and supplemental books someone might want to see, clothes, and her trademark matching jewelry. Linda always looked "put together" with her lovely jewelry pieces that she could find everywhere and put together with something she already had (making it easier to tell her husband Travis about purchasing her new finds). Linda and Travis enjoyed traveling to Florida to Disneyworld and to Universal Studios where she could immerse herself In Harry Potter; they often shared that experience with their son and grandsons, but they were also quite content to enjoy their time together. Linda lived life to the fullest surrounded by the love and admiration of family, friends, colleagues, and others whose lives she touched along the way. Thank you for enriching our lives. Rest in peace, dear Linda.

Instructional design for effective teaching: The application of ADDIE model in a college reading lesson

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Abstract

In this paper, the authors will discuss the application of ADDIE, a five-step instructional design model. ADDIE prescribes the generic, systematic, dynamic, and flexible instructional design process, which offers educators a productive approach to education. The authors will illustrate how to apply the model in a college-level reading lesson. Following the steps in ADDIE would enhance the effectiveness of teaching in a variety of post-secondary classrooms and adult education and training settings. Key words: ADDIE, instructional design model, college reading

Introduction

Although there may be a number of reasons for low academic performance in college classrooms, effective instructional design can offset some disadvantages and lead to more desired student learning outcomes. Instructional design offers educators a productive approach to education, viewing all purposeful teaching and learning as systematic processes. In this process, every component is crucial to successful learning: the instructor, learners, materials, instructional activities, delivery system, and the overall learning environment. Instructional design is such a systematic approach that it helps teachers create effective and efficient learning experiences for learners. While teachers in higher education are facing many challenges, instructional design enables them to use systematic thinking to solve instructional problems and push for innovations in teaching.

ADDIE is one of the models which prescribes the generic, systematic, dynamic, and flexible instructional design process, which is widely used in instructional design for effective learning (Holden, 2015). ADDIE has five steps—Analysis, Design, Development, Implementation, and Evaluation (See Figure 1). Each step is the prerequisite of the following and results in each step feeding information into the next. In this paper, we will illustrate ADDIE by applying the five steps in a lesson that is appropriate for post-secondary classrooms.

Figure 1. *The ADDIE Model*
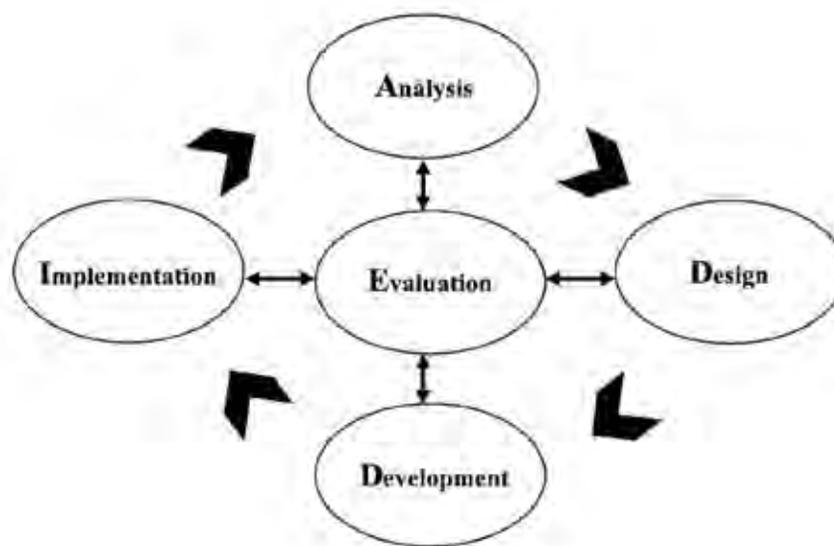
Instructional Context

The instructional context in this paper is a reading lesson in an integrated reading and writing class at a community college. The instructor finds students in this course have difficulty in distinguishing the difference between a main idea, a topic, and a supporting detail, particularly in the context of longer reading passages. Therefore, she plans to develop a 30- to 45-minute enhancement lesson to help this group of students to distinguish between a topic, a main idea, and supporting detail sentences in a long paragraph reading passage.

