

Bringing ADDIE to Life: Instructional Design at Its Best

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Instructional design has numerous approaches and theories available for use by designers and instructors. One model was particularly effective in providing developers with a generic, systematic framework that was easy to use and applicable to a variety of settings. The ADDIE model (i.e., Analysis, Design, Development, Implementation, and Evaluation) was used in two ways in a Master's level instructional design course, first as a framework for the development of the course and later as a process for the creation of multimedia projects. The ADDIE model presented users with an approach to instructional design that incorporated an iterative process complete with essential steps for the development of an effective course or program. Employing the ADDIE model in the development of a program or course can assist developers in instituting a learner-centered approach rather than a teacher-centered approach, making the program more applicable and meaningful for learners.

The ADDIE instructional design process (i.e., Analysis, Design, Development, Implementation, and Evaluation) is a common approach widely used in the development of instructional courses and training programs (Figure 1). This approach provides educators with useful, clearly defined stages for the effective implementation of instruction. Consisting of five phases, the ADDIE framework was used in two ways in the development of an instructional design course for Master's level students. First, the ADDIE framework was used in the planning of the instructional design course. Subsequently, the framework proved useful as a scaffold for students developing

multimedia projects as their culminating requirement for the course. Using the ADDIE model throughout the course placed an emphasis on the learner rather than a teacher-centered approach. The analysis of the learners became a crucial aspect in the design of the course and was an essential piece for the learners as they designed their individual multimedia projects. The ADDIE framework brought the instructional design course and projects to life by providing a process that actively engaged developers in problem solving (Figure 1).

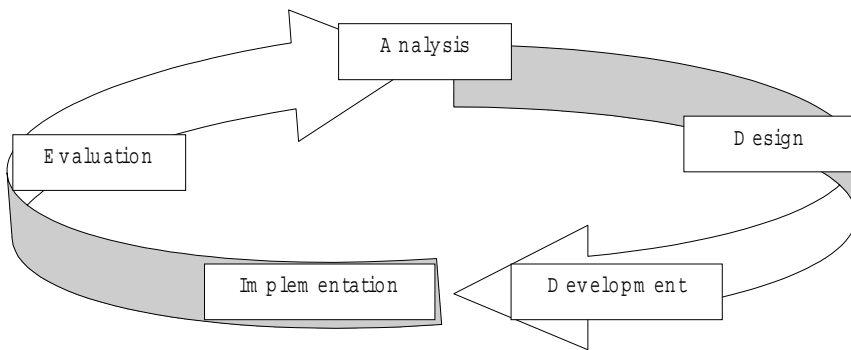


Figure 1. The ADDIE framework

THE ADDIE FRAMEWORK: FIVE PHASES

The ADDIE framework is a cyclical process that evolves over time and continues throughout the instructional planning and implementation process. Five stages comprise the framework, each with its own distinct purpose and function in the progression of instructional design.

Phase 1: Analysis

In the analysis phase, the designers' main consideration is the target audience. First, a needs analysis is conducted to determine the needs of the audience by distinguishing between what students already know and what they need to know at the conclusion of the course. During the needs analysis, instructors or designers examine standards and competencies to establish a foundation when determining what students need by the completion of the

course. Information may also be available from previous course evaluations if the course has already been taught. Subsequently, a task analysis is also necessary to identify the instructional content or the specific skills related to the job or course. The content of the course or program can be analyzed with the aid of course texts, sample syllabi, and course websites with a similar focus. With the advent of the Internet, many courses are easily accessible online and can provide a framework or workable template for instructors that are developing a course or teaching a course for the first time. Last, an instructional analysis is performed to establish what must be learned (Seels & Glasgow, 1998). The designer determines the amount of instruction that is needed in relation to the needs and task analysis. "If there is great variability among the members of the target audience, some students will need more and different instruction than others to reach the same goal" (Seels & Glasgow, 1998, p. 11). The standards and competencies reviewed beforehand will assist in this process.

Phase 2: Design

The design process consists of several key facets. Primarily the designer is conducting research and planning throughout this stage. The planning includes the identification of objectives, determining how the objectives will be met, the instructional strategies that will be employed to achieve the objectives, and the media and methods that will be most effective in the delivery of the objectives (Seels & Glasgow, 1998). During the design phase, the designer or instructor must consider the information or data from the analysis phase. If a thorough analysis is not conducted instructors or designers may find that they are replicating their efforts during the implementation stage. Thorough planning is necessary in the first two stages and will decrease the need for further research or planning later in the program. Another facet during the design process is assessment. As a vital component of the instructional plan, designers determine how objectives will be assessed and what forms of assessment will be used prior to implementation. The objectives and assessments should align and be meaningful. Tanner (2001) emphasized that assessment should serve the other components of the plan. Tanner described the Armstrong, Denton, and Savage (1978) model as "a consistent logical progression from the early planning activities that precede instruction to the final assessment activities, with assessment interwoven throughout" (p. 20, Figure 2).

