ABSTRAK

Imam Sutopo "Pengembangan Media *Virtual Reality* dan *Augmented Reality* Berbasis Multirepresentasi untuk Meningkatkan Motivasi Belajar dan Hasil Belajar Kognitif Peserta Didik Pada Materi Hukum Kepler"

Penelitian ini bertujuan mengembangkan media Virtual Reality (VR) dan *augmented reality* (AR) berbasis multirepresentasi untuk meningkatkan motivasi dan hasil belajar peserta didik pada materi Hukum Kepler. Penelitian menggunakan metode Research and Development (R&D) model Hannafin dan Peck yang meliputi tahap *needs assessment*, *design*, serta *development/implementation*. Hasil *needs assessment* menunjukkan bahwa motivasi belajar fisika masih rendah, peserta didik kurang aktif, dan nilai belum mencapai KKM. Kesulitan utama terletak pada pemahaman konsep abstrak akibat pembelajaran yang masih didominasi metode ceramah dengan media terbatas. Pada tahap *development*, hasil validasi menunjukkan media VR memperoleh kelayakan 91% dan media AR 89%, keduanya dalam kategori sangat layak. Pada tahap *implementation*, keterlaksanaan pembelajaran menggunakan VR berada pada kategori sangat baik (93,75%–100%), sedangkan AR berada pada kategori baik (87,5%–93,7%). Peningkatan motivasi belajar pada kelas VR memperoleh N-Gain 0,71 (kategori tinggi) dan AR 0,51 (kategori sedang). Peningkatan hasil belajar kognitif pada kelas VR menunjukkan kenaikan nilai rata-rata dari 36 menjadi 83 dengan N-Gain 0,73 (kategori tinggi), sedangkan kelas AR meningkat dari 48 menjadi 82 dengan N-Gain 0,67 (kategori sedang). Berdasarkan indikator kognitif Bloom, peningkatan pada VR lebih optimal hingga level analisis, sedangkan AR dominan pada level kognitif rendah hingga menengah. Uji hipotesis menunjukkan terdapat perbedaan peningkatan motivasi belajar yang signifikan (sig. 0,000 < 0,05), namun tidak terdapat perbedaan peningkatan hasil belajar kognitif yang signifikan (sig. 0,216 > 0,05). Dengan demikian, kedua media efektif meningkatkan hasil belajar, tetapi VR lebih unggul dalam meningkatkan motivasi belajar peserta didik.

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Kata Kunci: media *virtual reality,* media augmented reality, motivasi belajar, hasil belajar, hukum Kepler

ABSTRACK

Imam Sutopo "Development of Virtual Reality and Augmented Reality Media Based on Multirepresentation to Improve Student Learning Motivation and Learning Outcomes in Kepler's Laws". '

This study aims to develop multirepresentation-based Virtual Reality (VR) and Augmented Reality (AR) media to improve student motivation and learning outcomes in Kepler's Laws. The study uses the Hannafin and Peck Research and Development (R&D) model, which includes the stages of needs assessment, design, and development/implementation. The results of the needs assessment show that motivation to learn physics is still low, students are not very active, and scores have not reached the minimum passing grade. The main difficulty lies in understanding abstract concepts due to learning that is still dominated by lecture methods with limited media. In the development stage, the validation results show that VR media obtained a feasibility of 91% and AR media 89%, both of which are in the very feasible category. In the implementation stage, the implementation of learning using VR was in the very good category (93.75%–100%), while AR was in the good category (87.5%–93.7%). The increase in learning motivation in the VR class obtained an N-Gain of 0.71 (high category) and AR 0.51 (medium category). The increase in cognitive learning outcomes in the VR class showed an increase in the average score from 36 to 83 with an N-Gain of 0.73 (high category), while the AR class increased from 48 to 82 with an N-Gain of 0.67 (medium category). Based on Bloom's cognitive indicators, the improvement in VR is more optimal up to the analysis level, while AR dominates at the low to medium cognitive levels. Hypothesis testing shows that there is a significant difference in learning motivation improvement (sig. $0.000 < 0.05$), but there is no significant difference in cognitive learning outcome improvement (sig. $0.216 > 0.05$). Thus, both media are effective in improving learning outcomes, but VR is superior in improving student learning motivation.

Keywords: virtual reality media, augmented reality media, learning motivation, learning outcomes, Kepler's laws