Step 1: Analysis

The first step in ADDIE is analysis. The major tasks in analysis include clarifying the instructional problem, establishing instructional goals, goal analysis and subordinate skills and entry behaviors analysis, and learning environment and learner analysis (Holden, 2015).

Identifying the instructional problem and defining the instructional gap

To design effective learning, an instructor will first clarify the instructional problem and define the instructional gap in the lesson. The instructional gap is defined as the difference between the desired and the current performance (See Figure 2). In the lesson, students' desired performance is that they can distinguish between main ideas, topics, and supporting details, while their current performance is that they have difficulty in distinguishing the difference between a main idea, a topic, and a supporting detail in a paragraph or essay of more than 100 words. A pre-test, or assessment, and results from a related previous lesson can provide evidence for the students' current performance.
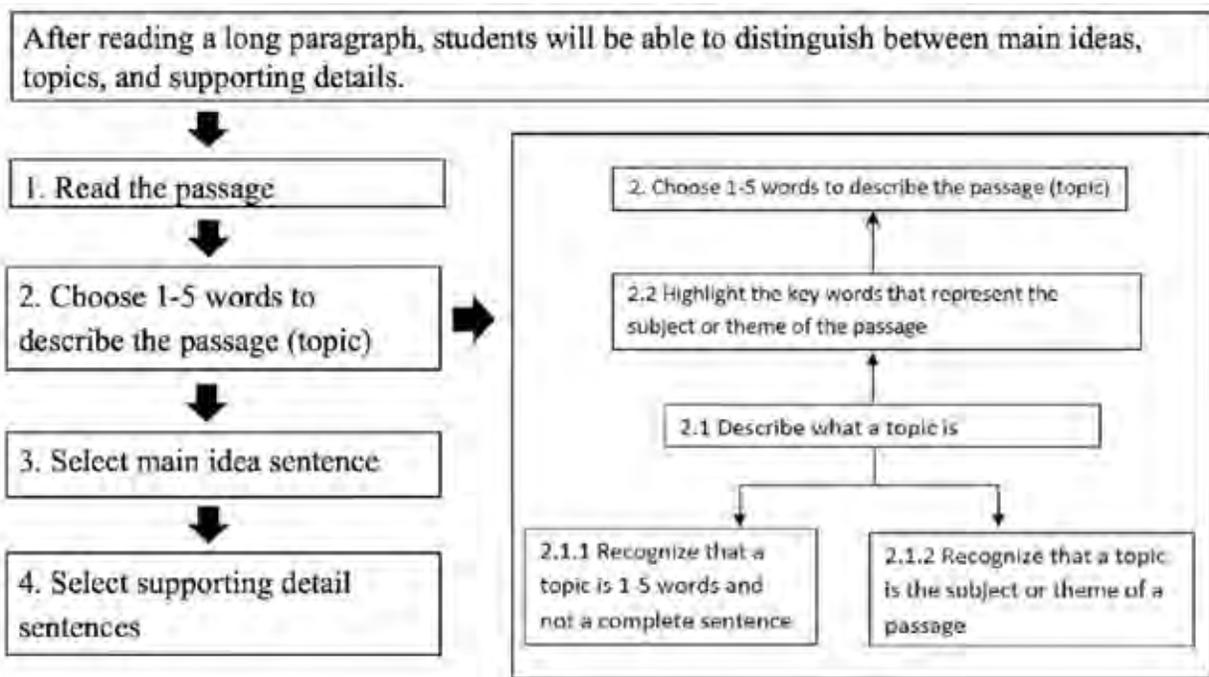
Figure 2. *Instructional Gap*

Clarify instructional problem
Instructional gap = Desired performance – Current performance

