A Methodology to Develop E-Learning Modules

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Abstract. With the explosion of online courses in higher education, many students are opting for the convenience of learning in a virtual environment. However, instructors often rush into the course development stage without appropriately assessing the learners' characteristics. Figure 1 describes the online study-habits consists of 100 college students at a target university in southern Taiwan, and provides seven online study habit categories. This figure refers to some online learning problems, such as autonomously studying, cooperating instructing, and time managing. In order to raise the target university students online study habits as shown in Figure 1, the researcher designed an instructional design plan that facilitates students' online learning with a special focus on the key characteristics of the learners.

Keywords: Online Learners, Motivation, ADDIE Instructional Design

1 Introduction

Technology has profoundly impacted classroom instructions. Online instructions provide opportunities for rich learning resources that go far beyond the scope of the traditional classroom lecture. However, the International Office of University of Southern Queensland (2000) stated that the hardest part of learning through distance education is to study online independently, and cooperate with the instructor and other learners.

According to Hall (1997), The ADDIE instructional design model ensures learning experiences for all kinds of learners, and helps learners to achieve the goals of instruction, including web-based learning. The goal of this instructional plan was focused on the declared study-habits of 100 college students' in online courses in Figure 1. The objectives was focused on raising the percentages of the seven categories of students' declared study-habits for online courses from Figure 1, such as energy and motivation, and organization, and to ensure the development of new online courses that more motivating to the learners.
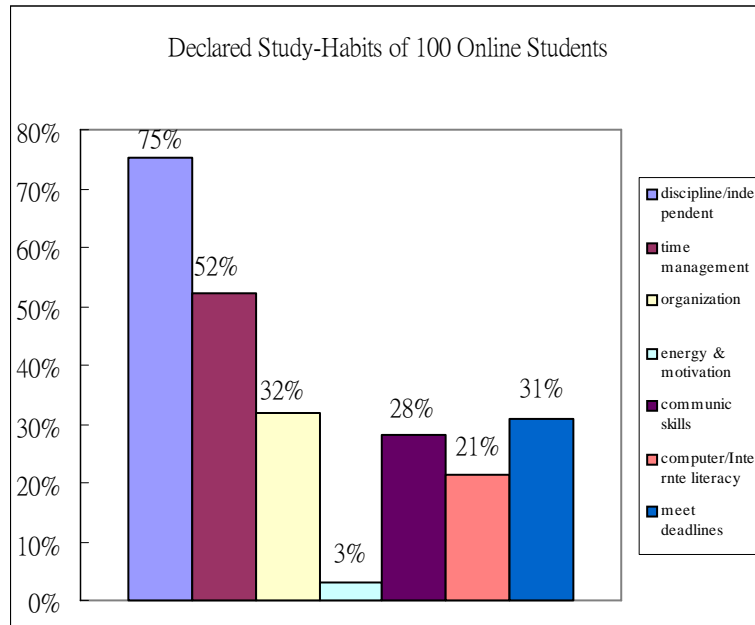
Fig. 1. Declared Study-Habits of Online Students (N=100).

1.1 Analysis of College Students' Online Study Habits

According to the data displayed in Figure 1, this study of desirable study-habits consists of 100 online college students, and provides seven online study habit categories. Overall, 75% of 100 college students responded they are disciplined and independent of their online study habits, but the percentage of the other six categories are extremely low. There are 52% of the 100 online college student users able to manage their time with the online study, 21% of them are not struggling with computer or internet literacy, also, 32% responded that they are self-organized for the online course schedule. The 28% of 100 online college student users agree that they have adequate communication skills for their online studies, and 31% of them are aware and meet the datelines of the courses. Only 3% of the students feel that they have energy and motivation during online courses.

2 Instructional Design Plan

In order to raise the college students' online study habits as shown in Figure 1, the priority task is to design an instructional design plan that facilities students' online learning with a special focus on the key characteristics of the learners. According to Hall (1997), the ADDIE instructional model ensures learning experiences for all kinds of learners, and helps learners to achieve the goals of instruction, including web-based learning. Gagné, Briggs, & Wager (2005) addressed the ADDIE instructional design

model as a systematic approach to the instructional design process, which comprises the following generic instructional system design elements: Analysis, Design, development, Implementation, and Evaluation. Each phase of the ADDIE model is a decision making process that needs to ensure the effectiveness of the instructional experience (Molenda, 2001).

