

Teachers' Beliefs Towards Teaching Kinematics of Linear Motion

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ABSTRACT

The world is marching into a new development era where the concept of Industrial Revolution 4.0 assumes blurring the differences between the work of people and the work of machines. Humans are therefore being challenged by machines in terms of work due to the machines' capability to perform various tasks for a longer period with precision, as compared to a human. Thus, human capital development is vital in creating a better future for our nation. This leads to the curriculum reform in Malaysia where the focuses on the development in science, technology, engineering, and mathematics (STEM) education as the STEM-related careers are in demand these days. In mathematics, kinematics is the study of the type of movement of an object without regard to the forces that cause the object to move. It is important because it can be used to solve problems in engineering, robotics, biomechanics, sports science, and astronomy. Kinematics of linear motion (KLM) is one of the topics in Additional Mathematics, a subject taught in school that teachers find difficult to deliver effectively as it is the application to the other calculus topics known as differentiation and integration. These topics are most complex and require a long teaching period due to their massive content. Thus, teachers need good pedagogical content knowledge in teaching these topics. Furthermore, studies have shown that teachers' beliefs can influence their instructional and curricular decision making, the effectiveness of teaching and learning practices on their lessons, motivation to teach, demonstrate greater persistence in guiding challenging students, and ultimately, students' performance. However, there are not many studies on mathematics teachers' beliefs on KLM at the national level. Thus, this study intends to explore teachers' beliefs towards teaching kinematics of linear motion in Malaysia through these objectives: (1) to explore the teachers' beliefs on the content (2) the importance of KLM, and (3) to identify the challenges faced by the teachers in teaching KLM. Teachers' beliefs, according to Ajzen's theory of planned behaviour, are the basic contributing factor of any behaviour that is an indicator of unconsciously held ideas of manifestations on verbal commitments to abstract ideas that may be thought as part of a general teaching ideology. This study will use a qualitative multiple case study approach. Data will be collected through semi-structured interviews using interview protocol and non-participant classroom observations using fieldnotes. The study will involve eight Additional Mathematics teachers in West Malaysia who have graduated with a Bachelor of Science degree programme and has at least five (5) years of teaching experience. Data will be analysed through thematic analysis. In conclusion, the findings of this study may benefit other educators by providing insights on teachers' beliefs on the content and importance of KLM, challenges faced when teaching KLM, and the best practices in teaching KLM.

Keywords: Teachers' beliefs, kinematics of linear motion