Students' able to distinguish main ideas, topics, and supporting details	Students having difficulty in distinguishing the difference between a main idea, a topic, and a supporting detail in a long paragraph of more than 100 words or an essay
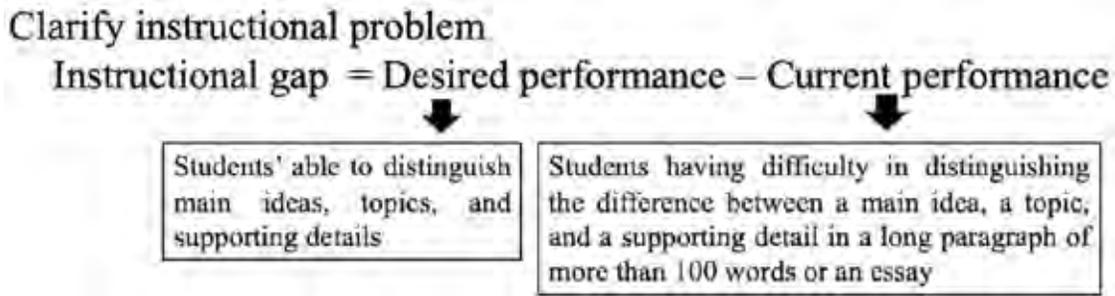
Instructional goal, goal analysis, and subordinate skills and entry behaviors analysis

After defining the instructional gap, the instructor establishes the instructional goal and performs goal analysis and subordinate skills and entry behaviors analysis (See Figure 3). She first translates the instructional gap into the instructional goal, which is "after reading a long paragraph, students will be able to distinguish between main ideas, topics, and supporting details." Then the instructor asks this question: What are the essential steps for students to perform the establish goal? She identifies the following four steps: 1. Read the passage. 2. Choose one to five words to describe the passage (topic). 3. Select the main idea sentence. 4. Select supporting detail sentences.

In order to establish behavioral objectives for the lesson, these four steps are general and not specific enough. The instructor then asks this question: What should students do in order to complete each step? The instructor will continue to ask this question until she cannot further break down the step or until she reaches a point where students have acquired the knowledge or skill in a previous lesson. In Figure 3, we used Step 2, as described above, as an example to show how to perform subordinate skills analysis. The knowledge or skills which students previously acquired are considered the entry behaviors for this lesson.

Figure 3, *Establishing the instructional goal, and performing goal analysis and subordinate skills and entry behaviors analysis*

After reading a long paragraph, students will be able to distinguish between main ideas, topics, and supporting details.

1. Read the passage

2. Choose 1-5 words to describe the passage (topic)

3. Select main idea sentence

4. Select supporting detail sentences

2. Choose 1-5 words to describe the passage (topic)

2.2 Highlight the key words that represent the subject or theme of the passage

2.1 Describe what a topic is

2.1.1 Recognize that a topic is 1-5 words and not a complete sentence

2.1.2 Recognize that a topic is the subject or theme of a passage

Instructional design for effective teaching

Learning environment and learner analysis

Another task in the analysis is to analyze the learning and performance environment and learners' general information, entry behaviors, and prior knowledge (Holden, 2015). Such information will feed into the design stage. For example, movable tables and chairs in a learning environment mean that it is easier for the instructor to organize small group discussions or collaborations in class. In addition, understanding students' entry behaviors and prior knowledge can help the instructor determine the starting point of a lesson. Such information can be collected through assessment from a previous related lesson, student profiles, observation, and interviews.

Step 2: Design

The major tasks in the design stage are to establish behavioral objectives and assessment instruments, identify instructional strategies, and select media (Holden, 2015).

