

***Augmented Reality for Science Learning Module in Physics Subject:
Momentum and Potential Energy.***

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ABSTRACT

Momentum and potential energy are two important concepts in physics that have various types, characteristics, change processes, and different roles. These concepts are part of the material in the Physics subject in class XI high school. Currently, learning about momentum and potential energy is still done conventionally through oral explanations, textbooks and YouTube videos, which have limitations in providing an in-depth understanding of the material. To overcome this limitation, an Augmented Reality (AR) based learning application was developed which can help students understand the concepts of momentum and potential energy through a 3D model and the use of two interactive markers. This research lasted for 11 months at SMA Negeri 2 Jember and Jember State Polytechnic, using the Multimedia Development Life Cycle (MDLC) method which involved interviews with physics teachers as sources of information and validators. From the research results, it appears that the use of AR as an alternative learning media succeeded in increasing students' cognitive abilities by 20.06%. Apart from that, User Acceptance Test (UAT) testing showed a satisfaction level of 80.92%. The success of the application is influenced by several factors, such as optimal light intensity between 80 and 100 lux, a simple background, a distance between the user and the marker of 10 to 50 cm, and a camera angle of around 45° so that 3D objects can be displayed clearly.

Keywords : *physics learning media, momentum and potential energy, augmented reality, marker interaction.*