

Students' View on STEM Lessons: Analysing the Needs to Design Integrated STEM Instructional Practices Through Scientist-Teacher-Students Partnership (STSP)

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ABSTRACT

Learning is a process of acquiring knowledge and forming identities. The process empowers individuals by providing a meaningful and engaging context in which they can make sense of their entire experience. Previous research found that students failed to make connections between what they learned in class, the skills they learned, and the applications of the knowledge and skills in real life when learning STEM subjects. Interest and motivation are two major components that have been determined to contribute to these problems. Furthermore, STEM subjects are perceived by students as rigid, drab, fixed, and a limited platform for realising their desired identities. The declining trend of students choosing STEM-related subjects at the upper secondary school level and also the shortage of STEM workforce in the country has indirectly proven the problems the nation is currently facing. This study explores students' views on STEM lessons to incorporate their needs in designing integrated STEM instructional practices through Scientist-Teacher-Students Partnership (STSP) initiative. Scientist-Teacher-Student Partnership (STSP) in this study refers to collaboration among upper secondary science teachers and university scientists which involves mutual learning and collaboration via a partnership. Through this partnership, it hoped that meaningful STEM lessons could be designed and implemented in the science classroom. By embracing a qualitative research design, the researchers adopted a purposive sampling strategy to select six (6) secondary school science students, aged sixteen to seventeen (16-17) years old who are studying within the Klang Valley area as informants. This sampling technique is really important for qualitative researchers since it provides participants who can give in-depth and detailed information about the phenomenon under investigation. Besides that, the researchers also used semi-structured interviews to explore the informants' insights on the current STEM lessons that they experience. The semi-structured interview was served as the primary means of data collection whereby a basic interpretive qualitative design was employed. Based on the analysis of the interviews, three (3) themes have emerged to indicate the current STEM lessons that they experience during Physics, Biology, and Chemistry lessons in the classrooms. The three themes are; (1) instructional practices during the science lessons, (2) issues in STEM learning, and (3) students' demand for effective STEM lessons. For the first theme, there are four (4) categories that have been determined to explain the current instructional practices that students experience which are; (a) teacher-driven, (b) lack of instructional aids, (c) content laden, and (4) use of drilling techniques. For the second theme, the many issues highlighted by the students were further placed under three (3) main categories which are related to; (a) learning engagement, (b) use of practical activities and, (c) application of STEM knowledge. For the third theme, there are also three (3) additional categories determined to indicate students' demands in order to have effective STEM lessons. They demanded to have an environment of (a) active learning, (b) contextual learning, and also (b) exposure to mastery STEM skills through meaningful STEM activities during the instructional practices. The study concludes that teachers' instructional practices for STEM lessons still heavily focus on preparing students for examinations. Hence, aspects like students' involvement, practical knowledge, and meaningful learning which are lacking in practice, need to be considered by the researchers in designing integrated STEM instructional practices through STSP.

Keywords: Integrated STEM, instructional practices, scientist-teacher-student partnership (STSP), STEM lesson, teaching and learning