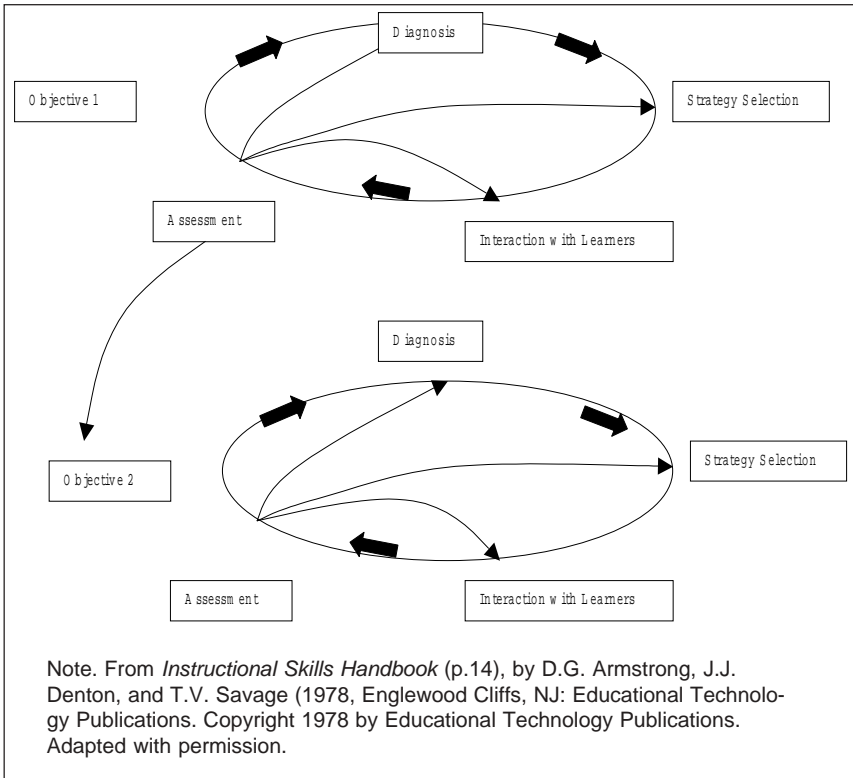


Figure 2. Assessment as part of instructional planning and implementation

When aligning goals and objectives with assessments, designers refer to the analysis phase for data that provides requisite information about the learners' characteristics, prior knowledge, and needs. These details can assist instructors and designers in the selection of appropriate assessment methods or strategies. Following these steps as a guide in developing and selecting assessment methods can decrease the likelihood assessment is occurring for the sake of assessment. If goals, objectives, and assessments do not align, learners may find themselves losing interest in the course or program furthermore, influencing perceptions of the instructional quality. Ultimately, this can affect the long-term retention of participants in the program. Designers who refer to analysis findings and carefully select assessment methods that include a variety of techniques, may find that learners are more likely to become actively engaged in the course content. Students' overt and covert participation can contribute to their overall satisfaction and can determine whether students continue in a program or course (Murphy, 1999).

Phase 3: Development

Designers must now refer to the results from the previous two phases and construct a product for the delivery of the information during the development phase. This transitional stage transforms the designer's role from research and planning to a production mode. The development phase emphasizes three areas: drafting, production, and evaluation. Designers in this stage develop or select materials and media and conduct formative evaluations (Seels & Glasgow, 1998). Evaluations during the development stage contain a different focus than the actual evaluation format that occurs during stage 5 of the ADDIE process. Encompassing a formative approach, evaluation during the development phase calls attention to the product and the quality standards of the product. Designers are to determine if the students or audience will learn from the product and how it can be improved before implementation.

Phase 4: Implementation

In the implementation phase, designers must take an active role rather than a passive role. The designer or instructor's role intensifies with the advent of this phase. In order for the product to be delivered effectively, developers must continue to analyze, redesign, and enhance the product. It can be counterproductive to the implementation of the program if the product or course is left to function in its natural state. No product, course, or program can be effective without conducting an evaluation and necessary revisions throughout the implementation phase. When the learners and instructor are active contributors in the implementation, modifications can be made instantaneously to the course or program to ensure effectiveness.

