Chapter 25
Examining the Effectiveness of Hyperaudio Learning Environments

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ABSTRACT

The focus of instructional designers is increasingly shifting towards mobile devices such as smartphones or tablets and their use for learning purposes. These devices not only enable text-based but also audio-based instruction. This chapter presents the concept of hyperaudio, a special type of non-linear auditory learning environment. Contrary to other instructional devices such as hypertext, there is little research on learning with hyperaudio yet. In view of this scientific gap, this chapter aims at examining the effect of non-linear auditory presentation of information in more detail. To begin with, cognitive processes which are crucial for hyperaudio learning are examined. Then, some seminal studies investigating the design of hyperaudio learning environments and their influence on learning processes are presented. Results indicate that non-linear auditory information presentation is not always beneficial in terms of learning outcomes and cognitive load.

INTRODUCTION

The post-modern era has brought about a dramatic change in our requirements from education and information. From a subjective point of view, the need and urgency for retrieving specific information has increased significantly. As a result, learners demand instant access to learning resources and information required for problem-solving as well as a flexible approach to learning. The development of new media offers, amongst other things, various opportunities for such flexible ways of learning. This is supported from a technological perspective by an ever-increasing number of versatile handheld devices. Mobile

technologies such as smartphones are particularly well suited to meet these demands as they facilitate learning outside the bounds of time and place. Such equipment allows a fast retrieval of the right information at any given moment. While the place and time of learning were previously predefined by teachers, new media allow today's learners to decide where and when to learn (Weidenmann, 2001). Mobile learning scenarios, usually referred to as "m-learning", provide enormous potential for autonomous learning. In addition, current standards and software developments (e.g. data reduction) open up a wide range of applications. Consequently, a wide field of research on learning and instruction using mobile digital devices has been emerging in recent years (e.g. Hsi, 2003; Roschelle & Pea, 2002) as developing increasingly sophisticated mobile learning environments requires considerable experience and expertise. Particularly careful planning is required with regard to the uses of mobile devices in order to attract users and learners and to provide them with an integrated learning experience. Mobile technologies such as smartphones or tablets allow the presentation of both auditory and visual or audio-visual information. Given the wide range of technical possibilities available, finding the best way to present information and meet learners' needs still poses a challenge to instructional designers. This paper focusses on auditive information as an arrangement of information that is presented exclusively via the auditory channel. In particular, the dissemination of mobile devices such as MP3-players or smartphones, to name but two examples, has led to an intensified usage of auditive instruction in recent years (O'Bannon, Lubke, Beard & Britt, 2011; Vajoczki, Watt, Marquis & Holshausen, 2010).

This chapter analyses the influence of different formats of audio-based learning environments. Generally, linear presentation of audible information is widely used for learning purposes, e.g. in podcasts, audiobooks, or other instructional material exclusively designed for auditive instruction. In the following paragraphs, however, the authors would like to focus on a different format of information presented via the auditory channel, namely "hyperaudio". To begin with, a closer look will be taken at the concept of hyperaudio as a means of presenting non-linear auditive information. In the context of basic theoretical assumptions, the differences between hyperaudio and existing non-linear information media such as hypertext will be examined. In contrast to Hypertext, for example, there is hardly any research on hyperaudio yet, especially with regard to its use for learning purposes. This paper therefore aims to contribute to this field of research by providing an overview of theoretical and empirical findings regarding the design of hyperaudio learning environments. To this end, a brief definition of hyperaudio and a summary of relevant theoretical concepts such as Cognitive Load Theory (Paas, Renkl & Sweller, 2004; Sweller, 1994) or Cognitive Flexibility Theory (Spiro & Jehng, 1990) will be provided. Furthermore, some empirical findings regarding hyperaudio and related topics such as hypertext or hypervideo will be presented. In this context, different factors influencing self-paced knowledge acquisition by means of non-linear media will be analysed. These include content features such as text type and structure, modality of information presentation (visual or oral), and text arrangement and order (linear versus non-linear). According to research related to linear and non-linear learning environments, the above-mentioned factors are known to have an impact on learning outcomes and cognitive load as they are experienced by learners during the process of knowledge acquisition. The analyses presented in this paper seek to provide an understanding of the influence of different formats of information presentation on knowledge acquisition. Finally, some design principles for supporting knowledge acquisition in hyperaudio learning environments will be proposed.

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