

ABSTRACT

The rapid development of technology has encouraged the increasing use of mobile devices in the field of education. To support the learning process, this study developed an Android-based "Dental AR" application as an educational medium to help users learn about dental and oral health through digital visualization using augmented reality technology. The model target approach was applied to improve the stability and accuracy of virtual object placement through the use of physical markers, while markerless was used to provide user convenience and flexibility. The application development was carried out using the Multimedia Development Life Cycle method which includes the stages of concept, design, material collecting, assembly, testing, and distribution. Application evaluation included functionality testing using black-box testing with equivalence partitioning techniques, performance testing, material expert assessment, and usability testing using the System Usability Scale on 46 respondents. The results of the functionality test show that all features run according to design, the performance test proves that the application performance is good and stable, the results of the material expert validation obtained a score of 95.6% which is included in the "Very Suitable" category, and the usability test obtained a System Usability Scale (SUS) score of 78.26 which is included in the "Acceptable" category with a scale grade of B, Adjective Ratings "Good", and the NPS (Net Promoter Score) aspect "Passive" approaching "Promoter".

Keywords: Android, Augmented Reality, Learning Application, Markerless, Model Target.

ABSTRAK

Pesatnya perkembangan teknologi telah mendorong meningkatnya penggunaan perangkat *mobile* dalam bidang Pendidikan. Untuk mendukung proses pembelajaran, penelitian ini mengembangkan aplikasi "Dental AR" berbasis android sebagai media pembelajaran untuk membantu pengguna dalam mempelajari kesehatan gigi dan mulut melalui visualisasi digital dengan menggunakan teknologi *augmented reality*. Pendekatan *model target* diterapkan untuk meningkatkan stabilitas dan ketepatan penempatan objek virtual melalui penggunaan penanda fisik, sedangkan *markerless* digunakan untuk memberikan kemudahan dan fleksibilitas pengguna. Pengembangan aplikasi dilakukan menggunakan metode *Multimedia Development Life Cycle* yang mencakup tahap *concept, design, material collecting, assembly, testing, dan distribution*. Evaluasi aplikasi meliputi pengujian fungsionalitas menggunakan *black-box testing* dengan teknik *equivalence partitioning*, pengujian performa, penilaian ahli materi, serta pengujian usabilitas menggunakan *System Usability Scale* terhadap 46 responden. Hasil pengujian fungsionalitas menunjukkan seluruh fitur berjalan sesuai rancangan, pengujian performa membuktikan kinerja aplikasi baik dan stabil, hasil validasi ahli materi memperoleh nilai 95,6% yang termasuk kategori "Sangat Layak", dan pengujian usabilitas memperoleh skor *System Usability Scale* (SUS) sebesar 78,26 yang termasuk kategori "Acceptable" dengan *grade scale B, Adjective Ratings "Good"*, serta aspek NPS (*Net Promoter Score*) "Passive" mendekati "Promoter".

Kata Kunci: Android, Aplikasi Pembelajaran, *Augmented Reality*, *Markerless*, *Model Target*.