# Evaluating Key Attributes of Effective Digital Games in Tertiary Education: Solution to Designing a Digital Game Based Learning Model

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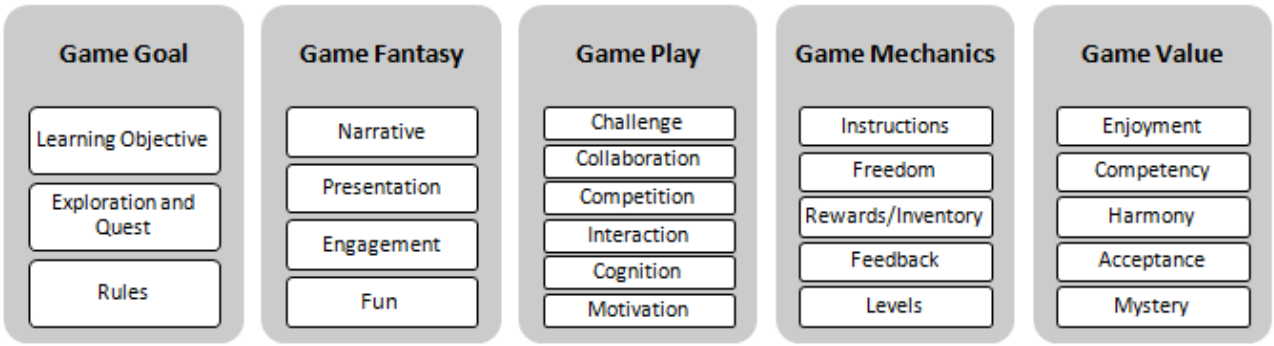
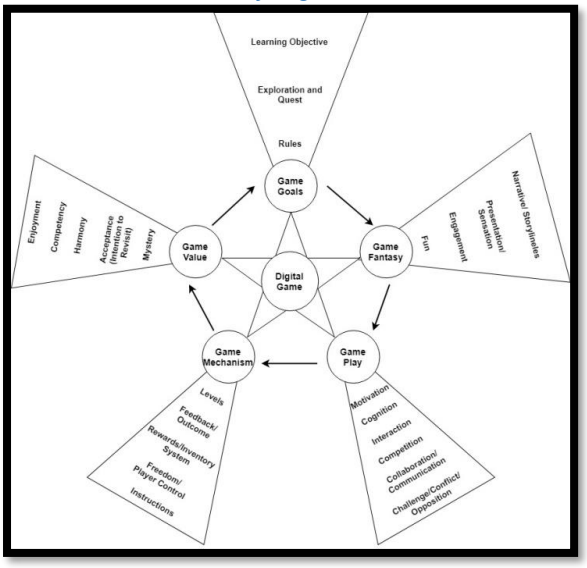
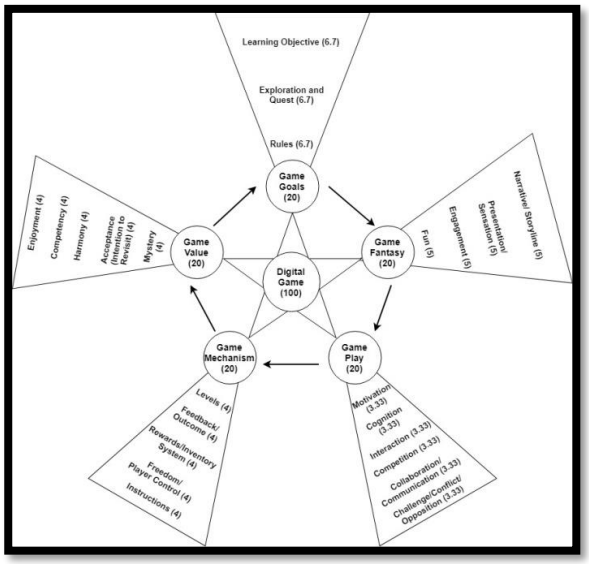



23 Key Digital Game Attributes and Their Grouping by Game Categories # 1




Summary Digital Game Based Learning (SDGBL) Model # 2




Weighted Summary Digital Game Based Learning (WSDGBL) Model # 3

## INTRODUCTION

The project is about proposing a novel approach for designing a DGBL model using high-level game design attributes of several educational digital games belonging to various game genres. This model can help educational game designers and educators in designing and integrating effective and engaging educational digital games into the tertiary education curriculum.

### What?

This project is about studying various literatures from the period of 1990-2020 to identify, know and organise key game attributes of educational digital games that make it an effective learning medium in tertiary education. These key game attributes are used to construct a universal model - Summary Digital Game Based Learning Model (SDGBL). The SDGBL model can be used to design and evaluate new/existing educational digital games belonging to any game genre to teach a particular skill or concept in tertiary education.

### Why?

The project was undertaken since one of the most serious issues with educational games to date is the insufficient convergence of educational and game design concepts which is partly because digital game designers and educational experts rarely share a common language. Additionally, the research to date has developed digital game-based learning (DGBL) models that can be used to design and evaluate educational digital games related to a specific game genre and they are hard to apply when the intended game genre varies significantly from the research default genres.

## DEVELOPMENT

This project was developed using the following research methodology:

To answer the research question and address the research problem presented in this study, this study used a combination of two types of qualitative research methods: systematic literature review and content analysis. (Ritterfeld et al. 2009; All et al. 2013; All et al. 2016) used a

similar combination of two methods: systematic literature review and content analysis to assess the effectiveness of DGBL in education.

This study used a systematic literature review method to find literatures related to the research topic, determine how digital games are used an efficient learning medium in tertiary education and determine what attributes are used to design educational digital games. Next, the research used qualitative content analysis method to analyze the relevant high-level design attributes of digital games that contribute to their educational efficacy and used them to construct a universal DGBL model.

Thus, this research was carried out in three stages:

1. Stage 1: Conduct a Systematic Literature Review (the data for research was collected)
2. Stage 2: Design a Summary Digital Game Based Learning (SDGBL) Model (the research data was analyzed)
3. Stage 3: Evaluate Existing DGBL Based on the SDGBL Model (The research outcome was evaluated)

## FINDINGS

The findings of this research are as follows:

- Discovered 23 common high-level design attributes of digital games belonging to various game genres based on the common properties, functionality, and values they share
- The study revealed that these 23 key attributes of the educational digital games contribute to their educational efficacy
- These 23 game attributes can be categorised into five game categories namely Game Goals, Game Fantasy, Game Play, Game Mechanism, Game Value using different approaches suggested by Sillaots et al., 2016; Federoff & Federoff, 2002; Adams, 2009
- These 23 game attributes and the five game categories can be used to construct a novel conceptual model that can help educational game designers integrate learning resources into their games and help educators integrate digital games into tertiary education curricula.

## CONCLUSION

This research made the following contributions:

1. The universal SDGBL Model consisting of the game attributes and game categories can be used to:
    - Design and analyze digital games for educational purpose in tertiary education
    - Test the applicability and appropriateness of any new or existing educational digital game before integrating it into the tertiary education curriculum
    - Enhance teaching and learning practices in tertiary education institutions by assessing existing DGBL against the model and by incorporating assessed DGBL in the curriculum
2. Based on the SDGBL Model, a digital educational game evaluation tool was designed - the WSDGBL Model (scoring model). The WSDGBL Model can be used as a universal model to evaluate any genre of educational digital games related to any subject, skill, or course in tertiary education
3. This new conceptual model (SDGBL) and the evaluation tool the WSDGBL Model (scoring model) are the contribution to the knowledge on DGBL