

Effective Educational Computer Games (CG): A Structured Equation Modeling Approach

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Abstract: In this paper, a Structured Equation Modeling (SEM)-oriented game model will be developed based on the literatures. The main reference of this model is the user-centered game-based learning model [3]. The model developed consists of 10 exogenous and 5 endogenous variables. Future research will be carried out to determine the validity of the model by determining the relationships among all the variables.

Keywords: Motivation, challenges, learning, SEM, educational game

Introduction

Successful learning is dependent on motivation [8]. However, classroom teaching is often considered as boring and not motivating. Most students like to play computer game because it is motivating [5]. Therefore, greater efforts have been made to incorporate learning content into computer games, resulting in what is now popularly known as edutainment. Edutainment developed based on behaviorist learning theories focuses on drill and practice which requires memorization [4]. This form of learning stimulates only a low level of interaction. In this paper, the authors will determine the important factors in educational game development that contributes towards quality interaction in game development.

1. User-centered Game Based Learning

In [3], a user-centered game based learning model in higher education classifies learning process into conscious and unconscious processes. In this model, two important factors lead to enjoyability in playing games, i.e., user's motivation and the game's usability. To motivate the user to play educational games, it is important to understand the user's background. Games which are usable should be simple, available at any time any where, have short play time and are featured with competition. Playing and enjoying the game generates opportunities for players to experience incidental learning.

In addition to the model developed by [3], motivation-driven educational game design model is discussed by [2] whereby fun creates intrinsic motivation, which is a balance between challenges and skills. In [6], the authors developed an experiential gaming model based on experiential learning theory, flow theory and game design. Based on some other educational games literatures, a structural model is developed.

2. SEM (Structural Equation Model)-oriented Game Design Model

Our SEM model (Figure 1) consists of five orders of latent variables. The first order latent variables are independent and exogenous because no prior casual variables. As for the second latent variables, motivation is positively related to complexity [10, 9], usefulness [3], fun [2], control [10, 2], variety [7], challenge [7, 6, 2] and curiosity [7, 2]. Usable games are positively related to usability [3, 9, 1], flow state [1, 6] and reality of function [1]. Motivation and usable game are positively related to the third order latent variable, enjoyability [3]. Enjoyable game-based learning is positively related to the fourth latent variables, i.e., incidental/ experiential learning [3, 6, 1]. Finally, the learning process is positively related to the fifth latent variable, the learning result [3].

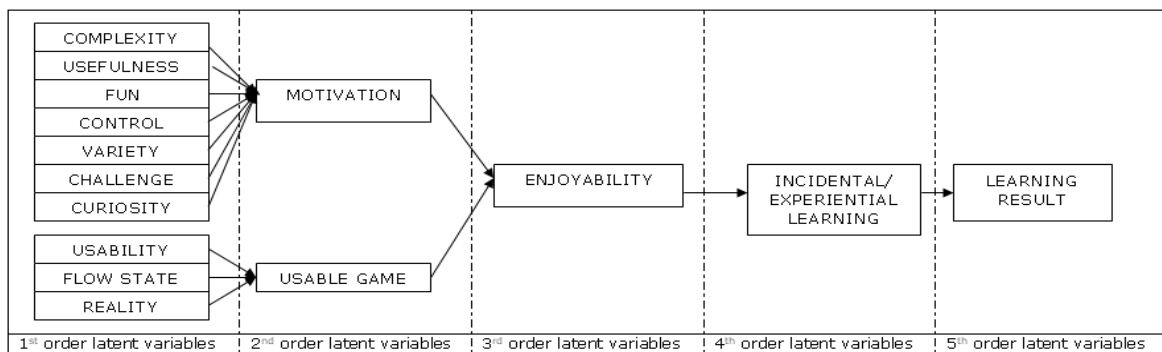


Figure 1: Path Diagram of Structural Model

3. Conclusion

Based on the path diagram in Figure 1, SEM will be used to estimate the multiple interrelated dependence relationships among the variables and to define a model to explain the entire set of relationships. The variables are conceptualized as latent and each variable will be measured by at least three indicators.

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