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THE EFFECTS OF AN ADVANCE ORGANIZER AND TWO TYPES OF  
FEEDBACK ON PRE-SERVICE TEACHERS' KNOWLEDGE APPLICATION  
IN A BLENDED LEARNING ENVIRONMENT

A Thesis in

Instructional Systems

by

Ying-Hsiu Liu

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The thesis of Ying-Hsiu Liu was reviewed and approved\* by the following:

James K. McAfee  
Associate Professor of Special Education  
Thesis Adviser

Francis M. Dwyer  
Professor of Education  
Chair of Committee

Judith A. Kolb  
Associate Professor of Education

John D. Popp  
Adjunct Assistant Professor of Education

Edgar P. Yoder  
Professor of Agricultural and Extension Education

Susan M. Land  
Associate Professor of Education  
Professor-In-Charge  
Instructional Systems Program

\*Signatures are on file in the Graduate School.

## ABSTRACT

This study examined structural supports (advance organizers and feedback) as a means of ensuring the greater effectiveness of the case method in instruction. The study also discussed the efficiency of structural supports from the course administration perspective. In the course examined for this study, students were presented with a blended learning environment that combined face-to-face lectures with online instruction. Factorial design permitted study of both the main effects and the interactive effects of an advance organizer and two types of feedback. The target performances consisted of students' short-term and long-term test scores. A total of 282 students participated in the study. Two-way ANCOVAs were used to test the effects of treatment components. This study indicated that the advance organizer had a facilitative impact on students' scores on the short-term test, but not on the long-term test. Types of feedback had no statistically significant effect on test scores. From a course-administration perspective, however, scripted feedback is much more efficient than individualized feedback. The advance organizer is also administratively efficient.

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## CHAPTER 1

### Introduction

#### *Issues of Teacher Preparation*

Today, teachers face more challenges, such as increasingly diverse student populations, falling student performance, and federal mandates to meet the needs of students with disabilities. Empirical evidence suggests effective teaching practices can improve students' performance (Scheeler, 2002). However, acquiring teaching skills is a progressive developmental process. Teacher education uses various means, such as internships and student teaching, to prepare teachers, but several issues concern teacher educators.

The first issue is the nature of teaching. The goal of a teacher preparation program is to prepare teacher candidates with the capabilities needed to effectively manage classrooms and to teach. Wilson, Floden, and Ferrini-Mundy (2001) examined research on teacher preparation. They found that the specific details regarding what student teachers should learn and how they should acquire teaching skills are vague. According to other researchers, this is because teaching demands complicated cognitive skills (Leinhardt & Greeno, 1986). A teacher's assignment involves both teaching and classroom

management. For example, in a math class, a teacher may encounter situations involving seeming inability to retain recently acquired information (Mary always forgets what was taught yesterday) and acting up in class (Tom always jokes with or pokes classmates who sit next to him in class). Thus, under these circumstances, we expect a teacher to effectively manage the class and to engage students in learning while delivering instruction. Thus, a teacher's knowledge should include subject matter, pedagogical knowledge, and classroom management principles (Wilson et al., 2001). However, teacher candidates need more than theoretical knowledge to effectively teach.

The second issue is the gap between theory and practice. Research shows that novice teachers usually encounter reality shock when they first enter the work place (Hsu, 2004; Veenman, 1984). For example, Kim often off tasks during instructional time or Kevin bullies classmates. Novice teachers perceive classroom management as the most serious/frequent problem among the many they encounter (Veenman, 1984). Teacher educators believe the reason for the problem is that pre-service teachers have difficulties linking theory with practice because they lack related experiences or exposure to similar situations. Hence, universities and colleges utilize media and instructional strategies, such as video-cases, field observation, and

internship opportunities, to help pre-service teachers better understand theoretical knowledge and gain exposure to real situations (Ruhl & Hall, 2002; Stephens, Leavell, Fabris, Burford, & Hill, 1999). The acquisition of teaching skills, however, is a progressive process. A novice teacher needs intensive practice involving real or simulated scenarios or situations, and feedback from experts in order to become an experienced and expert teacher. Research on expert performance has shown that expertise development is a continuous process (Ericsson, 2002; Norman, 1982). Furthermore, studies have shown that experts have well-organized, contextualized, and content-specific knowledge and experience (Anderson & Krathwohl, 2001; Bransford, Brown, & Cocking, 1999). Thus, before pre-service teachers enter the field, they need training in their subject and in pedagogy, and help in linking theoretical knowledge to practice.

The solution to these issues is the use of cases in instruction. Cases can serve as the interim means for enhancing and contextualizing instruction (Stephens et al., 1999). For example, cases can help students conceptualize their knowledge, expose students to teaching situations, and help students link and apply learned knowledge to real situations. Researchers claim that cases improve student learning. Furthermore, more and more researchers



have turned to the Internet, and use web sites as supplements to further enhance case instruction (Hsu, 2004; Lanna, 2002; Pindiprolu, Peterson, Rule, & Lignugaris, 2003); however, reports of the effects of case methods are mostly descriptive or advocacy papers, and very little empirical research exists that bears this out. Researchers suggest that the investigation of cases should be more systematic and empirical (Lundeberg, Levin & Harrington, 1999; McNaughton, Hall, & Maccini, 2001; Merseeth, 1994). Specifically, for example, the effectiveness of case-integrated instruction is not conclusive. Research also does not reveal what constitutes a good case study (Colliver, 2000; Norman, & Schmidt, 2000). Furthermore, instructional strategies employed in a case study may be the key factor determining the effectiveness of the case method. That is, it may not be the case story that is effective or ineffective, but the instructional methods used to investigate, instruct, and apply the case.

Smith and Ragan (1993) argued that the choice of instructional strategies should correspond to desired learning outcomes. For example, a rehearsal strategy is most effective in improving students' memorization but is ineffective in helping students understand concepts. Researchers suggested that for the case methodology, instructional activity should be structured and purposeful (Lundeberg et al., 1999). They further suggested that advance

organizers may have a positive impact on students' case analysis performance and may be used to support a case study. Advance organizers serve as ideational scaffolding in helping students comprehend instructional content and increase knowledge retention (Ausubel, 1960, 1977; Ausubel & Fitzgerald, 1961; Kloster & Winne, 1989; Mayer, 1978). Research has shown that advance organizers not only activate learners' prior knowledge but also provide ideational framework for learners to subsume new information (Ausubel et al., 1961). Since Ausubel proposed the idea of advance organizers, many researchers have investigated the procedure. Advance organizers exist in various forms such as paragraphs, graphics, and questions. However, most researchers investigated how advance organizers affect knowledge acquisition (Alvermann, 1981; Kiewra, Mayer, Dubois, Christensen, & Kim, 1997; Mayer, 1978); few researchers have examined the effects of advance organizers on knowledge application. Research also shows the importance of strategies to encode advance organizers. That is, the effects of advance organizers are limited when advance organizers are merely presented to learners without any cognitive engagement (Dinnel & Glover, 1985; Jonassen & Wang, 1993). Thus, advance organizers should be combined with other instructional activities to reach maximum effect.

However, the type of advance organizer that is the best choice in supporting complex learning tasks is not clear, especially for case methods.

In addition to advance organizers, feedback is another critical instructional component influencing learning, including the implementation of case methods. However, the method by which advance organizers affect feedback is not clear, nor is the influence of these two components on the effectiveness of the case study.

Feedback supports practice and serves a corrective function (Kulhavy, 1977). It confirms the learner's behavior and clarifies and corrects people's misconceptions. There is much research on feedback, such as feedback on written instruction, motor learning, simple concept acquisition, and paired-association. Kulhavy reviewed feedback research and indicated that time (immediate vs. delayed) and forms of feedback (communication mode, and load of information, etc.) are two important variables in feedback effectiveness. Researchers have also determined that effective feedback should be corrective and immediate. That is, learners should be able to correct error or improve their performance with information provided via feedback. Second, learners should be able to access feedback as soon as possible after a response (Riccomini, 2002; Scheeler, 2002). However, effective feedback

practice regarding complicated learning tasks is inconclusive. With the increasing use of web case-based instruction, it is not clear how and what types of feedback can be used effectively and efficiently in order to have the greatest impact on students' achievement in terms of knowledge application, and whether there are compensation effects of other structured instructional activity (advance organizers) on feedback.

To begin to fill the gap in our knowledge of effective case-integrated instruction, this study was conceived. The purpose of this study was to investigate the effects of two forms of advance organizers and two forms of feedback on college students' knowledge application under a case-based blended learning environment.

