

## Chapter 4

# Linking the Elements of Learning, Assessment, and Play Experience in a Validation Framework

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### **ABSTRACT**

*Educational games are often described as a balancing act between the entertainment aspects of video games—be it the engagement, motivational, or immersive advantages of it—and the serious subject matter of teaching, learning, and assessment. Thus the key challenge of game-based learning is how the merging of these two aspects could assist in the knowledge retention and application of the subject matters within the real-world environment, especially in the realm of education. The chapter proposes a validation framework that can link elements of learning and assessment in a subject matter to play experience in educational games before those games are developed. The framework will allow game designers and developers to understand the cognitive processes of learning, not only in designing effective educational games, but also to comprehend the intricacies and connections between learning and principles of game design. This in turn enables game researchers to develop effective educational games which are pedagogically and ludologically sound.*

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## **INTRODUCTION**

Educational games are often described as a balancing act between the entertainment aspects of video games—be it the engagement, motivation or immersive advantages of it; the serious subject matter of teaching, learning and assessment; and how the merging of these two aspects could assist in knowledge retention and application of the subject matter within the real-world environment, especially in the realm of education (ref). Understanding cognitive processes of learning not only facilitates effective educational game design, but also allows game designers and developers to comprehend the intricacies and connections between learning and principles of game design (ref).

Meanwhile, game researchers should have the ability to identify and validate educational games for their effectiveness, although they might not have the capacity to develop games themselves (ref). Therefore, there is a need for a method for validating educational games, specifically from both pedagogical and ludological perspectives. At the core of such need, one should be able to measure the success for any educational game through its assessment of learning outcomes. The link between learning and assessment of competency is a momentous process in academic and vocational education (ref). In this process, assessment is playing arguably a vital role, particularly when measuring the competence of learners and the effects of the learning process.

This chapter explores methods of validating educational games at the pre-development stage. As shown in Figure 1, validation of educational games can occur in either the pre-development, development or post-development stages (ref). However, most evaluation or validation of educational games are conducted at the post-development stage (Connolly et al., 2012; Clark, Tanner-Smith, & Killingsworth, 2016; Wouters et al., 2013). This is evident from the use of randomized control trials and various quasi-experimental designs, involving pre-test and post-test scenarios—methods best suited to assess the causal relation between product and effect, in this case educational games and learning that takes place. However, validating a game after it has been released arguably presents some ethical concerns as the layer of implication would state that the said educational game may have been deployed in the market without under-going a sufficient validation process. The concern would also be the limited amount of resources the developers have for rectifying mistakes found upon the end of development if the game was deemed not effective. Thus, a pre-development validation framework would elevate those concerns, since game developers would have higher degree of controls to identify and repair eventual problems in the early stage of the educational game creation.

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