2.1   Analysis Phase

Learners' Characteristics
Malachowski (2002) pointed out that the keys to the Analysis Phase are learner analysis, goals, and objectives definitions. The data in Figure 1 shows that the students' study habits did play a critical role in online learning, even though most of them (75%) believe they are self-disciplined and study independently. It also indicates the interaction between instructors and classmates should play an important role in online courses, as only 28% of the students think they communicate well with classmates or instructors. Moreover, the students are not able to refrain from distractions and stay on task while working or studying, and have difficulty monitoring their learning progress, keeping up with their assignments, and meeting deadlines. The key problem of the students' online study-habits is that they need motivation and energy to become successful online learners.

Learner Constraints / learners Supports
There are many ways of facilitating online learner supports. To gain attention for the students, it is always suggested they e-mail or fax questions to their instructors or fellow students, discuss questions in online chat rooms, or post them on electronic bulletin board systems (BBSs) (Draves, 2001); in turn, students may respond at their convenience. Sclater (2003) pointed out that frequent teacher-student interaction enables the instructors to get to know the students' problems and needs better than if their only contact is via the Internet. Students, too, need clear guidance in putting all online class information together, reaching their classmates, completing and submitting assignments, and chatting their progress (Yeap, 2002).

Goals and Learning Outcomes
The goal of this instructional design plan will be focused on the desirable study habits of 100 college students in online courses. We can assume the learners have a wide variety of reasons for pursuing learning at a distance: constraints of time, distance, and finances, the opportunity to take courses or hear outside speakers who would otherwise be unavailable, and the ability to come in contact with other students from different social, cultural, economic, and experiential backgrounds (Willis, 1993). As a result, for this instructional design goal, the learners should gain not only new knowledge but also new social skills, including the ability to communicate and collaborate with widely dispersed instructors and peers whom they may never have seen. The learners should also become self-disciplined, good time-managers, well organized, motivated, and responsible for the online courses.

Objectives

Classifying the target objectives helps instructional designers make it possible to check that all the instructional goals have been followed (Gagné, et al, 2005). The main instructional objective will be focused on raising the percentages of the seven categories of students' desirable study-habits for online courses from Figure 1, such as energy and motivation, and organization. Another objective of this instructional design plan is to ensure the development of new online courses that are more motivating to the learners. Creating a well-designed instructional delivery system for all new online courses, in which the learners can better communicate with each other, is also an objective of this instructional plan.

Timeline Considerations

Assuming the learners are expected to learn in 16 weeks, the timeline for concept mapping will be two weeks, and the flowchart in the next Design Phase will also take two weeks. Since the new online courses need to address the problems of the students' low online study-habits, the data collection and analysis of online instructional resources and strategies will take six or more weeks to complete. Testing, coding, and debugging the new online courses will take three weeks. Training the instructors will take four weeks, and the implementation will take sixteen weeks. Finally, evaluation will take four weeks to complete. The time schedule of this instructional design will take approximately thirty-seven weeks.

According to Kemp, Morrison, & Ross (1999), each major phase of the ADDIE model is accompanied by formative evaluation to test the adequacy of the decision-making during the phase. The question of the formative evaluation of this Analysis Phase, especially those focusing on the students' online study-habits as presented in Figure1, are as follows:

1. What are the learners' characteristics?
2. What purposes do the online courses serve in the students' learning?
3. Are the goals and objectives appropriate?
4. What are the social needs and communication skills for the online courses?
5. Is the timeline for the completion of the project logical?
6. What motivates the students?

2.2 Design Phase

Appropriate Online Learning Environment

For this phase, selecting the most appropriate online learning and delivery environment by examining the students' cognitive skills is the main idea to achieve the instructor's goals (Driscoll, 1998). Thus, the new online courses plan will focus on skills from two objective domains, cognitive and affective (Bloom, 1971). Gagné (1992) pointed out that the affective domain is the learner's learning attitude that may be influenced by the instructional design. The content and objectives of new online courses will be examined to decide on appropriate sequencing, media, and methods, which refer to the learners' characteristics of Figure 1. The Subject matter Experts

(SMEs), college distance-learning instructors from the target university and from the other same competitive level universities, will check and examine the major and minor new online course contents identified in the concept map to determine if the contents matches the objectives and if any instructional strategies need to be added, deleted, expanded, or revised. Flowcharts will be created in this phase, which indicate the steps in the process. The flowcharts will provide clear descriptions of the target objectives.

One goal of this instructional design plan is to define the highest learning outcomes of the new online courses, and the major outcomes for each study-habit category in Figure 1. According to Gagné, et at (2005), breaking the online courses into lessons and learning activities will encourage the learners responding or constructing the online courses better, and raise the percentage of their study-habits, such as categories of organization, energy, and motivation in Figure 1. The formative evaluations in this phase are the appropriate instructional objectives in the concept maps, and contents of the flowcharts, and the appropriate descriptions of the flowcharts (Kemp, et al, 1999).