### *Statement of the Problem*

Wilson et al. (2001) expressed concerns about how and what teacher preparation programs prepare student teachers to do. Novice teachers often feel ill-prepared to enter the workplace, expressing special concerns about discipline. One of the reasons for this concern is that novice teachers do not have sufficient experiences and cannot link theory to practice. Research shows that expert teachers possess more experience and practical knowledge than novice teachers. Case methodology may be integrated into teacher

preparation programs because cases can provide learners with real or simulated situations for practice. Thus, instructional designers should design case-integrated instruction in ways that facilitate linking theory to practice and enhancing application.

Gagne and White (1978) suggested three complex components for designing instruction: (1) the learner, (2) the original task, and (3) the targeted future task. Thus, techniques that enable the learner to complete the original task in a case study and then apply the skills they learned to a future task are essential. Advance organizers are one such technique that may be used to assist students in developing case analysis ability (Lundeberg et al., 1999), and systematically assimilate the new information. However, there is little research on the effect of advance organizers on knowledge application, and especially of how advance organizers interact with other important factors, such as feedback, and their joint effect on facilitating knowledge application under a case-integrated blended learning environment.

This research was designed to investigate the educational value of advance organizers and types of feedback, and their joint impact on facilitating knowledge application. Research findings may contribute to the instructional design fields and to teacher preparation. The investigation of the role of

advance organizers and types of feedback in knowledge application can further clarify the importance of structured and purposeful instructional activity, and whether advance organizers complement the effects of feedback.

### Purpose of the Study

The primary purpose of this research was to investigate the facilitative effects of advance organizers and two types of feedback, specifically individualized feedback and scripted feedback, on pre-service teachers' knowledge application in a case-integrated blended learning environment.

The study was designed to:

1. determine if there are differences in the criterion tests scores between students who received the advance organizer and students who received no advance organizer.
2. determine if there are differences in the criterion test scores between students who received scripted feedback and students who received individualized feedback.
3. determine if there are interactive relationships between the advance organizer and the type of feedback on criterion test scores.

### *Hypotheses*

The study was designed to test six hypotheses on a short-term test (within one week of the activity) and the long-term test (three weeks after the activity).

HO<sub>1</sub>: There are no statistically significant differences in the short-term test scores between students who receive an advance organizer and students who receive no advance organizer.

HO<sub>2</sub>: There are no statistically significant differences in the short-term test scores between students who receive scripted feedback and students who receive individualized feedback.

HO<sub>3</sub>: There are no interactive relationships between the advance organizer and the type of feedback on the short-term test scores.

HO<sub>4</sub>: There are no statistically significant differences in the long-term test scores between students who receive an advance organizer and students who receive no advance organizer.

HO<sub>5</sub>: There are no statistically significant differences in the long-term test scores between students who receive scripted feedback and students who receive individualized feedback.

HO<sub>6</sub>: There are no interactive relationships between the advance organizer and the type of feedback on the long-term test scores.

## Explanation of Terms

For clear communication, below are definitions of terms used in this study.

### *Advance Organizer*

Advance organizer is “introductory material at a high level of abstraction, generality, and inclusiveness which facilitates meaningful verbal learning and retention” (Ausubel & Fitzgerald, 1961, p 266)

### *Adjunct Question*

Questions positioned in the beginning or after learning material.

### *Blended Learning*

A type of instruction combining face-to-face and online instruction mixes various instructional strategies and media in order to help learners achieve maximal learning outcomes.

### *Case*

“A case is a story or event that represents a taxonomy or typology. It usually contains characters, setting, plot, and history” (Shulman, 1986; 1992).

A case may be delivered orally, in writing, or through audio or video technology.

### *Case Methodology*

A system of methods prescribing the use of case as a



learning/instructional tool.

### *Concept Map*

Visual networks that organize and represent concepts and relationships.

They represent how knowledge is stored in the human mind (Jonassen,

Beissner, & Yacci, 1993)

### *Knowledge Applications*

Cognitive processes through which knowledge and skills in various situations, other than the situation in which the knowledge and skills were learned, are applied (Brooks, & Dansereau, 1987).

### *Individualized Feedback*

Examination of each component of an assignment, indicating whether the component is correct, and providing corrections and suggestions to improve the assignment response.

### *Scripted Feedback*

Scripted models of correct responses constructed before student performance. After students receive scripted feedback, they may compare their responses with the model of correct performance.

## CHAPTER TWO

### Literature Review

This literature review focuses on five main areas: (a) expertise development and the role of practice, (b) case methodology, (c) blended learning, (d) advance organizers, and (e) feedback. Each of these bodies of work relates directly to the proposed project. The first three variables—(a) expertise development and the role of practice, (b) case methodology, and (c) blended learning—are contextual variables. That is, these instructional strategies have been used on targeted university students for several years and were not manipulated in this investigation; however, they are part of the instructional methodology applied and used to develop expertise in students. Advance organizers and feedback (both scripted and individualized) are the variables of interest in this study. The manipulation of these two variables and the impact of these variables on expertise are measured in the assessment. In the following review, the literature on the context variables is discussed, followed by an analysis of the literature pertaining to the independent variables.

#### *Expertise Development and the Role of Practice*

Experts are persons who are at the top of their professional fields such as

medicine, law, education, music, and chess. They are acknowledged to manifest superior performance compared to those in their field with merely average skills. More specifically, research found that compared to average people, experts are better able to detect important information, recognize problem patterns, and effectively and efficiently perform tasks related to their areas of expertise. Since the 1960s researchers have been interested in what expertise is and how experts perform differently from novices (Glaser & Chi, 1988). Expert studies not only contribute to the building of expert systems but shed light on the learning processes that enable development of expertise, which is the ultimate result of learning. With better understanding of expertise and how it is acquired, educators can hope to provide instructional experiences that will encourage and prepare students to develop expertise.

### *Definition*

Experts are people who greatly outperform average people in specific areas. Understanding the development of expertise is critical to understanding learning. Bransford, Brown, and Cocking (2000) concluded that experts are people who “have developed expertise in particular areas and are able to think effectively about the problems in those areas” (p. 31). They further argued that it is the acquired extensive knowledge that affects what

experts notice and “how they organize, represent, and interpret information in their environment” (p. 31). Benner (1984) interviewed novice and expert nurses about their nursing practice, and analyzed data by employing Dreyfus and Dreyfus’s skill acquisition model (1986). She regarded a (nurse) expert as a person who has enormous experience and is able to grasp intuitively the essence of the problem and generate effective solutions with little effort.

Thus, the expert is able to react to and solve a problem much faster, and move efficiently and have greater achievement. Similarly, Smith and Ragan (1993) defined an expert as a person who can apply knowledge to solve problems in a particular field. Ericsson (2002) defined expert performance as “the end product of an extended series of psychological modifications and physiological adaptations” (p. 17), and the excellence of experts as superior achievement in the core activities of a domain. In sum, experts are persons who have extensive knowledge that enables them to capture the essence of a problem and solve problems effectively and efficiently in a specific domain. Thus, expertise is both the knowledge and cognitive skills developed through practice, and the purposeful performance to achieve goals.

Kennedy (1989) argued that expertise development is based on how professional educator view expertise. Professional development programs

have different strategies and approaches that aim to develop these areas according to their beliefs. She identified four different views of expertise.

Each of these is described below.

(1) Expertise as technical skills. Professional educators identify essential skills that experts must have in order to carry out a task. These skills differentiate experts from novices, and are the focus of expertise development. For example, microteaching is one of the types of expertise development influenced by this view.

(2) Expertise as application of theory or general principle. Adherents to this view believe that once learners acquire theory and principles, they are able to solve problems and accomplish tasks. Thus, experts are those who have a broad conceptual understanding of an area.

(3) Expertise as critical analysis. Under this paradigm, interpretive, analytic, and reasoning skills are the essential components that enable a novice to develop into an expert. This critical analysis approach is seen in the case study method first used in the Harvard Law School.

(4) Expertise as deliberate actions. This paradigm emphasizes expertise as capability of reflection. Professional development programs should provide opportunities for practice that relate to the acquisition of technical skills

along with opportunities to self-evaluate. The ultimate goal of professional development programs should be to prepare professionals who are able to effectively and efficiently solve problems encountered in their workplace.

Each of the four views identified by Kennedy (1989) provides a glimpse into expertise. However, each is incomplete. A more complete picture of expertise is provided by the integration of the four views. Thus expertise is technical skill, theoretical understanding, analytical and problem solving skills, and reflection and self-evaluation. In order to achieve this goal, researchers need to understand the nature of expertise and how it is acquired. These topics are discussed in the following sections.

### *The Characteristics of Expertise*

How do experts differ from novices? What makes an expert out-perform novices and how is the expertise acquired? For decades, many researchers have compared the performance of experts and the performance of novices in various domains such as chess, physics, mathematics and teaching, and investigated how experts differ from novices. Bransford et al. (1999) and Glaser and Chi (1988) summarized research findings and identified some common characteristics of expertise.

1. Experts have extensive and elaborative domain knowledge organized in

a functional way.

