

PRE-SERVICE CHEMISTRY TEACHERS' SKILLS IN INTEGRATING SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM): A CASE FOR VOCATIONAL SCHOOL

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ABSTRAK

This research aims to explore pre-service chemistry teachers' (1) prior knowledge, (2) developments of PCK, and (3) factors that obstructing them in integrating STEM based chemistry learning at vocational school. This research was a qualitative research with an instrumental case study. The focus of the case was pre-service chemistry teachers' experience in integrating STEM based chemistry learning at vocational school. Since it used an instrumental case study, thus the participants were trained for preparing chemistry learning using STEM approach. The participants in this research were pre-service chemistry teachers that enrolled in Vocational Chemistry course with a total of 27 third-year students. The data collected in this research were pre-service chemistry teachers' prior knowledge, their developments of PCK, and the factors that obstructing them in integrating STEM based chemistry learning at vocational school. These data were collected through pre and post questions and document analysis. The data that collected were analysed using qualitative content analysis with interpretative and inductive coding techniques. This research gave a great insight toward an effective way in preparing pre-service chemistry teachers' skills in integrating STEM based chemistry learning at vocational school. Also, it has a good contribution in improving the quality of chemistry learning in the vocational school. Some interested findings were discussed in this report. Still as the output of this research, some parts of this findings have been presented at the international conference (the 8th ICRIEMS) organized by FMIPA UNY and accepted at AIP Conference Proceeding indexed by SCOPUS. Another part of the findings has been prepared to international reputable journal (Chemistry Education Research and Practice). In addition, an Implementing Arrangements with *The Education University of Hong Kong* as one of the universities that belongs to the world's top 100 QS university by the subject of education and training has been signed. This research aims to explore pre-service chemistry teachers' (1) prior knowledge, (2) developments of PCK, and (3) factors that obstructing them in integrating STEM based chemistry learning at vocational school. This research was a qualitative research with an instrumental case study. The focus of the case was pre-service chemistry teachers' experience in integrating STEM based chemistry learning at vocational school. Since it used an instrumental case study, thus the participants were trained for preparing chemistry learning using STEM approach. The participants in this research were pre-service chemistry teachers that enrolled in Vocational Chemistry course with a total of 27 third-year students. The data collected in this research were pre-service chemistry teachers' prior knowledge, their developments of PCK, and the factors that obstructing them in integrating STEM based chemistry learning at vocational school. These data were collected through pre and post questions and document analysis. The data that collected were analysed using qualitative content analysis with interpretative and inductive coding techniques. This research gave a great insight toward an effective way in preparing pre-service chemistry teachers' skills in integrating STEM based chemistry learning at vocational school. Also, it has a good contribution in improving the quality of chemistry learning in the vocational school. Some interested findings were discussed in this report. Still as the output of this research, some parts of this findings have been presented at the international conference (the 8th ICRIEMS) organized by FMIPA UNY and accepted at AIP Conference Proceeding indexed by SCOPUS. Another part of the findings has been prepared to international reputable journal (Chemistry Education Research and Practice). In addition, an Implementing Arrangements with *The Education University of Hong Kong* as one of the universities that belongs to the world's top 100 QS university by the subject of education and training has been signed.

Kata Kunci: *pre-service chemistry teachers, STEM, prior knowledge, pedagogical and content knowledge, vocational chemistry*