Phase 5: Evaluation

The evaluation phase is an essential component of the ADDIE process and is multidimensional. The evaluation phase can occur during the development stage in the form of formative evaluations, throughout the implementation phase with the aid of the students and the instructor, and at the end of the implementation of a course or program in the form of a summative evaluation for instructional improvement. Throughout the evaluation phase, the designer must determine if the problem has been solved (relevant

to training programs), if the objectives have been met, the impact of the product or course, and the changes that are necessary in the future delivery of the program or course. The evaluation phase can often be overlooked because of time or economic factors, however it is a necessary practice. The evaluation phase should be an integral part in the continuation of analysis and effective implementation of future courses and programs.

UNIVERSAL INSTRUCTIONAL DESIGN

Students in the course were enrolled in a Master's of Education in Technology program at Waynesburg College in Waynesburg, Pennsylvania. The eight students included individuals from education and business fields. Many students were interested in the applications of technology in a variety of environments. Therefore, in the analysis phase of this course, identifying students' background and experiences was paramount. All students completed an anonymous online survey consisting of six questions pertaining to the students' educational and work experience, instructional design experience, learning goals for the course, and any other information that assisted in the analysis for the design and development of the course. Students completed the survey prior to the first week of class, however this could be accomplished through a separate mailing when students register for courses.

The course was delivered on campus for eight weeks. Students met one day a week for a 4-hour class session that was divided into two sections. The first section consisted of a 3-hour class session that involved student presentations, working in collaborative groups on projects, or discussions related to instructional design research. The second section was a 1-hour segment that was to be used as lab time. Students could opt to stay an additional hour on campus and work in the computer lab or they could complete the lab work on their own time throughout the week. All students opted to complete the lab work throughout the week rather than stay the additional hour.

The instructional design course was developed with an emphasis on the ADDIE process. Each week students were engaged in activities that focused on analysis, design, development, implementation, and evaluation as related to their multimedia projects. The projects that students were able to choose from included the development of a webquest, online course, business or school website. Each student was considered a primary developer in the process. Since instructional design is typically conducted in a collaborative team approach, secondary developers (students) were selected to serve as a resource and an assistant for a primary developer assigned by the instructor. Individuals partnered served as secondary developers to each other. Students

were partnered according to several criteria: teaching experience, technology experience, and project selection (i.e., webquest, online course, business or school website). Each partnership provided support throughout the development of the multimedia projects.

During the analysis phase students were engaged in activities that would aid in the development of curriculum integration plans (CIP) to identify the needs of their audience, the content, and the goals of their project. To determine the needs of their audience, the analysis sources included: observations, interviews, questionnaires, document reviews, current or previous work experiences and/or conditions, and research by way of the Internet. The development of the CIP was used as a guide in the remainder of the phases and was often revised throughout the design and development stages. The use of the CIP throughout the earlier stages of the ADDIE process kept students focused on the planning segments (analysis and design stages) rather than the creation of the product (development stage).

During the design phase, students explored a variety of materials and media. The students often found themselves in a problem-solving mode as they compared the strategies that they previously recorded in their CIP with the methods they were considering for the delivery. Functioning as designers for their multimedia projects, students scrutinized media selections, repeatedly questioned the purpose, and tried to determine the most effective and meaningful method of delivery for their goals and objectives. Students also conducted research on formative and summative evaluations during the design phase. They previewed online and text-based evaluations for resources that were applicable to their projects. The formative evaluations that students developed sought to elicit feedback pertinent to: instructor effectiveness, webquest organization, site usability and navigation, course delivery methods, and/or user information. The formative and summative evaluations were used to provide feedback on the improvement of the product before, during, and after the implementation. Students also developed an evaluation tool (rubric) that would be used to assess their secondary developers' multimedia project.

For the implementation and evaluation phase, students attempted to determine in an intangible environment if the course or program could be implemented as intended. The secondary developers role became critical at this stage. In a sense, secondary developers became the user, reviewing the product through the eyes of a learner and evaluating the product using a rubric. Their analysis became a significant part of the process and served as a formative assessment of the initial product. Their analysis provided valuable feedback for the designers in relation to the identification of deficiencies and recommendations for corrective action. Generally during the implementation

phase the instructor or designer conducts some sort of formative or summative assessment to ensure that learning has occurred. A summative evaluation is then distributed near the end of implementation phase to determine the impact of the course or program. This can be conducted by an independent evaluator or often because of a lack of resources, time, and/or funding instructors or designers will conduct their own evaluations in the form of anonymous surveys, observations, interviews, pilots, prototypes, and/or internal reviews. Secondary developers were particularly helpful in providing, to a certain extent, an internal review of the products, and proved to be a major contributor during the implementation and evaluation phases within a traditional classroom environment.

