

A Conceptual Teacher-Learner Model for a Collaborative Learning with Serious Games

Amri Yusoff, Sultan Idris Educational University, Malaysia, amri@fskik.upsi.edu.my
 Richard M. Crowder, Lester Gilbert, and Gary Wills, University of Southampton, Southampton, UK,
 Email: rmc@ecs.soton.ac.uk, lg3@ecs.soton.ac.uk, gbw@ecs.soton.ac.uk

Abstract: This paper introduces a conceptual Teacher-Learner framework for a collaborative learning with serious games. An initial study identified twelve attributes of educational serious games that can be used to support effective learning. These attributes are used in the conceptual framework to support learning and pedagogy in combination with a game. A considerable number of serious games have been developed over the last ten years, with varying degrees of success. Due to a lack of clear standards and guidelines for game developers; it is difficult to justify claims that a specific game meets the learner's requirements and/or expectations. This paper defines a conceptual model for serious games that will contribute to their design and the measurement of achievement in meeting the learners' requirements.

A Conceptual model for collaborative learning

The framework is an evolution of the input-process-outcome game model discussed by Garris et al (Garris, Ahlers, & Driskell, 2002), the conservation framework by Laurillard (Laurillard, 2009) and the conceptual framework presented by Yusoff et al (Yusoff, Crowder, & Gilbert, 2010; Yusoff, Crowder, Gilbert, & Wills, 2009). The individual components of the model are discussed in this section.

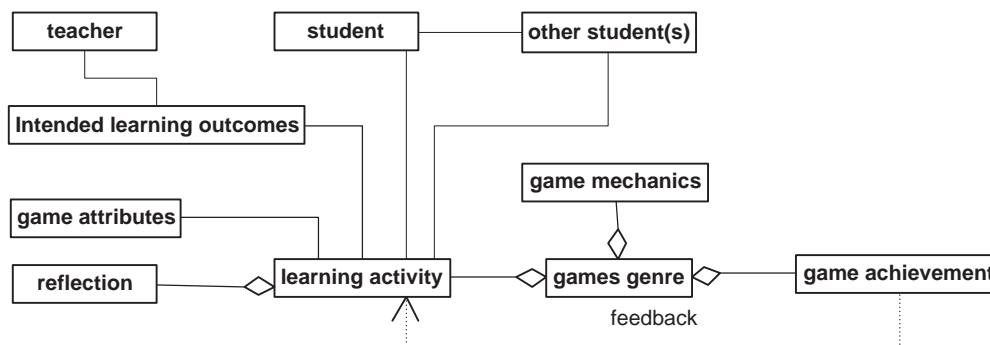


Figure 1: Conceptual Framework for Collaborative Learning shown as a Structural Class diagram.

Game attributes

Game attributes are those aspects of a game which support learning and engagement. The game attributes are developed based on the critical thinking resulting from the literature review on behaviorist, cognitive, constructivist, educationist, and neuroscience perspectives (Yusoff et al., 2009), as listed in *Table*. The serious games framework presented in this paper identifies the major components that create an effective model for learning through the use of serious games. Every component inside this framework plays a role to ensure that learning would take place while playing the game. We propose this framework as an appropriate basis for effective serious games design for designers and teaching practitioners.

Attributes for Serious Games	Values for Learning and Education
Incremental learning	Learning material is delivered incrementally. Additional new knowledge is delivered and not done all at once. It will have a proper start and end section. Learner feels and learns in a natural way and less complex.

Linearity	Learning will be in sequence. This will suit the sequential learner. However, due to the games flexibility, active learner can skip chapters.
Attention span	This concerns with the cognitive processing and short-term memory loads placed upon the learner by the game. These loads need to be carefully calibrated to the target learner Not to be overwhelmed and too long in the learning process.
Scaffolding	Support and help during learning within the games.
Transfer of learnt skills	Learnt knowledge to apply to other skills in the next level.
Interaction	Higher engagement, higher learning.
Learner control	Active learning, self study and self exploration based on individual pace and experience.
Practice and drill	Repeating for harder task, better knowledge retention and can have plenty of game activities for drills.
Intermittent feedback	Learner to reflect on what has been achieved so far and motivated for higher score (higher learning). Also using just in time feedback for learning.
Reward	Encourage learner and keep motivated. Negative reward as punishment within the game may also contribute to learning.
Situated and authentic learning	Learning where the learner can relate what is being learnt within the game to the outside world.
Accommodating the learner's styles	To suit and to reach out to different learner styles.

Table 1: Serious Games Attributes

References

- Garris, R., Ahlers, R., & Driskell, J. E. (2002). Games, motivation, and learning: A research and practice model. *Simulation & Gaming*, 33(4), 441-467.
- Laurillard, D. (2009). The pedagogical challenges to collaborative technologies. *International Journal of Computer-Supported Collaborative Learning*, 4(1), 5-20. doi: 10.1007/s11412-008-9056-2
- Yusoff, A., Crowder, R., & Gilbert, L. (2010, July 15-17). *Validation of Serious Games Attributes Using the Technology Acceptance Model*. Paper presented at the The 2nd International IEEE Conference on Serious Games and Virtual Worlds for serious applications (VSGAMES 2010), Braga, Portugal.
- Yusoff, A., Crowder, R., Gilbert, L., & Wills, G. (2009, July 15-17). *A Conceptual Framework for Serious Games*. Paper presented at the 9th IEEE International Conference on Advanced Learning Technologies (ICALT 2009), Riga, Latvia.

Acknowledgments

Author would like to thank Universiti Pendidikan Sultan Idris for funding him with a one-year research grant.