Establish behavioral objectives and assessment instruments

In the analysis stage, the instructor has analyzed the subordinate skills. Now it is time to translate the subordinate skills into measurable performance objectives and design parallel assessments. A performance objective is often presented in the ABCD format, which means a performance objective should have four components: Audience (A), behavior (B), condition (C), and degree (D). Take Objective 2.1.1 as an example (See Figure 4). By adding the condition (given prompts) and the degree (with 100% accuracy), the instructor translates the subordinate skill 2.1.1 in Figure 3 into a performance objective. The audience is the students in the enhancement reading lesson by default.

Figure 4. *Establish behavioral objectives and assessment instruments*
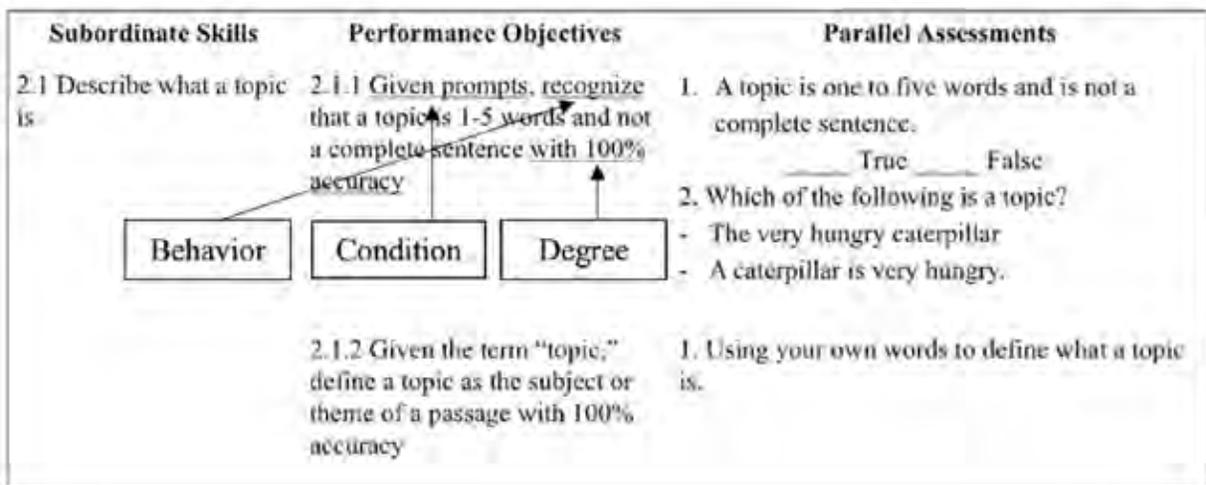
After establishing the performance objectives, the instructor develops parallel assessments for each objective. Objective 2.1.2 is "Given the term 'topic,' define a topic as the subject or theme of a passage with 100% accuracy." A parallel assessment item for this objective is a short essay question: "Using your own words to define what a topic is."

Identify instructional strategies

After establishing the performance objective and designing parallel assessment items, the instructor identifies instructional strategies. For example, to help students describe a topic, the instructor decides to use the strategy example and non-example (See Figure 5). This strategy is often used when introducing a new concept. By providing the examples and non-examples of a topic, the instructor can help students distinguish one important aspect of a topic: A topic is one to five words and not a complete sentence.

Figure 5. *Identify instructional strategies*

> Objective 2.1 Describe what a topic is: A topic is the overall theme or subject of a passage. It is never a complete sentence. We can use 1-5 of our own words to come up with the topic.
>
> **Examples:**
> - Going to college
> - Success in reading class
>
> **Non-examples:**
> - Going to college is important.
> - It is good to be successful in reading class.
>
> **Practice Items:** What is a topic? Read a long sentence and use your own words to come up with the topic.
>
> **Feedback:** Remind students that a topic is not a complete sentence, is 1-5 words that is the overall subject and refer back to the examples given.

Select media

When the instructor completes the design of instructional strategies and instructional activities, she will choose media that are compatible with the strategies and activities. For example, in this lesson, a computer and a projector at the teacher's station are necessary for the instructor to present information, such as the examples and non-examples above, to the students. Computers shall also be provided to students in order for them to complete the learning activities.

