

## INTISARI

Tugas akhir ini bertujuan untuk mengembangkan sebuah simulasi *fire drill* berbasis *Virtual Reality* (VR) pada gedung Smart Green Learning Center (SGLC) Fakultas Teknik Universitas Gadjah Mada dan membandingkannya dengan metode tradisional yaitu video petunjuk keselamatan. Tema kebakaran diangkat mengingat seberapa besarnya potensi kerusakan aset dan korban jiwa yang dapat ditimbulkan akibat ketidaksiapan penghuni dalam menangani kebakaran. Metode VR diambil karena menawarkan pengalaman yang lebih imersif dan realistis sehingga lebih dapat mensimulasikan kejadian nyata. Permainan ini dirancang dengan menggunakan MDA (*Mechanics, Dynamics, Aesthetics*) *framework* untuk mendesain model keseluruhan permainan beserta gamifikasi yang ada di dalamnya. Elemen gamifikasi utama yang digunakan pada permainan ini adalah pemberian *reward* berupa bintang berdasarkan waktu tempuh evakuasi dan *level unlock* yang akan membuka akses level ketika level sebelumnya telah selesai. Pengembangan aplikasi dilakukan dengan Unity dan simulasi dirancang untuk dapat dimainkan dengan optimal pada perangkat *Meta Quest 2*. Aplikasi menjalani tiga jenis pengujian yakni *Black Box Testing*, *System Usability Scale* (SUS), dan *User Experience Questionnaire*. Pada *Black Box Testing*, fungsionalitas aplikasi berjalan 100%. SUS dan UEQ diikuti oleh 17 responden. Nilai SUS yang didapatkan adalah 71,47 yang mengindikasikan aplikasi masuk dalam kategori "Good". Nilai UEQ mengindikasikan bahwa aplikasi mendapat predikat *Above Average* pada aspek daya tarik, *Good* pada aspek kejelasan, efisiensi, dan ketepatan, serta *Excellent* pada aspek stimulasi dan kebaruan. Selain pengujian aplikasi, penelitian ini juga membandingkan capaian belajar antara metode VR dengan video petunjuk keselamatan. Perbandingan dilakukan dengan membandingkan responden menjadi 2 kelompok dengan ukuran yang sama dan meminta responden mengerjakan *post test* setelah melakukan pembelajaran. Hasilnya, tidak terdapat perbedaan signifikan antara metode video dan VR.

**Kata kunci:** *Virtual Reality, Fire Drill, Game Development*, Gamifikasi, Aplikasi Pembelajaran

## ABSTRACT

*This undergraduate thesis aims to develop a Virtual Reality fire drill on the Smart Green Learning Center (SGLC) building of the Faculty of Engineering of Gadjah Mada University and compare it to the traditional method, the faculty's official safety induction video. It is very important to have discourses and research surrounding the topic of fire since the cost of the occupant's inability to handle and evacuate during the fire has resulted in multiple losses of both property and human lives. VR was chosen due to its ability to offer a comparatively more immersive and realistic fire environment and therefore can better simulate the real world. The game was designed with the MDA (Mechanics, Dynamics, Aesthetics) framework to construct the overall model of the game with the gamification elements inside. The key gamification element in this game is the reward system which consists of stars that are given to the players based on the evacuation completion time and the level unlock system which unlocks a level when a player finishes the previous level while blocking the access for players who haven't. The game was developed with Unity and it's designed to be optimally run on Meta Quest 2, a VR headset by Meta. This app has undergone three different tests which are Black Box Testing, System Usability Scale (SUS), and User Experience Questionnaire (UEQ). In the Black Box Testing, all the features and functionalities of the game work well as per the pre-defined criteria. The SUS and UEQ was done by 17 respondents, all of which are Universitas Gadjah Mada students. The game gets 71,47 for the SUS score which indicates the game is in the "Good" category. The UEQ scores indicate that the game is "Above Average" on its attractiveness, "Good" on its perspicuity, efficiency, and dependability, and "Excellent" on its stimulation and novelty. Other than the app testing, this research also tried to compare the learning outcome of the VR method and the use of safety induction video. A group of 30 respondents will be divided into 2 groups of the same size, one of which will be learning with a video and the other with VR. The result is that there's no significant difference between the video and VR methods.*

**Keywords :** Virtual Reality, Fire Drill, Game Development, Gamification, Educational Games