

# Chapter 16

## Background Music in Educational Games: Motivational Appeal and Cognitive Impact

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### ABSTRACT

*Most game-designers likely stick to the assumption that background music is a design feature for fostering fun and game play. From a psychological point of view, these (intuitive) aspects act upon the intrinsic motivation and the flow experience of players. However, from a pure cognitive perspective on instructional design, background music could also be considered to be redundant information, which distracts from learning. The presented study investigated the influence of background music (present vs. not present) within an educational adventure game on motivational (intrinsic motivation, experienced flow) and cognitive variables (cognitive load, learning success). The results suggest a high motivational potential of background music. However, neither positive nor negative effects on learning were detected. Thus, background music can be considered as a motivating design element of educational games without negative side-effects on learning.*

### INTRODUCTION

Background music is an important design feature in games and is mainly implemented for enhancing immersion and game play. Since educational games aim at establishing a playful, enjoyable

form of learning, background music can be conceptualized as a source of motivation to play and to learn. However, from a theoretical point of view background music can have different effects on learning which will be explained in more detail in the following subchapters. On the one hand

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it might foster learning via motivation, on the other hand it might either distract from learning or be neutral with respect to cognitive variables. So far, systematic research on background music in educational games, which considers motivational as well as cognitive variables is rather spare (Richards, Fassbender, Bilgin, & Thomson, 2008; for an overview see Zehnder & Lipscomb, 2006). The aim of the presented study is to give first evidence on the motivational and cognitive effects of background music with respect to game-based learning.

## **THEORETICAL BACKGROUND**

The presented study concentrates on two main aspects of background music: On the one hand the motivational appeal of background music is investigated and on the other hand the cognitive impact of background music is disputed. Accordingly, the theoretical section is twofold: First, the relevant theories and findings on the motivational appeal of background music are explored. Second, the cognitive impact of background music is disputed from a theoretical perspective. Based on the presented theoretical considerations, the section closes with the derived research questions of the presented investigation.

### **Motivational Appeal of Background Music**

Background music as a design feature of (educational) video games is often mainly implemented for fostering fun and game play. These aspects can be theoretically conceptualized as intrinsic motivation and the flow experience of players. In this section we provide first a psychological theory on motivation, and second outline the theoretical framework of the so-called Flow Theory.

Among the most prominent theories concerning motivation is the Self-Determination Theory (Deci & Ryan, 1985) that focuses on the degree

to which human behavior is volitional or self-determined. Within this approach different types of motivation can be distinguished, whereas the most essential distinction is made between intrinsic motivation and extrinsic motivation. Intrinsic motivation refers to the fact that individuals do something because it is inherently interesting or enjoyable. This type of motivation has emerged to be essentially important for education. On the other hand, extrinsic motivation refers to doing something because it leads to a separable outcome (Ryan & Deci, 2000a). With respect to this differentiation, the implementation of background music mainly refers to the concept of intrinsic motivation.

A psychological concept that is closely related to motivation refers to the so-called flow experience, which is said to be intrinsically rewarding and can be seen as a kind of hedonic state. Principally, the Flow Theory (Csikszentmihalyi, 1990; Csikszentmihalyi, Abuhamedh, & Nakamura, 2006) is a unified framework on subjective experiences in the course of mastering everyday challenges. According to this approach the quality of subjective experiences is determined by the balance between the perceived challenges of the task on the one hand, and the perceived necessary skills for mastering the task on the other hand. If challenges and skills are both at a low level, the person experiences apathy. If the perceived challenges are lower than the perceived skills, the person is bored. If the perceived challenges overrun the perceived skills, the person feels anxiety. If the perceived challenges as well as the perceived skills are simultaneously high, the person experiences flow or flow in consciousness, respectively, and this represents the highest quality of subjective experience. The experience of flow or being immersed in an activity, respectively, is intrinsically rewarding and can be seen as a hedonic state. This notion implies the following assumptions: If the person is bored (skills > challenges) then he/she should seek new challenges. On the other hand, if the person is overloaded and anxious (skills

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