Chapter 7.17
Lost in Translation:
Improving the Transition Between Design and Production of Instructional Software

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ABSTRACT

Developing modern instructional software has become very complex. As a result, the communication between instructional designers and other stakeholders in the development process is becoming increasingly important. However, due to differences in background, focus, and tools among ISD stakeholders instructional designers lack the means to provide reasonably unequivocal design documentation for these stakeholders. These differences in stakeholders create a context where the design documents produced are not sufficiently related to the specific needs of the stakeholders, in terms of meaningful organization and differentiation of level of detail. This problem is complicated by the lack of shared design languages. These problems prevent precise expression of design information. The 3D-model is introduced to support instructional designers to stratify, elaborate, and formalize design documents, even if design languages are hardly shared between designers and other stakeholders. Two validation studies show that the 3D-model contributes to a better information transition between instructional designers and software producers—one of the stakeholders in the development process.

INTRODUCTION

Currently, the educational field is characterized by many innovations: mobile learning, next-generation e-learning systems that retrieve information from business processes, or case-based learning in virtual environments. These innovations, and others, provide the flexibility to enable the integration of working and learning,

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with time and place independent learning, and adaptive learning, personalized for individual learners (Rosenberg, 2000). These innovations illustrate how organizational, technological, and pedagogical aspects of instructional software can change rapidly. Also affected by these innovations is the way instructional software is developed. The combination of organizational considerations (e.g., "What are the new roles of teachers using instructional software?"), pedagogical considerations (e.g., "How can authentic learning tasks be implemented in the instructional software?"), and technological considerations (e.g., "Which media mix is optimal?") makes the development process highly complex (Jochems, van Merrienboer, & Koper, 2003). Consequently, a structured approach to design, production, and implementation of instructional software is required.

One area in the instructional software development process that appears to be negatively affected by this increased complexity is the transition of information from the design phase to subsequent phases, or, from an instructional designer to the other stakeholders in the process (Boot, van Merriënboer & Theunissen, submitted). A bottleneck is created in that the intentions of the instructional design, described in training blueprints and storyboards, are not communicated clearly enough to other stakeholders of the development process. For example, instructional design information may be insufficiently represented in the specifications created by software producers. As a result, time-consuming reviews and frequent discussions between instructional designers and software producers are often required to reach correct technical specifications that are fully in line with the blueprint and storyboard. This suboptimal transition process is further undermined by the fact that many software producers are not specialized in instructional software, and therefore inexperienced in specifying and creating instructional software programs. When reviews and discussions are impossible, due, for example, to legal reasons, the production process often results in an unsatisfactory outcome: flawed instructional software that requires correction afterwards ("design by debugging"). This example focused on the most obvious stakeholders, as designers traditionally interact mostly with producers. Of course, modern, complex development processes require that a large number of other stakeholders are also sufficiently informed.

In this chapter, we discuss the transition problem between design and other development phases, and identify three major causes for this problem. To overcome these three problems, we introduce the 3D-model as an aid to stratify, elaborate, and formalize design documents, even if design languages are hardly shared between designers and stakeholders. Finally, we present an empirical validation of the 3D-model and discuss the implications of the use of that model.

THE TRANSITION BETWEEN DESIGN AND PRODUCTION

Most instructional software is developed using some variation of the instructional systems development (ISD) model, which often is an instantiation of the generic, five-step ADDIE model: analysis, design, development, implementation, and evaluation model (Dick & Carey, 1996). Every phase in the ISD model identifies specific types of activities and outcomes for which any number of different specialists (e.g., subject matter experts, instructional designers, or software producers) are responsible.

In contrast to ISD models, instructional design (ID) models are a subset of ISD models and encompass only the first two steps of ISD, namely analysis and design (van Merriënboer, 1997). This distinction is useful because it helps to highlight a logical grouping of activities. In general, instructional designers are the specialists responsible for the activities that occur during these two phases (van Merriënboer, 1994).