Step 3: Development

The major task in the development stage is to create the instructional materials according to the blueprint in the design phase (Holden, 2015). For example, Figure 6 below is designed to be used when the instructor presents to the students what a topic is.

Figure 6. *Instructional material (adapted from Smith & Morris, 2014)*

Finding the Topic

- A topic is the overall theme or subject of a passage.
- It is never a complete sentence.
- We can use 1-5 of our own words to come up with the topic of the passage.

Examples:

1. Children can have fun on rainy days by making forts, baking cookies, playing computer games, or reading books.

    The topic of this passage is <u>rainy day activities</u>.

2. Under hypnosis, people may recall things that they are unable to remember spontaneously. Some police departments employ hypnotists to probe for information that crime victims do not realize they have. In 1976, twenty-six young children were kidnapped from a school bus near Chowchilla, California. The driver of the bus caught a quick glimpse of the license plate of the van in which he and the children were driven away. However, he remembered only the first two digits. Under hypnosis, he recalled the other numbers and the van was traced to its owners.

    --David Dempsey and Philip Zimbardo, *Psychology and You*

    The topic of this passage is <u>hypnosis</u>.

Step 4: Implementation

The major task in the implementation phase is to teach the lesson to the target audience and have the audience provide valuable feedback (Holden, 2015). When a lesson is designed and developed, pilot testing the lesson is necessary. According to Dick, Carey, and Carey (2015), there are three ways one can implement the design: through one-to-one teaching, in a small group, or through field trial. The instructor can pilot test the lesson on one target student or a small group of target students. In addition, if permitted, the instructor can implement the lesson in a real-world classroom section to the target audience. During and after the implementation, the instructor collects information on the lesson to provide feedback on the design, which is a major function of the final step in the ADDIE process, evaluation.

Step 5: Evaluation

According to Dick, Carey, and Carey (2015), there are two types of evaluation to evaluate the design of instruction: Formative evaluation and summative evaluation. Formative evaluation focuses on providing feedback to the process of the design. After implementing the lesson, the instructor can conduct a questionnaire or interview on the learners to collect feedback on the lesson. In this case, the instructor develops a questionnaire (see Figure 7) to collect students' feedback on the following aspects of the lesson: The introduction, objectives, pretest, handout, instruction process, instructional strategy, and instructor's feedback for students. After the trials are complete and feedback is collected from learners, the instructor will revise and streamline instruction.

The second form of evaluation is summative evaluation, focusing more on the learning outcomes. The instructor can use a variety of methods to assess students' mastery level of the content. In this lesson, students' scores in the "Finding a Topic Test" (see Figure 8) will be an important indicator for success.

Figure 7. *Formative evaluation questionnaire*

Formative Evaluation Questionnaire

Learner Number: _____   Date: _____

Directions: Use the following questionnaire to judge the effectiveness of today's lesson and instructional materials. Please rate the quality of the instruction by circling the number on a scale of 1 (poor) to 5 (excellent) that you believe best describes each lesson part. In the right column, please describe ways that you believe we can improve each lesson part to make it clearer and more interesting for you. Thank you!

Lesson Part	Quality Rating	Suggestions for Improvement
Introduction—did the introduction give a good overview of what you would be learning in the lesson and connect the topic to other courses?	Poor 1 2 3 4 5 Excellent	
Objectives—did the objectives sound reasonable and clear?	Poor 1 2 3 4 5 Excellent	
Pretest—was the pretest appropriate for the lesson? Were the directions clear?	Poor 1 2 3 4 5 Excellent	
Handout/Memory Aid—did the memory aid provide a reminder about the topic?	Poor 1 2 3 4 5 Excellent	
Information/instruction on Objective 2.1—was the instruction adequate and clear?	Poor 1 2 3 4 5 Excellent	
Information/instruction on Objective 2.2—was the instruction adequate and clear?	Poor 1 2 3 4 5 Excellent	
Examples/Nonexamples—were the examples and nonexamples adequate and clear?	Poor 1 2 3 4 5 Excellent	
Instructor Feedback—did the instructor provide timely, adequate, and clear feedback?	Poor 1 2 3 4 5 Excellent	