2. Experts are able to recognize meaningful patterns in their specialized area.
3. Experts are more flexible and faster at retrieving task-relevant knowledge with little effort.
4. Experts have superior short-term and long-term memory.
5. Experts see problems at a deep and functional level.
6. Experts tend to capture the essence of a problem before they work on the solution.
7. Experts have better self-monitoring skills.

These characteristics of expertise shed light on how experts excel. Research demonstrates that experts have an extensive amount of domain-specific knowledge (Chase & Simon, 1973). However, it is not only the extensive amount of knowledge but also its structure and types of knowledge that make experts' performance excellent. Some researchers looked into the nature of knowledge that experts obtain, and found that experts have both theoretical and practical knowledge. Most importantly, experts' knowledge is well-organized (Benner, 1984; Borko & Livingston, 1989; Chase & Simon, 1973; deJong & Ferguson-Hessler, 1986). For example, Benner interviewed

nurses with various experiences. She found that expert nurses have high levels of theoretical knowledge and extensive practical knowledge. The practical knowledge (know how) is developed through practice, and application of theoretical knowledge. She further identified the roles of theoretical and practical knowledge. Although practical knowledge can extend theoretical knowledge and vice versa, theoretical knowledge is the understanding of principles, relationships and concepts, while practical knowledge is a narrower ability to perform a skill under specific environmental conditions. Both are necessary for the development of expertise. However, novices are deficient in theoretical knowledge compared to experts but may have similar levels of practical skill. Peterson and Comeaux (1987) found that expert teachers not only have better-developed schemata but also rely heavily on prior experience when analyzing and evaluating classroom events. Their findings also supported those of Brown and Day (1983) that experts use more high-order skills such as evaluation and synthesis compared to novices in problem-solving strategies. Novices tended to use lower-order skills. For example, in Brown and Day's study, subjects were asked to summarize an expository text. The most often-used summary strategy for novices was copy-deletion. Experts used a combining-paragraphing strategy routinely.



Further evidence of these differences is provided by deJong et al. (1986), who determined that experts perceived problems in a fashion that differs from that of novices. In their study, subjects took a pretest, and then were asked to categorize physics problems. Experts performed their problem-sorting task based on physics formula functions, theory and principles, while novices sorted problems based on the surface features of the problem. They concluded that expert knowledge is not only hierarchically structured but also problem-centered.

Another element of expert performance is practice. Research shows that expertise is not innate ability but rather develops through deliberate practice (Ericsson, 2002). According to Ericsson, deliberate practice comprises activities that are specifically designed to improve performance. It is purposeful, and enables learners to go beyond their current abilities.

Deliberate practice is not mindless repetition. With practice, experts are able to recognize meaningful patterns and flexibly and quickly retrieve task-related knowledge, because practice not only exposes learners to many conditions, but develops maxims and automaticizes psychological process. Practice enables automaticity—the ability quickly to organize and apply information.

Thus practice improves memory functions for experts!

### *Development of Expertise*

Many researchers agree that expertise acquisition is a continuous, developmental and purposeful process, and expertise develops through deliberate practice. In other words, novices gradually approach expertise through structured learning activities (Alexander, Sperl, Buehl, Fives, & Chiu, 2004; Bransford et al., 1999; Ericsson, 2002; Gick & Holyoak, 1987). Several researchers proposed stages of expertise acquisition. Alexander et al. (2004) compared learners at different stages. They examined such learners in terms of analogical reasoning, domain knowledge, individual interest, general, and professional strategy use, text-based strategies, deep processing, and recall skills. Their findings support the expertise development as a progressive and developmental process. Furthermore, they proposed that expert development involves three stages (acclimation, competency, and proficiency). These levels of development require different activities to enable the next stage of development. Thus educators or instructional designers should provide different educational interventions to scaffold students according to their stages of learning (Alexander et al., 2004; Gick et al., 1987).

Norman (1982) categorized expertise development into three modes: (1) accretion—the addition of new information to the existing knowledge structure

(most learning is accretion); (2) structuring—the stage of learning new knowledge (learners do not have prior knowledge, so this is most effortful learning); and (3) tuning—the stage of adjusting, reorganizing knowledge to tasks. It can also be “the development of specific knowledge for specific cases” (p. 89). Norman believed that in order to benefit from tuning and restructuring, a learner must have a solid base of lower-order skills, or knowledge. With practice and tuning, learners can move on to the next higher-order development. Dreyfus and Dreyfus (1986) proposed that skill acquisition involves five stages: novice, advance beginner, competent, proficient, and expert (See Table 2-1.)

Table 2-1

*Five Stages of Skill Acquisition (from Dreyfus & Dreyfus, 1986, p. 50)*

<b>Skill Level</b>	<b>Components</b>	<b>Perspective</b>	<b>Decision</b>	<b>Commitment</b>
Novice	Context-free	None	Analytical	Detached
Advanced beginner	Context-free & situational	None	Analytical	Detached
Competent	Context-free & situational	Chosen	Analytical	Detached understanding and deciding. Involved in outcome
Proficient	Context-free & situational	Experienced	Analytical	Involved understanding. Detached deciding
Expert	Context-free & situational	Experienced	Intuitive	Involved

Other researchers examined instructional components of developing expertise.

Ericsson (2002) further suggested that goals, practice, and feedback are important components in expertise attainment. More specifically, practice should be purposeful, specific and domain-related, and should be accompanied by feedback. However, acquiring technical skills or theories

and principles does not guarantee that learners will be able to apply acquired knowledge to problems encountered at work. This problem may have something to do with the nature of practice. Instructional practice should be provided to students according to the targeted learning outcomes (Smith & Ragan, 1993; Wager & Mory, 1993). While deJong et al. (1986) suggested that to help novices move toward expertise, instructional practice should provide novices opportunities to develop problem schema, Gick and Holyoak (1987) determined that practice must involve tasks that students will encounter in the future in order to ensure transfer. In addition, Norman (1982) implied that during restructuring of the schema, supports and feedback from experts are necessary because novices are unable to see functional features behind the task. Therefore, educators not only have to provide instructional practice that reflects reality but also provide guidance in the form of exceptional support, especially in initial stages of learning. Some of this structure may be provided via advance organizers and feedback.

### *Case Methodology*

After acquiring and comprehending theories and principles, learners need to reorganize the knowledge in a more holistic manner and link it to its context. Case is often seen as a bridge in connecting theoretical knowledge to practical

knowledge. It provides a context and representative problems through which learners can integrate and practice learned knowledge. Specifically, the context described in a case should be similar to the context learners will encounter in their work places. Context similarity enables students to transfer what they have learned to solve a new problem and serves as a prototype for future use (other cases, real or simulated). Thus, cases are used in professional education to extend a learners' capability and to provide verisimilitude. The case study method, its definition, and how it is used in professional education are examined below.

### *What is Case Methodology?*

Case methodology has a long history in professional education. It has been extensively used in professional education for various purposes. According to the *Oxford American Dictionary*, a methodology is "a system of methods used in a particular area of study or activity". In this study, case methodology was defined as a system of methods prescribing the use of a case as a learning/instructional tool. The case is frequently used in professional education. Surprisingly, there are no commonly accepted definitions of case, with each definition depending on usage. Shulman defined a case as a "story, event, or text that represents a taxonomy or

typology”, which contains “characters, setting, plot, and history” (1992, p17).

Other researchers defined a case as an instructional instrument or a tool presented in narrative form (Merseeth, 1994; Wasserman, 1994). They also stated that a case scenario usually contains background information, characters, observations, and technical data that reflect reality or real-life events. The scenario presented in a case should represent multidimensional and complex reality and there is usually a main idea behind the scenario (Merseeth, 1994; Wasserman, 1994). Although researchers do not agree on the definition of a case nor do they have similar views of the essential elements of a case, there are properties that are applicable to the cases used in this research. Most researchers agree that a case should reflect reality and context. Doyle (1990) proposed that a good case should be fully elaborated, theoretically specified, and include multiple representations (p. 13).

Wassermann (1994) further expanded Doyle’s idea and suggested that cases are rooted in a main idea – the main issue overarches principles, concepts, and conditions that affect professional practice. Furthermore, he pointed out factors that would affect case implementation include the case itself, study questions, small-group work, debriefing of a case, and follow up. He cautioned educators to consider an important issue—“What do we want for our

students?”—before integrating cases into instruction.

### *Case Methodology Practice in Professional Fields*

Case methodology has been used in varied disciplines, and especially in law schools. In the 19th century, the Harvard Law School began case usage (Williams, 1992). The underlying assumption of using cases in professional legal education is the belief that active learning is best when preparing professionals. Furthermore, cases present students with “concrete phenomena of practice” (McAninch, 1993).

