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Operational priorities of instructional designers analyzed within the steps of the Addie instructional design model

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Abstract

To investigate the operational priorities of instructional designers, a thematic content analysis was conducted of responses to an online survey that was completed by 29 instructional designers. The instructional designers work in various areas of education (e.g., adult learning, K-12 science, educational technology) and are from several countries. The survey questions asked about the areas of design considered most important and other aspects of the respondents' professional work. The responses were coded using the five primary steps of the ADDIE instructional development model. It was concluded that instructional designers indicated the highest levels of concern for elements within the Analysis step of the ADDIE model. Further, within the Analysis step, much more attention is given to learner characteristics than to other considerations. These results indicate that in the instructional design process some elements relevant to instruction may receive more attention than others and, therefore, may be emphasized as changes in instructional design models proceed. Areas receiving less attention, such as identifying the reasons learners need to study the content of instruction and various contextual considerations, which can have an important impact on the overall design approach and effectiveness of instruction, may be given less attention in ID innovations.
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1. Introduction

Instructional design (ID) is a general term for a family of systematic methods for planning, developing, evaluating and managing the instructional process effectively in order to promote successful learning by students (Kemp, Morrison, & Ross, 1998). The purpose of ID models is to help educators and instructional designers incorporate fundamental elements of ID principles into a manageable process (Moellem, 2001). Gros, Elen, Kerres, Merrienboer and Spector (1997) state that instructional design models have the objective to provide a link between learning theories and the practice of building instructional systems. Kemp, Morrison, and Ross (1998) stated that four elements are fundamental in instructional design: characteristics of learners/trainees, objectives, instructional strategies and evaluation procedures. Overall, Zheng and Smaldino (2003) have identified 12 instructional design elements by combining Dick and Carey (1990), Kemp, Morrison, and Ross (1994) and Smith and Ragan (1993) ID

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models: Instructional goals, learner characteristics, learning context, learning task/content, instructional objectives, selecting, instructional strategies, media and materials, assessing learning performance, resources, producing instruction and revising instruction. In a departure from the more mechanistic approaches, Reiser (2001, cited in Faryadi, 2007) has argued that the designer must appreciate the deep involvement of human characteristics in its design. Similarly, Wilson (1995, cited in Thomas, Mitchell, & Joseph, 2002) stated that a key element in effective ID is the nature of the design team. Traditionally the design team was composed of the designer and subject matter expert working at separate distinct tasks.

In response to these factors that affect the practice of ID, instructional design theories and models are changing as educational philosophies and current trends in modern education evolve (Kallio, 2008). In general terms, instructional designers are increasingly convinced that innovations in information technology can deliver instruction more effectively in a wider range of contexts (Reiser, 2001 cited in Faryadi, 2007). Educators are forced to think carefully regarding how to design effective multimedia courseware that takes advantages of current state of the art of technology without compromising learners' needs, motivation and critical thinking skills in the process (Faryadi, 2007). Theories of ID have yet to explicitly respond to innovations in information technology and some other areas.

Merrill, Drake, Lacy, and Pratt (1996) emphasized that like other sciences, instruction is verified by discovery and instructional design is extended by invention. In this application, the idea of invention relates to the development of instructional design techniques (i.e. procedures and tools), as well as the technology of ID itself. The process of ID, like other techniques and technologies is designed to serve the needs of the user, and changes in response to the changing concerns of those implementing it. The advancement of instructional design, therefore, is most likely to proceed along the lines given most attention in the practice of instructional design.

2. Purpose

This study was undertaken to investigate the concerns on which instructional designers focus as they think about how they do their practice; that is, their operational priorities. The goal was to determine the factors of ID that the instructional designers focus on most, and with the greatest diversity of considerations. There are two areas in which this work can provide insight into ID. First, as ID evolves to address new technologies and emphases, it is expected that the operational priorities of instructional designers will provide the impetus for invention within the ID field. By understanding the direction of change in the field, ID professionals can focus there attention on inquiry that will inform the most salient aspects of their work. Further, Silber (2007) and others raise questions as to whether ID is a structured, stepwise process or is more realistically viewed as a problem solving process with undertaken by the application of principles. Examining the operational priorities of ID professionals can offer insight in this debate.

