

## ***From Non-STEM to Science Educator: Navigating the Chemistry Gap***

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In the Philippines, the demand for qualified science educators continues to rise, especially in junior and senior high schools where science proficiency is a major concern. However, a growing number of education graduates specializing in science did not come from the Science, Technology, Engineering, and Mathematics (STEM) strand in Senior High School. These non-STEM students, while passionate about teaching, often struggle with core subjects like chemistry, which they encounter rigorously for the first time in college (Capanzana, 2021). This gap poses a unique challenge in preparing effective science educators who are both confident and competent in content delivery.

For many non-STEM students, their entry into the Bachelor of Secondary Education major in Science comes with limited exposure to fundamental scientific concepts. Most of them took strands like General Academic Strand (GAS) or Humanities and Social Sciences (HUMSS), which prioritize social and language-based subjects rather than laboratory science or advanced mathematics (Magdadaro, 2020). When these students reach tertiary education, they are suddenly introduced to demanding courses such as General and Inorganic Chemistry, which require both abstract understanding and practical laboratory skills. Without a solid foundation, many experience anxiety, low performance, and self-doubt (England et al., 2019).

The chemistry gap affects not only academic performance but also long-term teacher confidence. Pre-service teachers who struggle with chemical formulas, reactions, and computations may later carry this insecurity into the classroom. They may shy away from experimental demonstrations or rely heavily on rote memorization, which undermines students' curiosity and understanding (Hanson, 2017). This is particularly concerning in public schools across provinces where science teachers are often the only subject experts available, and cannot afford to be underprepared.

Several universities in the Philippines are already addressing this issue by providing bridging programs and foundation courses. These aim to build basic chemistry literacy and gradually ease students into more complex content. However, these programs are not uniformly implemented, and access is uneven especially for state universities and colleges (SUCs) with limited resources (Orbe et al., 2018). Moreover, the demand for quality science teachers often leads institutions to admit non-STEM students even if they lack the baseline knowledge, further widening the preparedness gap.

To bridge this divide, a multi-level approach is needed. At the institutional level, education departments must integrate more contextualized and scaffolded chemistry modules early in the curriculum. These should focus on concept mastery, laboratory exposure, and pedagogy suited for the Filipino classroom (Saro et al., 2023). At the national level, the Commission on Higher Education (CHED) and the Department of Education (DepEd) can revise guidelines to strengthen science specialization pathways, possibly creating alternative routes for non-STEM students through summer boot camps or remedial learning programs (Rogayan et al., 2021).

More importantly, there must be an effort to humanize the journey of becoming a science educator. Many non-STEM students possess high teaching potential, empathy, and grit qualities that cannot be measured by grades alone. With proper mentoring, resource access, and a strong support system, these aspiring teachers can overcome initial content gaps and become transformative science educators, particularly in underserved schools.

In the end, science teaching is not about having a perfect academic background. It is about inspiring learners to explore, question, and experiment. By acknowledging the chemistry gap and addressing it through inclusive strategies, the education system can empower non-STEM students to fulfill their calling to spark curiosity in the next generation of Filipino scientists.

## **References**

Capanzana, Carmela. (2021). Non-STEM students' learning difficulties and coping strategies in general chemistry under an engineering course program. *International Journal of Research Studies in Education*. 10. 81-88. 10.5861/ijrse.2021.5072.

- England BJ, Brigati JR, Schussler EE, Chen MM. Student Anxiety and Perception of Difficulty Impact Performance and Persistence in Introductory Biology Courses. *CBE Life Sci Educ.* 2019 Jun;18(2):ar21. Doi: 10.1187/cbe.17-12-0284. PMID: 31120397; PMCID: PMC6755222.
- Hanson, Ruby. (2017). ENHANCING TEACHER TRAINEES' UNDERSTANDING ABOUT CHEMICAL REACTIONS AND EQUATIONS. *International Journal of Academic Research and Reflection.* 5. 57-68.
- Magdadar, Lovely. (2020). Passion- based vs. Practical- based Preference of Strand in Senior High School. *International Journal of Academic Research in Business and Social Sciences.* 10. 10.6007/IJARBS/v10-i3/7031.
- Orbe, J. R., Espinosa, A. A., & Datukan, J. T. (2018). Teaching Chemistry in a Spiral Progression Approach: Lessons from Science Teachers in the Philippines. *Australian Journal of Teacher Education*, 43(4). Retrieved from <http://ro.ecu.edu.au/ajte/vol43/iss4/2>
- Rogayan Jr, Danilo & Rafanan, Renzo & de Guzman, Clarisse Yimyr. (2021). Challenges in STEM Learning: A Case of Filipino High School Students. *Jurnal Penelitian dan Pembelajaran IPA.* 7. 232-244. 10.30870/jppi.v7i2.11293.
- Saro, Jeffry & Bello, Jayson & Concon, Loewela & Polache, Ma & Ayaton, Mechelle & Manlicayan, Ramel & Campomanes, Jemerie. (2023). Contextualized and Localized Science Teaching and Learning Materials and Its Characteristics to Improve Students' Learning Performance. 7. 77-84. 10.5281/zenodo.7607686.

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