In law school, cases are mainly used to facilitate law students’ reasoning ability (Shulman, 1992). Court cases are assigned to students. Students read and analyze cases, and then return to class for professor-led large group discussion about their analyses and solutions (Williams, 1992). Clinical cases also have a long history in medical education. Problem-based learning (PBL) is the representative case method used. Kinkade (2005) surveyed medical schools and found that 70% of 123 responding schools integrated problem-based learning in their curriculum. This teaching method was first developed at McMaster University in the 1960s (Hay & Katsikitis 2001; Norman & Schmidt, 1992). In PBL instruction, learners are given a real-life, unsolved problem, and they are expected to work as a group to identify



learning needs and resources. PBL is often used as self-study, and requires learners to apply newly gained knowledge to define the problem, identify the causes of a problem, generate potential solutions and make a decision.

The case method was also extensively applied to teacher training. In the 1960s, when cases were used to help student teachers deliberately practice teaching skills. Cases are examples used to allow teacher trainees to demonstrate teaching skills prior to actually entering the classroom. However, case study did not gain much attention in teacher education until Shulman gave a speech to the AERA in 1985 (Merseth, 1996). Researchers and educators then advocated the potential of this method specifically for teacher preparation (Greene, Grant, & Shulman 1990; Merseth, 1991, 1996; Shulman, 1992; Sykes, 1989, 1992). They claimed that cases can facilitate factual retention, bridge the gap between theories and practice, orient students to think “like a teacher”, promote reflective thinking and self-regulated learning, and improve problem-solving skills (Merseth, 1991). Since then, cases have been increasingly integrated in teacher education (Elksnin, 1998; Lanna, 2002; McNaughton, Hall, & Maccini, 2001). For example, Elksnin assigned a case to students to read outside of class. Students then completed a case preparation form before discussing the case. Students produced two copies

of the preparation form—one to hand in to the instructor and the other for small- and large- group discussion. Students were then assigned to small groups to review and analyze the case. In the end, the instructor debriefed the case and provided a summary of the case analysis. Though cases are heavily used in teacher education, researchers have questioned whether cases help in the ultimate goal of expertise development (Doyle, 1990; Kennedy, 1989).

Doyle (1990) proposed that the way in which cases are used should differ depending on the different goals of teacher education:

1. Modeling skills, principles and practices. In general, teacher education has various purposes. One purpose of teacher education is to supply students with precepts and teaching skills. Teaching skill acquisition is regarded as technical skill or theory development. To fulfill this purpose, cases often provide examples that demonstrate a model, a teaching skill, a theory or a principle. The purpose of cases is to “make a principle or a practice concrete” (p. 9), and cases are instances for learners to emulate. The representative case method under this framework is microteaching.

Microteaching is the commonly used method of training student teachers to acquire teaching skills demonstrated in a model case. Video cases are also

heavily used under this framework. Although this approach provides students with teaching skills or establishes students' knowledge base, it does not necessarily connect skill and theories to real situations (Doyle, 1990).

Students may have the skills and knowledge but they do not know how to use these knowledge and skills once they enter the workplace. Novice teachers may suffer tremendous reality shock, and may struggle to persevere.

2. Problem-solving and decision-making. In this framework, teacher educators try to connect the theories, and skills with situations. Shulman (1986) argued that cases are either precedents or instances of teaching practice from which students can interpret the situation and analyze the case with other learned knowledge and skills.

3. A developmental process building toward expertise. Teaching practices serve as practical knowledge to complement propositional knowledge. Teacher educators should provide student teachers with cases that support their organization of schema. Under this purpose, a case serves as an anchor for students to adjust their conceptualization of tasks.

Although researchers (Doyle, 1990; Elksnin, 2001; Wassermann, 1994) have provided models and principles, and identified factors that influence the effectiveness of case implementation, few studies have systematically

investigated the effectiveness of cases using different instructional practices for various learning outcomes. McNaughton, Hall, and Maccini (2001) and Merseth (1994) expressed concern that individual cases should be based on empirical evidence. For example, McNaughton et al. (2001) surveyed fifteen teacher educators who had experience integrating cases in the class and conducting research based on cases. Educators expressed concerns about the amount of time demanded by integrating case(s) into class and giving feedback. Furthermore, Fong and Woodruff (2003) also argued that novice teachers might need specific supports when cases are used. They asked eleven pre-service teachers and eleven experienced teachers to view web-based video vignettes of teaching practice, and found out that novice teachers and veteran teachers viewed these video vignettes significantly differently, leading them to suggest that it would be beneficial to provide some guidance to novice teachers. Diamantes and Ovington (2003) and Wassermann (1994) suggested that guided questions could serve as adjunct aids in supporting or preparing students before group discussions about cases. However, they did not describe the types of questions that should be used to guide novice learners. Other researchers acknowledged the role of experts and indicated that expert guidance has a positive impact on guiding novices to

apply their knowledge (Hay & Katsikitis, 2001; Pedersen & Liu, 2002).

Another factor that affects the case methods is “debriefing” (Wassermann, 1994). That is, at the end of a case discussion, an instructor should summarize the discussion and provide feedback and comments.

Although case study enjoys considerable popularity, few empirical studies provide evidence-based guidance on the best ways to structure or use cases. Medicine has produced substantial research on case methodology, but effectiveness is still debatable and may be more a function of how the cases are structured and used than the cases themselves. In other fields, much of the literature is more conceptual and theoretical. This is especially true in education. Thus, the methodology deserves much more analysis and experimentation.

### *Blended Learning*

The advantages of using computer technology are that it is boundary-free, has no time limitation, and provides an easy communication environment for learners and educators. Using advances in computer technology, many educators and researchers have attempted to find the best way to use the Internet to improve teaching quality, increase communication, and improve student learning. Many researchers are interested in developing a pure

online learning environment or in integrating the Internet into the classroom (Lanna, 2002; Merseeth & Lacey, 1993). Lanna (2002) suggested that the web can be used to enhance case-based instruction and to connect pre-service teachers with expert teachers. In his classroom, a course was delivered by WebCT, a course management system that offers lecture notes, varied communication tools (e.g., e-mail, chat and bulletin boards), and quizzes. Student teachers could access classroom cases, and analyze and adapt lesson plans to meet exceptional students' need. Experienced teachers could monitor their analysis and give feedback according to their adapted lesson plans at any time from anywhere. Hsu's (2004) study supported Lanna's proposal and concluded that the web has a positive impact on developing student teachers' problem-solving skills.

#### *What is Blended Learning?*

Despite the above-mentioned benefits of the web, learners can easily feel isolated and become lost in a purely online environment if the instruction is not well planned and designed. Social interaction has been a weakness of distance education (Martyn, 2003; Osguthorpe & Graham, 2003). Blended learning has been widely adapted by higher education, government, and corporations (Graham, 2006) and is regarded as an environment that can take

advantage of different media, and different instructional strategies to improve learning. Blended learning is a new term used to describe an old strategy. It is so widely implemented that the term “blended learning” could have different meanings to different people (Driscoll, 2002). For example, Driscoll asserted that blended learning involves four concepts (p. 54):

1. To combine or mix modes of web-based technology to accomplish an educational goal.
2. To combine various pedagogical approaches to produce an optimal learning outcome with or without instructional technology.
3. To combine any form of instructional technology with face-to-face instructor-led training.
4. To mix or combine instructional technology with actual job tasks in order to create a harmonious effect of learning and working.

Although blended learning has different meanings depending on the environment in which it implemented and how it is used, many researchers refer to blended learning as a blend of face-to-face instruction and online instruction (Graham, 2006; Martyn, 2003; Osguthorpe & Graham, 2003; Stevens & Frazer, 2005; Yelon, 2006). Graham (2006) argued that this position “more accurately reflects the historical emergence of blended learning

systems” (p. 4). The delivery system does make blended learning stand out from the traditional face-to-face classroom and extreme e-learning (purely online instruction), while the mix of instructional strategies and media is also the essence of blended learning. Valiathan (2002) defined blended learning as a solution that combines several delivery methods, or various instructional events. For example, instruction may be delivered both face-to-face and via the Internet so that learners can be immersed in a non-isolated, dynamically interactive, easily accessed, communicative environment. Thus, in this study, blended learning is defined as a type of instruction combining face-to-face and online instruction with various instructional strategies and media in order to help learners achieve maximal learning outcomes.

Blended learning has been widely adopted. Driscoll (2002) believed that blended learning is beneficial because it can (1) gradually transit an organization from traditional classroom to online, (2) develop and prepare learners skills needed for online learning, and (3) be cost-saving because previously developed materials may remain usable. Besides these advantages, blended learning has the potential to maximize the advantages of both online and traditional classroom environments. Enhancing social interactions between and among learners and the instructor is one of the



advantages, for example. Martyn (2003) described a good example of how blended learning can enhance social interaction and add a personal touch to the course. In the first class, learners are asked to gather in a classroom. They meet with the instructors and classmates to become familiar with each other and establish a community sense. Later, technology (e-mail, synchronous chat, and threaded discussion) is used to support interactions in the online course. Another example involves the blending of several components such as face-to-face coaching/ mentoring, virtual teamwork, virtual community of practice, and performance support tools to promote learners' basic comprehension of skill and knowledge as well as mastery (Stevens & Frazer, 2005).