The ADDIE model was selected as the analysis rubric for its wide use for many types of instruction. Magliaro and Shambaugh (2006) and McGurr (2008) state that ADDIE is the process traditionally used in ID. Likewise, Kallio (2008) indicates that the ADDIE model is used in all forms of instruction. According to Lohr (1998), the five steps of the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) have specific attributes. The Analysis phase involves the investigation of learner, content, and task and how these influence the design of instruction. The Design phase addresses how instructional goals and objectives shape strategies. The Development phase addresses the tools and processes used to create instructional material. The Implementation phase addresses the execution of the instructional materials or program. The Evaluation phase addresses both formative and summative assessment. Using these categories, therefore, the dynamics likely to undergird the ID field can be explicated in a way that can help ID practitioners be deliberate about the concerns to which they attend as they continue to innovate, develop and invent new approaches. The following research questions guided this study:

- What are the operational priorities (i.e. factors are considered most important in the practice of ID) expressed by ID professionals?
- Which step(s) of ADDIE model are most closely related to the ID operational priorities?
- What can be offered to instructional designers regarding how the current operational priorities might be taken into account in a deliberate approach to the practice of ID and innovation in the field?

3. Method

3.1. Participants

The sample for this study was a group of instructional designers whose professions in various areas of education (e.g., adult learning, K-12 science, educational technology) from all over the world. These instructional designers were contacted via the Internet and asked to complete an anonymous online survey. Completed surveys were submitted by 29 instructional designers (65.5% female and 35.5% male). The current locations in which the instructional designers work include 10 (34.5%) from the United States, 6 (20.7) from China, 3 (10.3%) from Malaysia, and 1 (3.4%) each from Canada, Colombia, Indonesia, Japan, Korea, South Africa, Switzerland and Turkey (two did not specify a location). The professional positions of instructional designers varied. The sample includes 8 (27.6%) full professors, 4 (13.8%) associate professors, 1 (3.4%) university lecturer, and 1 (3.4%) professional curriculum developer (outside academe). The remaining 15 respondents (51.75%) are in other positions such as executive director, university administrator, online, educational consultant, and PhD students.

3.2. Data collection

Data were collected using an online survey that included 5 demographic questions (nationality, gender, professional position, academic field, and time in their current type of position) and 5 open-ended questions related to the respondent's views on ID processes, priorities and models. The focus item for the analysis asked:

Please briefly describe a few of the major factors that you think are important in designing instruction for learners. Please consider whatever age of learners for whom you are most familiar with designing instruction.

The survey was sent out through the authors' professional contacts with the request that it be distributed freely. This process of dissemination was effective in that a substantial sample was obtained. Questions on the survey allowed the authors to assess the appropriateness of the respondent's involvement in ID for the purposes of the study.

3.2.1. Data analysis

Data were analyzed using a content analysis approach, which allows researchers to recognize patterns relative to a set of pre-determined and mutually exclusive categories (Hemmings, Rushbrook, & Smith, 2007). As the text is coded into the categories, related responses become grouped and their collective affect provides a more thorough understanding of concerns within that category. Further, the data are reduced in such a way that the length of a given statement does not carry more weight than a succinct statement. Within the 29 completed surveys, responses to the item quoted above were analyzed in detail, with other data providing contextual information. Participant's responses were read and relevant statements isolated that were thematically related to the categories being used. A total of 109 relevant statements were then analyzed using the ADDIE model categories. As content analysis is particularly susceptible to researcher bias (Kolbe & Burnet, 1991) the data were independently coded by each author to increase inter-coder reliability. The percentage of the agreement between the coding sets for the quotes was 82.5%, with a Cohen Kappa inter coder agreement coefficient calculated as 0.70 which is accepted as "good agreement". The 19 statements on which the researchers disagreed were discussed and the coding was resolved. Subsequent to the first-level coding, the statements within the most prevalent category, Analysis, were outlined in the categories of the task analysis method (Jonassen, Tessmer, & Hannum, 1999); Needs, Learner, Task, Context & Constraints.

4. Results

Results are organized according to categories corresponding to the five steps of ADDIE model that were mentioned earlier; Analysis, Design, Development, Implementation and Evaluation.

Analysis: It can be seen that aspects of the Analysis category was a very high priority area for the instructional designers. The majority (n=62) of statements related to this area. The second-order analysis indicated that within the

Analysis step consideration of Learner characteristics (n=26) was more prevalent than to other considerations such as Needs, Task and Context& Constraints.

In addition, within the Analysis category, 16 statements related to Task features, 11 statements related to Needs, and 9 statements conveyed concerns related Context & Contraints, indicating that while Learner characteristics were definitely the highest priority, the other aspects of Analysis also received significant attention. This demonstrates the diversity of concerns, even within one step of the ID process, that are taken into consideration.