ADDIE COMES TO LIFE

The projects developed in this course included webquests, online courses, and business or school websites. All four options were represented during this course. Webquests were a popular option for the educators in the course, meanwhile other students' selected online courses, business or school websites.

Having a variety of multimedia alternatives provided the diverse group with selections that were applicable to their individual needs and ultimately evolved into products that they found to be meaningful and valuable to their work experiences and learning goals. Figure 3 displays a sample webquest, Figure 4 represents a sample business website, and Figure 5 portrays a school website all of which were developed in this course.



Figure 3. Webquest



Figure 4. Business website



Figure 5. School website

Course Evaluations

The formative (Table 1) and summative evaluation results (Table 2) demonstrate a positive array of feedback relative to the course and student experiences. The results could be an indication that the use of the ADDIE model contributed to the smooth and effective delivery of the course.

The formative evaluation was administered during week 4 of the course. The survey included the following categories: excellent, very good, and good (Table 1).

Table 1
Formative Evaluation Results: Course Improvement

Questions	Formative Responses
1. The course so far is	Excellent- 2 Very Good- 5 Good- 0
2. The course content is	Excellent- 2 Very Good- 5 Good- 0
3. The instructor's contributions to student learning are	Excellent- 5 Very Good- 2 Good- 0
4. The effectiveness of the delivery format is	Excellent- 4 Very Good- 3 Good- 0
5. Relevance of required readings (websites, articles, text, etc.) are	Excellent- 1 Very Good- 6 Good- 0
6. Quality/helpfulness of instructor feedback is	Excellent- 6 Very Good- 1 Good- 0
7. Encouragement given students to express themselves is	Excellent- 6 Very Good- 1 Good- 0
8. Availability of extra help when needed is	Excellent- 4 Very Good- 3 Good- 0
9. Opportunity for practicing what was learned is	Excellent- 4 Very Good- 3 Good- 0
10. Reasonableness of assigned work is	Excellent- 3 Very Good- 3 Good- 1
11. Instructor as a discussion moderator/facilitator is	Excellent- 6 Very Good- 1 Good- 0
12. Clarity of instructor's syllabus	Excellent- 6 Very Good- 1 Good- 0
13. The course web site is	Excellent- 2 Very Good- 5 Good- 0
14. The links provided on the course website are	Excellent- 5 Very Good- 2 Good- 0
15. Usefulness of student reflections	Excellent- 1 Very Good- 4 Good- 2

Note. Seven out of eight students enrolled in the course completed the survey.

The results in Table 1 ranged from excellent to very good in all categories except for question 10, “reasonableness of assigned work” and question 15, “usefulness of student reflections.” The responses to question 10 and 15 may be attributed to the course length, which occurred over an eight-week period and was an accelerated Master’s level course. Due to the accelerated nature of the course students were required to complete a range of assignments that would typically be required in a 3-credit course that spans twelve weeks. Therefore, respondents may have felt the work load was unreasonable for the time frame.

In response to question 15, “usefulness of student reflections,” the students were often required to reflect upon various tasks within the class session and provided feedback that was posted to the course website for further consideration in the development of their multimedia projects. The reflections included postings relevant to learner considerations necessary in a web-based environment, instructional design definitions, and best and worst website features. The postings were intended as a reference for students throughout the development of their project, however it may be that once the postings were made, students no longer referred to them. Therefore, students did not recognize the value of their reflections in relation to the instructional design process and the development of their projects.

In addition to the questions described in Table 1, students were also asked several open response questions relevant to assessment option offerings, additional assistance that was needed, and suggestions for the course. When asked, “*What are your thoughts regarding having options for the assessments in this class (particularly the performance assessment options)?*” a particular respondent indicated that assessment options “were excellent” because “class members have a wide range of experiences, educational backgrounds, interests, and needs.” The respondent also mentioned that “each of us will benefit from preparing assignments that can be adapted to what we do on a daily basis; I’ve been in classes where the work assigned was nothing more than busy work. Practical replaces the word ‘busy’ in our assignments.” When asked, “*What additional assistance or guidance would you need in this course to make it a successful experience for you?*” a respondent indicated, “I have never done some of the basic things required in this course: e-mail a paper, *PowerPoint*, etc. I feel these have all been successful experiences. Lab time with a helper would be useful.” One respondent suggested, “Possibly more examples for some of the assignments would make completion easier.” Other respondents recommended assignments with “a bit more structure” and going “over the assignments and labs more for the next week.” Respondents were also asked, “*What suggestions do you have for the course?*” Suggestions included, beginning the “developing a little

earlier,” “I don’t like having to e-mail the assignments early...because of a tight work schedule.” This was required by the instructor (assignments were to be e-mailed prior to the class meeting). Last, respondents suggested selecting a course text that was not as expensive.