Besides enhancing social interactions, blended learning also utilizes the advantages of technology. Instructional components include online assessment, virtual community, online experts, online office hours, online job-aids, and materials (Driscoll, 2003). With the appropriate design, blended learning can share the maximal benefit from both environments and can provide (a) a rich pedagogical environment, (b) easy access to knowledge, (c) rich social interaction, (d) support to develop personal agency/ self-directed learners, (e) cost effectiveness, and (f) ease of revision (Osguthorpe &

Graham, 2003, p. 231).

Blended learning is highly adaptable and practitioners blend various types of media and instructional strategies. Graham (2006) concluded that blended learning could be implemented at different levels—activity, course, program, and institutional. However, no matter which media and instructional strategies are blended, researchers caution that there is no right mix of these two systems (Yelon, 2006). To design effective blended learning, instructional designers or instructors should go back to the instructional design principles and choose the mix accordingly. Most importantly, they should focus on “...producing and measuring learning instead of looking at the delivery of content and training...” (Williams, 2003, p. 22).

Although blended learning has a promising role in learning, there are several issues and challenges (Graham, 2006; Kerres & Witt, 2003; Martyn, 2003; Williams, 2003). These challenges include but are not limited to: (a) how to harmoniously blend various delivery systems, instructional strategies, and media to get maximal effects from both online and face-to-face systems, (b) how to improve learners' self-regulation abilities in the blended learning environment, (c) how to support and train learners' online learning and technology skills, (d) how to localize blended learning and fit local audience's

needs, and (e) how to keep a balance between innovation and efficiency.

Efficiency is a core issue in designing and implementing blended learning, especially with regard to the time and effort of the instructor and students.

The instructor's social presence and involvement is a key factor in the success of traditional classrooms, online instruction and blended learning. Usually, instructors have to build their own course web sites or ask technical specialists to do it. Course management systems (CMS) are an alternative choice in efficiently building and managing a course web site. A course management system is a shell that offers templates and instructional components such as quizzes and syllabi. CMS is popular in higher education because of its management functions (Morgan, 2003). Course management systems such as ANGEL (A New Global Environment for Learning), BlackBoard, LearningSpace, and WebCT offer various communication and management functions for students and faculty that enhance teaching and learning quality. In 2003 Educause Center for Applied Research (ECAR) surveyed 740 faculty members and interviewed 140 faculty about instructional technology. Study findings revealed that 73% of faculty use CMS to enhance classroom teaching (Morgan, 2003). With careful design, course management systems can enhance traditional classroom teaching. Instructors and learners can benefit

from both forms of instruction. Some advantages include improving communications, maintaining human interactions, monitoring students' performance, and identifying students at risk. Moreover, faculty can benefit from CMS course management functions and identify potential students at risk because evaluation data are more easily at hand. Despite the advantages, there has been concern about faculty's workload in online courses (Abacus Associates, 2000; Bender, Wood, & Vredevoogd, 2004; Dunlap, 2005; Moore, 2000) such as: (a) evaluating students' online learning and performance, and (b) providing feedback (Bender et al., 2004; Benigno & Trentin, 2000; Dunlap, 2005). Lazarus (2003) monitored an instructor's teaching time in online instruction with 25 students. The teaching tasks included reading and responding to e-mail, reading and participating in online discussion, and grading 15 assignments. The study found that the instructor spent three to seven hours per week in completing these tasks. Given this finding, imagine how much time would be required to teach a blended learning course that had more complex online instructional components and a large enrollment. Eventually, the quality of the instruction would be threatened, and the instructor could burn out, discouraging other faculty participation (Dunlap, 2005). Thus, designers and instructors should consider the efficiency factor in designing

and implementing blended learning.

### *Independent Variables*

Advance organizers and feedback are effective supports in moving learners toward the development of expertise. However, most advance organizer studies focus on lower-level cognitive development such as recall, recognition, and comprehension. There is limited research about how an advance organizer can facilitate learners in applying learned knowledge. In addition, most advance organizer studies examine the effectiveness of one specific organizer on knowledge acquisition, and do not address how to support learners in higher-level cognition after they acquire knowledge. Knowledge application is a complicated cognitive process. There is often a gap between knowledge acquisition and knowledge application. People are not likely to be able to automatically apply what they have learned after acquiring knowledge, especially with abstract or complex concepts, or principles. The use of advance organizers not only may activate learners' prior knowledge but also specifically guide learners' reasoning. Moreover, researchers have also neglected the relationship between advance organizers and feedback in the knowledge application learning process. In the following sections, advance organizers and feedback are reviewed, respectively.

### *Advance Organizers*

*Definition.* Ausubel defined advance organizers as introductory material at a high level of abstraction, generality, and inclusiveness which bridges the known to the unknown and facilitates meaningful verbal learning, concept assimilation, discrimination and retention by progressive differentiation and integrative reconciliation ( Ausubel, 2000; Ausubel & Fitzgerald, 1961) Thus, Ausubel viewed an advance organizer as a prelearning strategy designed to provide structure and support as the learner enters an abstract or complex set of knowledge.

*The role of advance organizers.* Advance organizers are proposed based on Ausubel's conception of meaningful learning (Ausubel & Fitzgerald, 1961), which differentiated meaningful reception learning and rote learning. Meaningful learning is defined as a learning process involving "the acquisition of new meanings" (Ausubel, 2000, p. 67), as opposed to arbitrary rote learning. According to Ausubel, the premise of meaningful reception learning is that learners should have the prerequisite knowledge (relatable ideas in cognitive structure) of new material presented. With these relatable ideas, learners can decode the new information, and thereafter relate and subsume later information to the related existing ideas. Advance organizers can serve as

“ideational scaffolding” (Ausubel, 2000, p. 149), and facilitate learners’ concept formation, discriminability and retention (Lawton & Wanska, 1977). Advance organizers can not only provide learners a general preview of new information but also more relevant, particularized and organized ideas to learners in advance (Ausubel, 2000).

*The empirical evidence for advance organizers.* Since Ausubel proposed advance organizers, researchers have conducted many studies to determine the efficacy and forms of, and encoding process with advance organizers, and related issues. Several reviewers found a general facilitative effect with advance organizers (Langan-Fox, Waycott, & Albert., 2000; Lawton et al. 1977; Luiten, Ames & Ackerson, 1980; Stone, 1983; Story, 1998) but the findings are inconclusive. For example, in Barnes and Clawson’s (1975) review, in 20 out of 32 studies the effect of advance organizers on learning did not reach statistical significance. In addition, although Ausubel et al. (1961) found that students with middle and low prior knowledge benefit from advance organizers most; Barnes and Clawson found no interactive effect between the ability levels of students and use of advance organizers. Luiten et al. (1980) analyzed 135 published and unpublished studies conducted from 1960 to 1979 and concluded that the facilitative effect of advance organizers for students

with lower ability is not as effective as claimed by Ausubel. The result of Alvermann (1981)'s study also contradicted Ausubel's finding. In his study, all ability levels of learners benefited from advance organizers. Perhaps part of the ambivalence relates to the conclusions of several studies (Alvermann, 1981; Ausubel & Fitzgerald, 1961; Meyer, 1978) which identified conditions under which the facilitative effect of advance organizers is limited, such as when the presented material is well organized, the features of new information are salient and easy to discriminate, or the material is familiar to learners. Alvermann (1981) and Meyer (1978) pointed out that in order for advance organizers to be effective, learners need to cognitively interact with the advance organizer and new information, and use advance organizers as an overarching framework to reorganize the new information. Also, the same studies, which failed to show the effectiveness of advance organizers, may be evidence that learners did not use advance organizers appropriately. Like all research involving educational methodology, the lack of treatment integrity and measures to establish it present significant impediments to making broad conclusions. Researchers (Alvermann, 1981; Corkill, Bruning, Glover & Krug, 1988; Snapp & Glover, 1990) argued that advance organizers can activate learners' relevant schemata, link new information to schemata, and eventually



facilitate learners' comprehension. However, merely asking learners to read advance organizers does not guarantee learners will use advance organizers effectively (Kloster & Winne, 1989). Students' ability to use advance organizers effectively could be a key point, and it is crucial to provide students with instructional activities or scaffoldings that enable students to interact with advance organizers, and use them appropriately and effectively (Alvermann, 1981; Corkill, et al., 1988; Griffin, Malone, & Kameenui, 1995; Kloster & Winne, 1989; Willerman & Mac Harg, 1991). In Kloster and Winne (1989)'s study, students were asked to match reading material with advance organizer content. They found a positive relationship between students' actual use of advance organizers and scores on a post test. Furthermore, the effectiveness of advance organizers depended on students' ability to link the new information to the advance organizers, that is, the information encoding process is critical for the effectiveness of advance organizers. Dinnel and Glover (1985) found that the requisite advance organizer encoding process (key words in advance organizers vs. paraphrasing advance organizers) does influence students' later performance in memorizing the subsequent learning material. Also, Griffin, Malone, and Kameenui (1995) pointed out the necessity of explicit instruction in the use of advance organizers. Therefore, to reach the maximal

effect of advance organizers on learning, researchers not only have to consider appropriate conditions and learners' ability level, but also ascertain whether learners use advance organizers appropriately. Thus researchers must ensure treatment integrity—that is, adherence to the treatment protocol.

