

One important factor influencing students' capacity to comprehend and communicate scientific concepts is their level of language skills. Engaging with scientific content requires a strong vocabulary and the capacity to decipher multimodal writings,

including graphs and diagrams, according to research. Purpura et al. (2017), for instance, discovered that mathematical reasoning and numeracy competences are predicted by early language skills, especially those pertaining to vocabulary. This relationship is seen in the Philippine educational system, where students must understand complicated texts and technical vocabulary in English, which is frequently employed as the language of teaching for science. Students' understanding and performance in science-related topics can be greatly improved by targeted interventions, such as content-specific language programs (Purpura et al., 2017; Klibanoff et al., 2014).

Since it enables pupils to interpret data and comprehend the links between variables in scientific phenomena, numeracy is equally important. Numeracy is more than just knowing numbers; it also includes reasoning, identifying patterns, and applying mathematical ideas to practical situations. Students frequently have to assess statistics on rainfall, wind speeds, and climate patterns in the Philippines, a country that frequently experiences natural disasters like typhoons. Gunderson and Levine (2011) emphasized the intimate relationship between mathematical competency and the development of quantitative and spatial language. By integrating numeracy into science curricula, students gain the abilities necessary to evaluate and comprehend data, which promotes a deeper comprehension of scientific inquiry and natural processes.

Fostering critical thinking and problem-solving skills in science education requires the integration of language and numeracy skills. The integration of these competencies through interdisciplinary approaches is emphasized in the K–12 curriculum of the Philippine Department of Education. For example, Project EASE (Effective Alternative Secondary Education) makes abstract scientific concepts more relevant and interesting for pupils by incorporating local contexts into instructional materials. According to Klibanoff et al. (2014), incorporating math-focused language into regular classroom interactions improves the development of both literacy and numeracy, indicating that interdisciplinary teaching methods are especially successful.

In summary, the development of scientific literacy and critical thinking depends on the incorporation of language and numeracy into science education. An intentional focus on these abilities helps close gaps and empower students in the Philippine environment, where socioeconomic and linguistic diversity affects educational achievements. Teachers can equip Filipino students to handle challenging scientific problems and ensure their preparedness for both local and global problem-solving by encouraging multidisciplinary methods.

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