Review

A review of research and a meta-analysis of the seductive detail effect

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A B S T R A C T

Seductive details constitute interesting but irrelevant information that are not necessary to achieve the instructional objective. The seductive detail effect occurs when people learn more deeply from instructional messages that exclude rather than include these details. This effect is mainly explained by assuming an overloading of the working memory, attention distraction, schema interference or coherence disruption. This review presents 39 experimental effects in the form of text passages, illustrations and other kinds of seductive details. This meta-analysis reveals a significant seductive detail effect with small to medium (retention performance) and medium (transfer performance) effects. Furthermore, empirical evidence for moderating effects and various explanations of the seductive detail effect are reviewed. Empirical data supports, but also calls into question, each of the four explanations. The review concludes by discussing the theoretical and practical implications, as well as the limitations and future directions of this research.

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Contents

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1. Introduction

Knowledge acquisition and knowledge transfer play a central role in human development, especially in today's culture. Knowledge can be presented with traditional or computer-assisted media, as well as with different presentation modes such as illustrated textbooks, animation and computer simulation. Instructional effectiveness should be optimised in all cases. One potential technique for improving instructional effectiveness is to add or remove seductive details (cf. Harp & Mayer, 1997). Seductive details are interesting but irrelevant details that are not necessary to achieve the instructional objective (Mayer, 2005). For example, an interesting cartoon could be added to or removed from a text, which is only tangentially related to the text topic and is an irrelevant adjunct that is not necessary to understand the content. The instructional objective determines what part of the instructional material is relevant for learning and what part can be considered a seductive detail.

Seductive details can be presented in different forms. The first studies examining seductive details referred to written seductive text passages that were typically added to instructional texts (e.g., Garner, Gillingham, & White, 1989). Later studies included seductive illustrations added to multimedia messages (e.g., Harp & Mayer, 1998). Other kinds of seductive details were also examined such as in spoken form during lectures (Harp & Maslich, 2005), as video clips (Mayer, Heiser, & Lonn, 2001) and as sounds and background music in multimedia messages (Moreno & Mayer, 2000). Thalheimer (2004) suggests using the term "seductive augmentations" for these kinds of interesting but irrelevant details, and reserving the term "seductive detail" for seductive text passages only. This proposed distinction has not prevailed in the recent literature on seductive details. Therefore, in this paper, "seductive details" constitute all kinds of interesting but irrelevant details that are not necessary to achieve the instructional objective (Mayer, 2005).

On one hand, many teachers, text book writers and instructional multimedia designers add seductive details to instructional messages with the hope of encouraging the learner to pay more attention to the rest of the instructional material and to foster learning outcomes by heightening the audience's curiosity, enjoyment and interest in the topic (cf. Harp & Mayer, 1997). On the other hand, it can be assumed that removing seductive details improves learning outcomes, for example, by shifting the learner's attention from irrelevant to relevant details (Harp & Mayer, 1997). In this regard, the seductive detail effect arises when people learn more deeply from an instructional message when extraneous material is excluded rather than included (Mayer, 2005).

The purpose of this review and the included meta-analysis is to present different theoretical explanations and empirical findings on the seductive detail effect and its moderating effects. This paper reviews the empirical evidence supporting the different explanations of the seductive detail effect, followed by a discussion on the theoretical and practical implications, limitations and future directions of this research.

2. Theoretical explanations of the seductive detail effect

Different theoretical explanations for the seductive detail effect exist (e.g., Harp & Mayer, 1998; Lehman, Schraw, McCrudden, & Hartley, 2007). These explanations are related to overloading working memory, attention distraction, schema interference and coherence disruption. In addition, motivational aspects, persistence and perceptual load are briefly discussed.

The first theoretical explanation for the seductive detail effect in the cognitive theory of multimedia learning (CTML) is that the working memory is limited and one or both channels can be easily overloaded by extraneous material (cf. with extraneous cognitive load postulated in the cognitive load theory from Sweller, 2005). If the learner is required to process extraneous material, they may not be able to engage in cognitive processes that are needed to make sense of the essential material (Mayer, 2005). Mayer, Griffith, Jurkowitz and Rothman suggest a similar explanation (2008). The authors assume that high-interest details use more of the learner's cognitive processing capacity than low-interest details do, thereby leaving less capacity for the learner to make sense of the essential material.

According to the distraction hypothesis postulated by Harp and Mayer (1998), seductive details reduce learning outcomes by drawing the learner's selective attention away from important information (cf. with the irrelevant sound/speech effect, e.g., Beaman, 2005). In this regard, Harp and Mayer (1998) assume that seductive details tend to contain information that requires little attentional effort and is easily understood. Garner et al. (Garner, 1992; Garner, Brown, Sanders, & Menke, 1992) use a light switch metaphor to explain information processing (Anderson, Mason, & Shirey, 1984) where the switch can be turned on (often to seductive details) and off (often to important generalizations). A similar explanation for the distraction hypothesis presumes that seductive details harm learning outcomes only for learner's with low working memory capacity who are less able to control their attention and focus on relevant information (Sanchez & Wiley, 2006).

Another explanation for the seductive detail effect assumes that seductive details interfere with learning by priming inappropriate schemas around which learners organize the material (Harp & Mayer, 1998; Lehman et al., 2007). A schema is a cognitive construct that organizes the elements of information in order to store them in long-term memory. According to this explanation, the learner builds a coherent mental representation of the instructional material that is organized around seductive details rather than the main ideas.