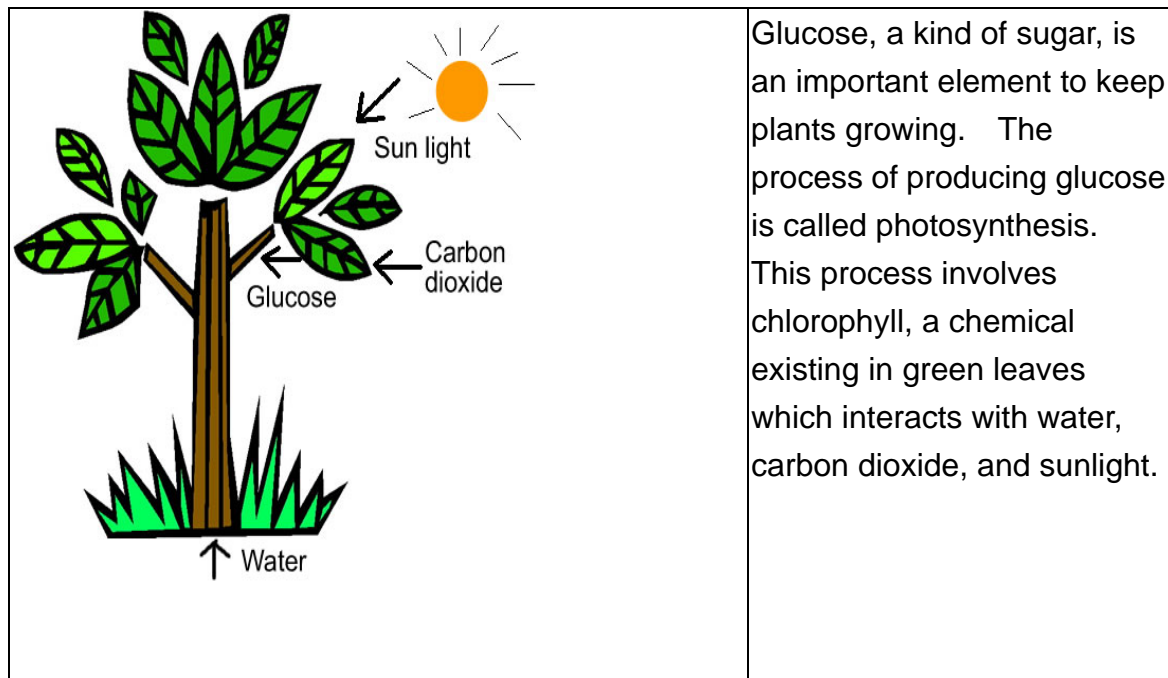
*Forms of advance organizers.* Advance organizers usually appear in narration (Ausubel & Fitzgerald, 1961; Derry, 1984; Mayer, 1978), yet there are many other forms of advance organizers, such as graphs, matrices, outlines, questions, concept maps, which can be presented in various media such as paper-based, audio, or video, etc. Story (1998) described various forms of organizers such as questions, and graphical organizers. Researchers are interested in knowing whether one specific form of advance organizer will outperform another in terms of improving students' learning (Kiewra, Mayer, Dubois, Christensen, Kim, & Risch, 1997; Langan-Fox, Waycott & Albert, 2000; Robinson & Kiewra, 1995). In general, research (Kiewra et al., 1997; Robinson et al., 1995) shows that graphic organizers are more effective than linear organizers (such as narration or outlines) in helping learners in terms of comprehending knowledge and attaining relational knowledge. Research also shows that graphic organizers have a compensatory effect for descriptive text (Alvermann, 1981; Alvermann & Boothby, 1986; Chang, Sung, & Chen, 2001;

2002) and facilitate learners' comprehension and attainment of relational knowledge (Dicecco & Gleason, 2002; Gil-Garcia & Villegas, 2003; Willerman & Mac Harg, 1991).

*Graphic organizers.* Graphic organizers are organized spatial adjunct aids that “use lines, arrows, and spatial arrangement to depict text structure and relationships among key vocabulary terms” (Alvermann, 1981 p. 44). They receive much attention due to their visual presentation features. Larkin and Simon (1987) claimed that diagrammatic representation is superior to sentential representation (or verbal descriptions) because of the visual computational effect. Larkin et al. defined a diagram as a form of pictures; unlike the linear features of narration/ sentence presentation, a diagram organizes information by locations, which is more effective in displaying implicit information. By placing several elements at the same location or adjunct, the graphic organizer enables learners to search information easier and faster, which results in facilitation effects on problem solving. Furthermore, learners can recognize features readily and make reference to them later. Other than the computational effect, several theoretical frameworks explain the role of graphic display in learning. Vekiri (2002) did a comprehensive survey of studies focusing on the effectiveness of graphic display on learning, and

concluded that there are three main theoretical perspectives: (a) dual coding theory, (b) conjoint retention hypothesis, and (c) visual argument. These three perspectives explain the effect of graphic display based on information processing. However, the dual coding theory and conjoint retention hypothesis focus on the verbal and visual memory representation aspect only, and visual argument focuses on perceptual and retrieval processes. Dual coding theory was proposed by Paivio and Csapo (1973). They argued that there are two distinct cognitive systems for verbal and visual information processing and storage. Visual and verbal information are not only processed separately and independently but are also processed and stored differently. Although these two systems are separate, they are interconnected. For example, from the view of dual coding theory, the graphic and text in Figure 2-1 are processed separately and independently, and are stored as different types of representation (verbal memory and spatial memory). The graphic is organized in an asynchronous manner and elements are processed simultaneously, but the text is processed serially. Conjoint retention theory (Kulhavy, Lee, & Caterino, 1985) is regarded as an extension of dual coding theory (Robinson, Katayama, & Fan, 1996). Robinson et al. applied dual code theory to an examination of the conjoint effects of text with geographic

maps, with emphasis on the important role of the connection between verbal and visual cognitive systems. The more information encoded in both formats, the more easily and completely it can be retrieved (Robinson et. al., 1996) because learners can “use information stored in one code as a retrieval cue for information stored in the other code” (Verdi, Raymond, & Kulhavy, 2002, p. 28). However, learners can benefit from the conjoint effect only when the maps are encoded as a whole unit. For example, from the conjoint retention theory perspective, learners process the graph and text in Figure 2-1 differently. Only when more of the graphic is remembered (that is, learners remember the tree, water, carbon dioxide, sun light, and glucose), can learners retrieve text information successfully. However, the visual argument includes yet another perspective in explaining the effectiveness of graphic display. That is, that the effectiveness of graphic display comes from the explicit relationships shown in the graphic because it makes the abstract concrete. Furthermore, learners can easily recognize relationships and search information using the organized graphic representation. For example, in Figure 2-2, the viewer can easily recognize that plants are divided into two major categories. Information with similar attributes is clustered in similar positions. Learners can easily tell that pine trees and maple trees belong to the same group: perennial plants.



Glucose, a kind of sugar, is an important element to keep plants growing. The process of producing glucose is called photosynthesis. This process involves chlorophyll, a chemical existing in green leaves which interacts with water, carbon dioxide, and sunlight.

Figure 2-1. Example of the process of photosynthesis.

