Transforming physics content into content physics for instruction through the Model of Educational Reconstruction (MER)

ABSTRACT

This study discusses how to transform physics content into instructional content using the Model of Educational Reconstruction (MER). The MER is a popular method of lesson design because it gives equal attention to the content of physics to be learned other than students' cognitive, affective, and learning processes. This model is from the German-*Didaktik* tradition, which is influenced by constructivism and is nearly unknown in Malaysia. According to this perspective, knowledge is derived through human reconstruction, and every young learner has intuitive knowledge prior to entering a formal classroom. As a result, in order to meet students' needs in a balanced manner, teachers must elementarize physics content and integrate it with students' alternative conceptions. This study focused on energy concepts to determine how effective MER is. With the complexity and difficulty of the dual meaning of energy, physics teachers must devise efficient teaching techniques to bridge the gap between energy in everyday language and scientific concepts. Thus, the researchers evaluated 15 significant papers to determine scientists' understanding of energy; interviewed 12 secondary school physics students to get their alternative conceptions; and re-analyzed 23 earlier studies on the same topic. This paper is exclusively on natural concepts and energy fundamentals, and it found physicists and students had a significant understanding gap. As a result, the contradiction in understanding of the energy concepts must be applied to the development of an energy lesson plan by narrowing the gap between physicists' and students' understanding.