Chapter 6
Guidelines for Designing Effective Games as Clinical Interventions: Mechanics, Dynamics, Aesthetics, and Outcomes (MDAO) Framework

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ABSTRACT
Games are a successful pedagogical tool to change attitudes and behaviors. This chapter will examine how games facilitate change, discuss common pitfalls, and outline best practices for making serious games for clinical practice. Sustained engagement and motivation are key to lasting clinical interventions. When developing a game for clinical practice, the designer should avoid “punishing by rewards” (Kohn, 1993), damaging motivation towards the desired goal. Understanding game design principles is crucial to creating intrinsically engaging experiences that lead to lasting motivation. The Mechanics, Dynamics, and Aesthetics (MDA) framework is widely accepted by game designers as a framework to make compelling games. Using MDA as a base for understanding how to create engaging experiences, this chapter proposes a new framework for serious games called Mechanics, Dynamics, Aesthetics, and Outcomes. MDAO describes how to design a game that is intrinsically motivating and effective by focusing on the interplay between outcomes and other vectors of design.

INTRODUCTION
A clinical intervention can be any program, activity, or experience designed to promote specific health outcomes. Not all interventions are games, but games have been shown to excel at engaging, motivating, and teaching - qualities that are valuable in interventions. To take full advantage of the engaging, motivating, and teaching potential of games, a designer must understand the elements that come together to create a game, and their implications for motivation. In this chapter, those interventions that meet the definition of a game are referred to as “serious games” (Abt, 1970), being
distinct from entertainment games in that they have an explicit intended outcome beyond entertaining the player. Many interventions that are designed with the intention of being games, or harnessing the motivational potential of games, fail to include all of the elements that would make them true serious games. These game-based interventions are unable to benefit from all that games have to offer as a medium for clinical interventions.

Most game-based interventions fall short of being true serious games because of a fundamental misunderstanding of the motivational nature of games. The definition of a game that is provided in this chapter will help to clarify this misunderstanding and illustrate the potential that serious games have as interventions. The most common type of game-based interventions, and perhaps the most worrying, is “gamified” interventions. Gamification is the process of adding game-like extrinsic rewards to an activity without adding the other elements that serve to create an intrinsic motivational framework. This approach has become popular because it appears to be effective early on, but as participants continue, they often begin to feel like they are being punished or controlled. This limits the effectiveness of gamified interventions, and can even leave participants feeling less inclined to work toward the goal of the intervention than they were prior to participating in the intervention (Deci, Koestner & Ryan 2001).

This chapter will present the challenges inherent in the medium for those interested in harnessing the potential benefits of games as clinical interventions, as well as propose a framework on which to base the game design process for clinical interventions. The chapter begins with a look at common design flaws that prevent interventions from fully utilizing the potential of games. An in-depth definition of games is provided and used to explain where and how interventions can fall short of becoming effective serious games, and why games are such an effective format for interventions. Next, the chapter will discuss the existing Mechanics, Dynamics, and Aesthetics (MDA) framework of best practices for game design, and present the new Mechanics, Dynamics, Aesthetics, and Outcomes (MDAO) framework, which adapts those practices to a more specific use in serious games. Finally, the chapter will cover the process of putting MDAO into practice, including a step-by-step example of making a hypothetical serious game, in order to familiarize designers with this process and help them create more effective serious games.

**BACKGROUND**

**Beyond Gamification**

In order to create effective serious games, it is important to understand why and how games create engaging motivational experiences that can lead to behavior change. The primary reason for this is that games are able to create intrinsic motivation, rather than relying on coercive extrinsic motivations. Deci and Ryan (2000) define intrinsic motivation as engaging with an activity because it is inherently interesting or enjoyable, and extrinsic motivation as engaging with an activity because it leads to a separable outcome. There are many misconceptions about what makes a game intrinsically motivating.

According to Gurau (2008), some of the misconceptions that have led to the creation of so many game-based interventions, when true serious games would have been more effective, come from a study by Chen and Ringel (2001) on “advergames” – game-based experiences designed to advertise products. In this study, the authors recommended that games should be kept simple in order to promote continuous interaction, a profound misunderstanding of the nature of engagement in games.

Today, we see many non-game activities with game-like elements poorly thrust upon them in misguided attempts to make tedious activities more engaging. The most common game-like elements
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