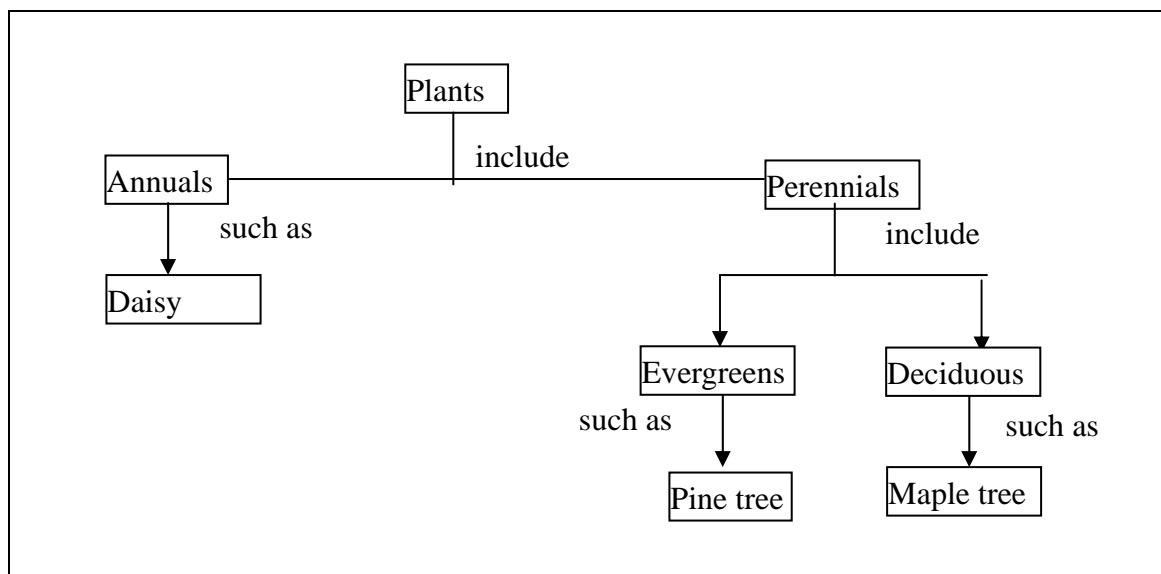


Figure 2-2. Example of plant categories.

Although these theories present different assumptions, they are each premised on the notion that human cognition processes text and visual-spatial information differently. Learners presented with text in an organized spatial

adjunct display are better able to retrieve information successfully later.

Although many researchers have investigated the effectiveness of graphic organizers, it is critical to understand that organizers have various formats. Some may be more effective for specific kinds of tasks. Graphic organizers can be roughly grouped into three categories: diagrams, matrices and, semantic networks (charts, concept map and knowledge map). The following literature review focuses mainly on the concept map because that is the form used in this study.

*Concept maps.* Concept maps are knowledge-organizing or representing techniques proposed by Novak and colleagues in the 1970s for improving children's learning in science (Novak, 1998). Novak examined Ausubel's work (1963) in order to shed light on the interpretation of research data regarding students' problem solving. Problem-solving ability is an individual's ability to process information as s/he examines an issue and proposes a solution. Ausubel's theory suggests that these two processes are "confounded in the process of new learning" (Novak, 1998, p. 50). Novak further argued that human learning, and more importantly integration of new information in existing knowledge, is a "function of both the quantity and the quality of cognitive structure organization" (p. 50). Based on this hypothesis,

Novak and his research group conducted a longitudinal study of science concept development utilizing concept-mapping techniques.

Concept maps are two-dimensional visual organizers representing knowledge. Novak (n.d., 1998, 2002) thoroughly discussed his view of epistemology and how concept maps facilitate learning. From Novak's perspective, knowledge contains concepts and propositions (Novak, 2002). He defined concepts as "perceived regularity in events or objects, or records of events or objects, designated by a label" (Novak, 1998, p. 36), and combined concepts form propositions (statements of relations). Concept maps represent specific knowledge domains held by a person or a group. Thus concept maps include concept labeling by words or symbols that are usually enclosed in circles or boxes of some type, with cross-links between concepts or propositions. Words on the connecting lines specify the relationship between the two concepts (Novak, n.d., 1998, 2002). Novak also defined the desirable characteristics of concept maps. They should: (a) use words or symbols and lines to represent propositions or semantic units (units of meaning), (b) be presented in hierarchical fashion, and (c) use relational links between and among concepts or domains. Novak (1998) specified several steps in constructing good concept maps.



1. Identify a target domain, a main problem(s)/ questions, or events that the concept maps will address.
2. Identify and list key concepts, and principles that apply to the domain or topic.
3. Rank these listed concepts from most general and inclusive to most specific.
4. Construct a preliminary hierarchical framework by moving these concepts around. At this stage, a post-it is a good tool to use in arranging and organizing these concepts and finding their position within the framework.
5. Draw cross-links to connect concepts. Also, descriptive words are used to specify how these concepts are connected to each other. Sometimes computer software such as “Inspiration” can be used to construct concept maps.

*The theory and empirical evidence of concept maps.* Concept maps are drawn from Ausubel and Mayer’s assimilation learning theory, which asserts that new information is assimilated into existing cognition structure (Novak, 1984). Meaningful learning involves learners actively incorporating new information into relevant prior knowledge. Therefore, the goal of concept mapping is to facilitate learners by providing practice in activating relevant

knowledge and structural nets into which new knowledge may be integrated.

Concept map studies contain two types of research. The first focuses on the features of concept maps, while the second focuses on the effectiveness of concept maps. Wiegmann, Dansereau, McCagg, Rewey and Pitre (1992) investigated the effect of map spatial configuration (gestal map vs. web map), map format (whole map vs. stacked map) and link (lines vs. embellished links) on students' performance. They found out that effective maps are organized and easy to navigate. Furthermore, they determined that learners' spatial ability and verbal ability are factors influencing the effectiveness of maps.

The other type of study focuses on the effectiveness of concept maps and how they should be used. Due to visual communication and organization features, concept maps are often used: (a) as an instructional tool in helping learners reorganize newly acquired knowledge into structures (Chang, Sung, & Chen, 2001, 2002; Stensvold & Wilson, 1990); (b) to facilitate learners' grasp of expert's mental models (Jonassen & Wang, 1993; Langan-Fox et al., 2000; Willerman et al., 1991); or (c) as an assessment tool.

One way to improve the effectiveness of concept maps is to use an expert concept map rather than ask learners to construct a concept map by themselves. Although concept mapping has a facilitative effect in helping

learners reorganize learned knowledge and visually communicate what they have learned, studies show that learners, especially novice learners, usually experience difficulties in constructing a concept map without help (All, Huycke, & Fisher, 2003; Chang et al., 2001; Chang et al., 2002). Thus, structure provided by experts is helpful. For example, learners who were asked to complete a partially completed concept map outperformed learners who constructed concept maps by themselves (Chang et al., 2001; Chang et al., 2002). According to Novak (1998), learners find it difficult to construct concept maps. Therefore, teachers should receive concept-mapping training before teaching students how to construct concept maps, and "...it usually takes several months of regular practice and feedback in order to teach students how to construct good concept maps" (p. 48). Cox (1999) argued that the cognitive processes of a self-constructed concept map and the external presented concept map are different, so that it is necessary to provide learners with "direct instruction" on how to use maps. Research also indicates that using a valid and accurate concept map is an important factor in improving students' learning (Rye & Rubba, 2002).

Merely showing learners an expert/ instructor-constructed map is insufficient. Learners must engage in active information/knowledge

interpretation- and- integration (Jonassen et al., 1993; Vekiri, 2002), and an instructor should provide learners with instruction to engage them in reorganizing their knowledge and interacting with the concept map provided. One of the potential strategies for accomplishing this structure/direct instruction is combining questioning strategy with the concept map.

*Adjunct questions.* Presenting questions to students is a strategy that has been used for as long as there are written records. Many researchers (Anderson & Biddle, 1975; Hamilton, 1989, 1992; Howard-Jones & Martin, 2002; Kreiner, 1996; Peverly, & Wood, 2001; Ram, 1991) have investigated the effectiveness of various question strategies and affirmed the important role of questioning in the learning process. Adjunct questions are generally defined as questions placed adjunct to the text (Anderson et al., 1975; Sagerman & Mayer, 1987). Researchers argued that adjunct questions are effective because they highlight important information that learners have to focus on (Hamilton, 1985; Rothkopf, 1970; Sagerman et al., 1987), and enable learners to reorganize their knowledge (Ram, 1991), thus making it easier for learners to identify critical concepts and relationships and hence create a concept map. Adjunct questions have facilitative effects on not only text comprehension (Hsu & Dwyer, 2004; Kreiner, 1996; Peverly et al., 2001;

Sagerman et al., 1987), but also improve learners' reasoning ability and problem-solving abilities (Hamilton, 1985, 1989, 1992).

*Variables affecting the effectiveness of adjunct questions.*

Researchers have studied and identified variables (Anderson et al., 1975; Peverly et al., 2001) that affect the effectiveness of adjunct questions. These variables include the position of questions (pre adjunct questions vs. post adjunct questions), time, question frequency, and types of questions.