Summative Evaluations

Summative evaluation results are presented in Table 2. Participants responded to 30 questions relevant to the effectiveness of the course. Respondents used a Likert-type scale (1= Strongly Agree, 2= Agree, 3= Neutral, 4= Disagree, 5= Strongly Disagree) to record their feedback.

The findings demonstrated that only one category was ranked in the agree-neutral range ($m=2.86$). In reference to question 21, “The textbooks contribute to the understanding of the subject,” in this course, the text served as a guide and a resource but was not typically used during the class session; but specific chapters were assigned for weekly reading.

Students were also able to provide written comments at the end of the survey for the instructor. The questions included: “What changes or additions would you suggest the instructor make to improve this course?” and “What comments would you like to make to the instructor?” The respondents’ comments in this section of the survey included:

“Permitted students freedom of expression and releasing the fear of technology that we do not understand as well as some.”

“The quick responses to e-mails throughout the week were appreciated. Great feedback and responses to students.”

“More information needed to be covered before given assignments to do at home.”

“Really enjoyed the course. I feel that I have come away with a valuable tool for my career as well as valuable knowledge.”

“She tried hard to make the class interesting and her concern for students was refreshing.”

Other results in Table 2 spanned the strongly agree-agree range and could be a strong indication that students felt the instructor contributed to the effective delivery of the course content, that the course was well planned, and the course met individual learning goals.

Table 2
Summative Evaluation Results: Course Effectiveness

Questions	Mean
1. Compared with other courses on this level carrying an equal amount of credit, the effort I put into this course is as much or more as in other courses.	1.00
2. If I have needed help outside of class, the instructor has given help to me.	1.29
3. Course objectives have been expressed clearly.	1.00
4. Computers, software and other technologies needed to complete the assignments are adequate, organized, and readily available.	1.71
5. The instructor demonstrates a personal commitment to high standards of professional competence.	1.14
6. During the term I looked forward to attending this class.	1.14
7. The instructor provides useful feedback on student progress (identifying strengths and weaknesses).	1.14
8. In this course I am learning much.	1.14
9. The clarity and audibility of the instructor's speech are excellent.	1.29
10. The contents of the assignments contribute to my understanding of the subject.	1.14
11. The requirements of the course (projects, papers, exams, etc.) were explained adequately.	1.29
12. The instructor's presentation or discussion questions often caused me to think in depth about this subject.	1.29
13. The instructor has adequate means for evaluating my learning.	1.14
14. The methods being used for evaluating my work are reasonable.	1.14
15. The out of class assignments are challenging.	1.29
16. Adequate opportunities were provided by the instructor for me to ask questions.	1.43
17. The instructor supervises and helps in new experiences without taking over.	1.29
18. The instructor is teaching the course material or skills clearly.	1.14
19. The instructor relates underlying theory to practice.	1.57
20. Overall, I rate this instructor a good teacher.	1.14

(continued)

Table 2 (continued)
Summative Evaluation Results: Course Effectiveness

20. Overall, I rate this instructor a good teacher.	1.14
21. The textbooks contribute to my understanding of the subject.	2.86
22. Examination questions or assignments are clearly phrased.	1.43
23. This course is practical and useful to those students for whom it was specifically planned.	1.14
24. The clinical or lab experiences meet my learning needs for this course.	1.43
25. The instructor explains or illustrates lab or clinical techniques clearly.	1.29
26. Pre-lab assignments (assigned readings and exercises) contribute to my understanding of lab assignments.	1.29
27. The instructor seems to be well prepared.	1.14
28. The instructor seems to care about my learning.	1.14
29. The course seems to be carefully planned.	1.14
30. Course objectives are being achieved.	1.14

Note. Seven out of eight students enrolled in the course completed the survey.

CONCLUSIONS

The ADDIE model is a useful, simple framework for instructional design. The process can be applicable in a variety of settings, because of its systematic and generic structure. The framework provides developers with a means for identifying the target audience's needs and reinforces the use of this information for the design and development of programs. Throughout the implementation and conclusion of the implementation phase, developers employ the ADDIE model to gather the necessary feedback (through formative and summative evaluations) to determine the effectiveness of the program. The developer then takes corrective action or makes modifications necessary to delivery the program successfully. The evaluation phase is essential to the delivery of a program and ensures that the needs of the target

audience are being met. A comprehensive iterative process like the ADDIE model provides designers and instructors alike with an effective model that can be used for a wide range of courses and programs.

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