Design: The second highest priority as measured by the frequency of statements addressing the category were features of the Design step (n=34) were arisen for design step. When these were considered thematically, learning strategies (n=27) emerged as getting much more attention than were factors such as specifying assessments (n=5) and delineating goals and objectives (n=2). It was seen that none of the instructional designers referred to specifying the choosing media, which is given as an element of the Design step.

Development: It is clear that the Development category was a relatively low priority for these instructional designers, with only 6 statements being coded in this area. Of those, 4 statements were related to creating instructional materials and 2 statements were related to obtaining or creating required media. None of the statements discussed planning activities specifically.

Implementation: The analysis indicated that the fewest statements related to the Implementation step of the ADDIE model, as only 3 statements were coded in this area. The ideas of putting the instructional plan into action, and broadening that to executing a broad instructional plan were both discussed, while the idea of executing the instructional materials was not discussed at all.

Evaluation: A total of 4 comments were focused evaluation. With respect to students, only summative evaluation was discussed, while other aspects of evaluation (e.g., formative evaluation) were not mentioned. Mention was also made of evaluation for the purpose of revising instruction.

5. Conclusions and Discussion

It was assumed for the purposes of the study that the frequency and diversity of statements made by instructional designers related to a given category were indicative of the attention that category would receive in the process of instructional design. Applying this, the results showed that some factors are given more attention than others, since the ADDIE steps were not discussed with equal frequency or diversity. The following conclusions are drawn:

1. The Analysis step is the highest operational priority, both in terms of the frequency and diversity of comments. Within Analysis, much more attention is given to Learner characteristics than to other considerations, while characteristics of the learning Tasks, are also considered to a high degree.

2. Within Analysis there seems to be little consideration given to the Need dimension; that is, why the learner needs to learn the material—what might called relevance. Relevance is closely associated with motivation to learn. This result suggests that ID professionals will want to be conscientious about considering the learner's need for the knowledge so that the relevance of the knowledge can be made appropriately explicit.

3. Little was said by the instructional designers that relates to the context in which learners will receive instruction, or in which the learners will apply the knowledge. Given the important role of context on learning, this is another area in which a deliberate focus may be called for so that ID professionals do not inadvertently neglect it.

4. Within the Design category, specifying the learning activities was the most prevalent consideration, being mentioned more frequently than designating goals, objectives, or assessments. There are many reasons why this might be. For example, when one considers the fact that learning activities are the most visible manifestation of ID, it is not surprising that these get a fair degree of attention.

The results of this study, therefore, suggest that the practice of ID among these respondents focuses on the learner's abilities and instructional strategies to undertake learning tasks. This seems to imply a highly cognitive focus (i.e. is the learner capable in terms of ability, experience and background knowledge), with comparatively less attention to affective considerations such as motivation or factors that influence motivation. The lack of attention to contextual factors may weaken the ID process. For example, individual differences play an important role in learning (Moellem, 2007) and when instructor's teaching style complement students' learning preferences, both student motivation and success generally improve (Pedrosa de Jesus, Almeida, and Teixeira-Dias, 2007).

The results of this study are consistent with the key elements of ID identified by other researchers, including Kemp, Morrison, and Ross (1998), Thomas, Mitchell and Joseph (2002), Reiser (2001 cited in Faryadi, 2007), Zheng and Smaldino (2003), and Kallilo (2008). On the other hand, these findings are not entirely consistent with those of Zheng and Smaldino (2006) that instructors' consideration of goals, and objectives, selection and the organization of the content, selection of media and resources and allocation of time are given most attention. Wedman and Tessmer (1993, cited in Uduma & Morrison, 2007) found that writing instructional objectives was the most occurred than other factors like pilot testing of instruction. It has also been found that ID serves the needs of the user and that changes in response to the concerns of those implementing it are common (Merrill et al., 1996).

These results suggest that it would be worthwhile for instructional designers to consider how the current operational priorities of ID might be taken into account in a deliberate approach to innovation. Areas receiving less attention have to be given attention deliberately, since it appears from these results that they are less likely to come to mind spontaneously when the practice of ID is considered. The results of this study also demonstrate that ID professionals voice a wide array of priorities, and that these do not distribute evenly across the ADDIE steps, nor do they address all of the concerns that strict adherence to a stepwise ADDIE approach would suggest. These results may, therefore, be interpreted as lending support to Silber's (2007) contention that "ID is NOT a procedure; rather it is ill-structured problem-solving" (p. 13, original emphasis.) When ID is considered in a problem-solving approach, it is seen as being undertaken more as an application of principles than as a procedure with pre-determined steps to be followed. The results of the current study could, therefore, be interpreted as the ID professionals articulating some of the principles that they apply in ID, rather than as describing priorities that flow into generalized steps.

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