Chapter VIII

An Adaptive Feedback Framework to Support Reflection, Guiding and Tutoring

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Abstract

In this chapter, an adaptive feedback framework (AFF) is proposed for the provision of personalized feedback accommodating learners’ individual characteristics and needs in the context of computer-based learning environments. Multiple informative, tutoring, and reflective feedback components (ITRFC) are incorporated into the framework, aiming to stimulate learners to reflect on their beliefs, to guide and tutor them towards the achievement of specific learning outcomes and to inform them about their performance. The proposed framework adopts a scheme for the categorization of learners’ answer, introduces a multi-layer structure and...
a stepwise presentation of the ITRFC and supports adaptation of the provided feedback both in the dimensions of adaptivity and adaptability. The adaptivity of the AFF is based on the gradual provision of the ITRFC and on the adaptive presentation of the ITRFC according to the learner’s knowledge level, preferences and interaction behaviour. The adaptability of the AFF enables learners to have control over the feedback presentation in order to guide the adaptive dimension of the framework. In the context of the Web-based concept map assessment tool referred to as COMPASS, the proposed framework has been adopted for the provision of personalized feedback in concept mapping tasks. A preliminary evaluation of the framework in the context of COMPASS showed that the AFF led the majority of the learners in reviewing their maps, reconsidering their beliefs and accomplishing successfully the underlying concept mapping task.

Introduction

Feedback is considered as a key aspect of learning and instruction (Mory, 1996). Bangert-Drowns, Kulik, Kulik, and Morgan (1991) emphasize that “... any theory that depicts learning as a process of mutual influence between learners and their environments must involve feedback implicitly or explicitly because without feedback, mutual influence is by definition impossible. Hence, the feedback construct appears often as an essential element of theories of learning and instruction”. Effective feedback aims to (i) assist learners in identifying their false beliefs, becoming aware of their misconceptions and inadequacies, and reconstructing their knowledge, (ii) help learners to determine performance expectations, identify what they have already learned and what they are able to do, and judge their personal learning progress, and (iii) support learners towards the achievement of the underlying learning goals (Mason & Bruning, 2001; Mory, 1996). Thus, feedback should guide and tutor learners as well as stimulate and cultivate processes like self-explanation, self-regulation, and self-evaluation, which require reflection (Chi, de Leeuw, Chiu, & Lavancher, 1994; Vosniadou, 2001). Moreover, feedback should be aligned, as much as possible, to each individual learner’s characteristics, since individuals differ in their general skills, aptitudes, and preferences for processing information, constructing meaning from it and/or applying it to new situations (Jonassen & Grabowski, 1993).

Characteristics that influence the effectiveness of feedback concern the type of feedback, the amount of the provided information as well as the adaptation to learners’ individual differences. Various types of feedback have been proposed and investigated in literature (see reviews by Bangert-Drowns et al., 1991;
Macromedia Director-MX Lessons Development (MAD-LED) Model: The Immediacy of Online-Distance Teaching-Learning in Multimedia and Real-Time Environments

Jameson Mbale and Manish Wadhwa (2016). Creating Teacher Immediacy in Online Learning Environments (pp. 252-272).

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