Figure 8. *Test for summative evaluation (adapted from Smith & Morris, 2014)*

<div style="border:1px solid black; padding:1em;">

<p align="center">Finding the Topic</p>

Name_____

Date_____

Class/Instructor_____

Directions: Read the passage. Using a pen or highlighter, identify words that might let you know what the topic of the passage is. Write the topic of the passage in the designated space.

Research has shown that girls and boys learn to use language differently in their sex-separate peer groups. Typically, a girl has a best friend with whom she sits and talks, frequently telling secrets. It's the telling of secrets, the fact and the way that they talk to each other, that makes them best friends. For boys, activities are central: their best friends are the ones they do things with. Boys also tend to play in larger groups that are hierarchical. High-status boys give orders and push low-status boys around. So boys are expected to use language to seize center stage: by exhibiting their skill, displaying their knowledge, and challenging and resisting challenges.

--Adapted from Deborah Tannen, "How Male and Female Students Use Language Differently," *The Chronicle of Higher Education*, June 19, 1991.

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Conclusions and Implications

In this paper, the authors illustrated how to use the ADDIE instructional design model to design a reading lesson in an integrated reading and writing class. They hoped to provide useful guidance to educators by describing the application of ADDIE in a relatively detailed manner.

Although the instructional context in this paper is a reading lesson, the ADDIE process can be applied to a variety of subject areas in post-secondary classrooms, which include general education dance course (Zimmerly, 2012), courses in a culinary arts program (Wang, 2011), a computer-assisted instruction module for metric area instruction for pre-service teachers (Springer, 2002), information literacy courses (Nichols Hess & Greer, 2016; Reinbold, 2013), programming language courses (Durak & Ataizi, 2016), and many other subject areas. Research found that the application of ADDIE resulted in better instructional results (Durak & Ataizi, 2016; Wang, 2011; Zimmerly, 2012).

Teachers who designed instruction with ADDIE had found positive experience using the model. For example, Nichols Hess and Greer (2016) used ADDIE to incorporate the high-impact practices recommended by the Association of American Colleges and Universities and some e-learning best practices into an online information literacy course. They concluded that ADDIE can "provide a structure around which librarians can develop a variety of instructional interactions"; "help librarians consider student engagement, learning, and assessment more intentionally"; "help to marry information literacy-specific standards and other learning guidelines, such as high-impact practices and e-learning best practices" (p. 264). At Weill Cornell Medical College, a group of librarians used ADDIE to redesign a medicine course for first-year medical students. They found the instruction

designed through ADDIE "focuses on learning outcomes relevant to students, meets students' needs, and facilitates active learning" (Reinbold, 2013, p. 244).

Despite its successful application in many settings, ADDIE is not "a guarantee" (Reinbold, 2013, p. 255) for successful and effective instruction. As Reigeluth (1999) put it, instructional methods are "probabilistic" (p. 11). This means instructional solutions cannot guarantee desired learning outcomes, which is very different from the causal relationship in a science rule. When instructors use ADDIE to design instruction, it is important for them to keep in mind that it is more a guideline for the design process. As Reinbold (2013) stated, "The ADDIE model instructs designers on a path to develop training; however, it does not tell the designer how to do this well, or the theory behind it" (p. 255). Because of this limitation, some scholars even argued that ADDIE is not a model, but a generally agreed on framework within the field of instructional design and technology (Bichelmeyer, 2005; Molenda, 2003). Therefore, instructors using ADDIE have to argue their rationale of the design and how likely the design can bring the highest possible probability of the desired results (Reigeluth, 1999).

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