2.3 Development Phase

Online Learning Materials
For this stage, it will address the tools and processes of creating new online courses, which is the process of authoring and producing the instructional materials needed to meet the goal and the objectives (Strickland, 2004). According to Gagné, et at (2005), there are several principles in his phase: well-established objectives, innovative objectives, team approach, instructional design and media production, and making or buying the new instructional materials. For this instructional plan, using the existing instructional materials to design module and add new materials for the missing objectives will be applied. Since many talents are required to design online courses (Draves, 2001), the SMEs will need to ensure all team members cooperate well, and assure the course contents are well represented and organized.

The formative evaluation in this stage will test the use of the online courses elements and contents, such as the format of the online courses (font sizes, colors, easy operation of buttons), audio and visual, e-mail, chatrooms, BBSs, and Internet meeting system).

2.4 Implementation Phase

Online Instruction Delivery
McGriff (2000) pointed out that the Implementation Phase means the actual delivery of the instruction after the course development is completed. This is also the phase to train instructors and students how to apply the new course systems (Strickland, 2005). The training will help instructors use the new online course systems more effectively and understand more ideas of the students' online study-habits. The training of learners will include the computer or internet literacy by using new instructional

materials and advising them to communicate well with their instructors and peers during the course sessions.

This phase consists of five principles in the area of learning: learning management systems, students' guidance, change strategies, delivery environment, and maintaining the course plan (Gagné, et at, 2005). Our project team will develop student learning management systems to record each learner's online process, in order to address problems such as time management and communication skill in Figure 1. The feedback received from each student will be helpful to understand his/her online study-habits better. In general, students always experience too much trouble in understanding clearly ideas regarding their online courses (Dravis, 2001), to address this issue, the instructors will provide schedules of lists of learning activities to the learners. The formative evaluation in this phase is to see if the implementation activities achieve the goal or if revisions are needed.

2.4   Evaluation Phase

Materials, Processes, Learner Reactions, Learner Achievements, Instructional Consequences
Evaluation is the final stage in the ADDIE model, which determines the quality and effectiveness of the instructional design (Strickland, 2004). Five types of evaluations will be made in this phase: materials evaluation, process evaluation, learner reaction, learner achievement, and instructional consequences (Gagné, et at, 2005). Formative evaluation involves the principles of improving the instructional materials and the procedures. Summative evaluation decides the value of the course, which is undertaken after the course project has been finished (Strickland, 2005).

Formative Evaluation
As mentioned, there are five types among evaluation phase (Gagné, et at, 2005). To be focused on the learners' characteristics in Figure 1, the third type of this evaluation phase, learner reactions, will be utilized. Keller (1996) indicated learner reactions can be received after the course is completed. The instructional materials will be reviewed by the SMEs, including the learning goals and objectives. A small group of students represent the target audience will be asked to take a pretest before the instruction, and then, respond to all learning activities within the new online courses. They will also be asked to respond to a survey to see how they feel about and understand the new online course. The survey will be the same categories as the Figure 1 presented. The SMEs will determine how well the new online courses are progressing, though analysis of data from the survey questions. Based on the results, the students' online learning progress and need can be modified any time if necessary (Gall, Borg, & Gall, 1996).

Summative Evaluation
Besides analyzing the data collected in the formative evaluation phase, the target group will receive a posttest after the instruction. The posttest will indicate the overall

success of the new online courses. Several independent and external evaluators will be hired to evaluate this complete project. The evaluators will also interview the students to understand how they feel about the online courses, which will lead to better decisions about the value of the online courses.

The results of both formative and summative evaluations in this phase determine how the new online courses have worked, discover if the percentages of students' online study-habits have risen positively increased, and provide a critical guideline for school administrators to make decisions regarding changing or maintaining online courses.

3   Conclusion

The benefits of online courses are often missed when the student-centered learning habits are abandoned since students are not required to attend virtual classrooms for most class sections (McFarland, 1996). Moreover, some emotions that online learner may experiences include confusing instructors' guidelines, feeling isolated, and mismanagement of learning schedule (NCREL, 2008). According to this case study, the students' study habits did play a critical role in online learning, even though most of them (75%) believe they are self-disciplined and study independently. It also indicates the interaction between instructors and classmates should play an important role in online courses, as only 28% of the students think they communicate well with classmates or instructors. Although it raises more and more concern about adoption of on-line technology as instructional tool nowadays (Doe, 2004), how to help students become better on-line learners and become self-efficacy and intrinsically motivated are main issues in learning system development (Strickland, 2008). Apple (2002) pointed out that one of the important contributions online learning courses made in education is how it affected students' attitudes toward learning. This instructional design plan indicates that online learning not only greatly facilities teaching and learning, but also enhances learning motivation, which is the impetus that can make better performance.

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