Researchers have found out that, in general, learners who receive questions immediately after reading text outperform learners who receive questions before reading the text (Anderson et al., 1975; Rickards, 1976). This position effect is caused by working memory overload when learners view questions first and follow reading text. However, when the questions involved deeper cognitive process, learners benefited more from the pre questions. Rickards (1976) found that giving conceptual questions to learners prior to reading the text resulted in better recall performance. However, this beneficial effect disappeared when verbatim questions were involved. His study showed that in addition to the question position, the type of the questions is another important factor requiring investigation by researchers. Since adjunct questions draw learners' attention to specific information, the type of questions

is an important factor affecting how learners process the information and learning outcomes. Hamilton conducted a series of studies of concept learning by using post questions (application question, definition question, and no question). He found out that learners who first received definition questions before the application post-questions outperformed learners who did not first receive definition questions. This study indicated the importance of activating factual knowledge before becoming involved in deeper cognitive processes.

### *Feedback*

Feedback is the second variable of importance in this study. Feedback allows learners to determine their success and plan corrective action for the next trial. Hamilton (1992) indicated that researchers need to investigate the interactive effect of “presence of and nature of feedback”; however, there are few studies in this area, especially comparing the effectiveness of types of feedback in instructions involving various degrees of structures.

Most feedback studies focus on the effectiveness of external feedback in assessment events. Feedback can be seen as an externally provided judgment about the appropriateness or correctness of the performance.

Kulhavy (1977) and Kulhavy and Stock (1989) regarded feedback as “in a generic sense”. Kulhavy defined feedback as “...procedures that are used to

tell a learner if an instructional response is right or wrong” (Kulhavy, 1977, p. 211). In general, researchers agree that feedback offers a corrective function and improves students’ later performance. However, many factors influence the effectiveness of feedback on learning. Researchers have identified conditions under which feedback is effective. For example, feedback may not be most helpful when learners possess more prior knowledge or learners feel more confident in their response.

However, most of the research is focused on verbatim association learning, psychomotor skill, and simple concept learning, that is, feedback for knowledge acquisition, but little research investigates feedback for application, such as learning that involves complex tasks, principles or rule applications (Smith & Ragan, 1993). Merely providing typical feedback (yes or no, or simple answer statements) for complex tasks is insufficient (Kulhavy & Stock, 1989). Some researchers (Clark & Dwyer, 1998; Schimmel, 1988; Smith & Ragan, 1993) suggest providing different feedback according to the intellectual-level task or learning outcomes in which the learner is involved. Schimmel (1988) further suggested providing feedback based on the cognitive complexity of the task involved. For example, provide feedback with confirmation and a correct answer for verbal information for such tasks as

learning vocabulary, terminology, etc. For intellectual skills (conceptual and principles learning), diagnostic feedback should be provided. Diagnostic feedback identifies errors, provides guidance toward correction, and praise for “aspects of the work done well” (p. 191). Yet the best manner through which to provide effective feedback for complex tasks or knowledge application tasks is not clear (Mory, 1992). In such tasks, errors may be made due to lack of knowledge, comprehension or practical knowledge. Thus, individualized and specific feedback is most likely to improve this type of task performance (Riccomini, 2002; Scheeler, 2002).

### *Summary*

Research shows that expertise cultivation involves a continuous developmental process. To help learners achieve goals, instructors or designers should provide different instructional strategies according to planned learning outcomes. With the more complex views about expertise, and a focus on improving teachers’ ability to apply knowledge, many educators believe that case methods have potential in helping pre-service teachers reorganize their knowledge and improve their teaching performance towards expertise.

In case methods, expert cognitive modeling (advance organizer) and



feedback are two essential components in initiating the process to become an expert. The prior knowledge that an individual possesses is another important factor. Prior knowledge can influence the degree to which an individual can benefit from instructional supports and feedback.

Moreover, with technology improvement, the web or course management systems can serve as a medium through which to deliver case instructions without geographical or time limitations. In light of all this, therefore, the purpose of this study was to investigate how prior knowledge mediates the effectiveness of various instructional strategies (advance organizer, and feedback) in terms of knowledge application under a blended case instruction.

## CHAPTER 3

This chapter contains descriptions of the methods used to gather and analyze data. However, prior to implementation of the final research and statistical procedures, the researcher conducted three pilot studies. The purpose and results of each pilot study are described in sequence below.

### *Pilot Studies*

The researcher conducted three pilot studies to verify the instrument, the advance organizer content, feedback content, research design and research logistics. In the next sections, each pilot study and the resulting modifications are discussed. A complete report of the pilot studies is available in Appendix A.

#### *The First Pilot Study*

The goals of the first pilot were to test the research design and the research logistic. This study was conducted in spring 2005 with fifteen participants. The reliability of the instrument was 0.441. Based on this study, several modifications were made:

1. The research design was modified. A two-by-two factorial design was proposed for the main study.
2. The researcher revised and verified the format and content of the advance

organizer based on feedback of three doctoral candidates (two from the special education program, and one from the instructional systems program).

3. Several items on the instruments were revised.

### *The Second Pilot Study*

The second pilot study was conducted to examine (a) test administration logistic and (b) instrument reliability. A total of 295 students completed the instrument modified from the first pilot study. The reliability value showed that the instrument was reliable ( $r= 0.620$ ), which meets the accepted reliability coefficient value of an instructor-created instrument (Sax, 1989).

### *The Third Pilot Study*

The purpose of the third and final pilot was to examine: (a) the modified two-by-two factorial design, (b) the experiment logistic, and (c) the instrument. This study was conducted in a blended learning environment with 70 participants. Data revealed that although neither advance organizers nor feedback showed main effects on students' test scores, the research design and procedures could be implemented without difficulty. As for the instrument reliability, the coefficient value was 0.588. Thus, the experimental procedures for the final study to be conducted in fall 2005 were modified as follows.

1. The instrument was divided into two components: a short-term test of 10

and the long-term test of 31 items.

2. In order to motivate students to cognitively engage in the instructional activity, the short-term test would count toward students' final grades.
3. To have better control over student performance under the experimental conditions, students were required to go to an assigned lab and work on the simulation assignment rather than complete the assignment at their own computers.

### *Methodology*

The purpose of this study was to investigate and compare the effects of various instructional supports, including advance organizers and individual feedback, on pre-service teachers' applications of effective teaching practices. The study took place in an existing undergraduate/graduate course, using a case-based, blended learning environment. This methodology section includes a description of (a) the course context, (b) participants, (c) instructional materials, (d) experimental materials and (e) experimental design and analysis, respectively. An ancillary analysis section is also included at the end of this chapter.

The researcher conducted a post hoc second analysis to: (a) identify factors that may influence the effectiveness of treatments, and (b) compare the

performance from fall 2005 and spring 2005 classes. Only the fall 2005 class received any of the experimental interventions. Thus, the spring 2005 cohort served as a non-randomly selected comparison group.

### *The Course Context*

The study was conducted in Special Education (SPLED) 400, a large section course ( $N=282$ ) designed to introduce general education majors to effective practices for exceptional children in general educational settings. This course is offered every spring, summer, and fall semester. Students who take SPLED 400 are enrolled in one of thirty undergraduate and graduate majors. Although students might have completed other education-related courses before the time of this investigation, most of them have no teaching experience prior to completing SPLED 400 and none had any special education coursework.

The course is divided into four parts: Part One and Part Two contain two chapters, Part Three contains four chapters, and Part Four contains three chapters. Each chapter comprises one week of study and lecture. The four parts are: (a) The legal mandate to provide appropriate education to exceptional children, (b) The nature and impact of disabilities, (c) Integrating effective classroom management practices to enhance successful inclusion,

and (d) Implementing effective instruction to enhance successful academic performance in inclusive settings. The research described herein focuses solely on Part Three—Effective Classroom Management.

SPLED 400 is conducted in a blended learning environment combining instructor lectures and online interactive instruction. Online instruction is delivered by a course management system named A New Global Environment for Learning (ANGEL). Students read the assigned chapters, participate in instructor-led lectures, and then work on chapter activities on the course web site. Instructional activities include readings, lectures, video simulations, online quizzes, simulation analyses, and exploration of links to related topics. ANGEL instructional components include a syllabus, chapter bulletin boards, chapter quizzes, video vignettes, and Internet resources (related web sites). For a sample web site map see Figure 3-1. Online activities comprise approximately half of the course activity and time commitment. The syllabus is included in Appendix B.

**Course Lessons**

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-  **Before starting the class...**  
Syllabus and Information you will need for this course.
-  **Chapter 1: Appropriate Education**  
Aug 30-Sep 6
-  **Chapter 2: Implementing IDEIA**  
Sep. 6-Sep. 12
-  **Part 1 Review (Chapter 1 and 2)-- for ALL students**  
Part 1 review activities due by midnight Sep. 12
-  **Part 1 Assignment (Students with last name beins with A through M should complete web activities inside)**  
Due by midnight Sep. 15
-  **Chapter 3: High Incidence Disability**  
Sep. 13-Sep. 19
-  **Chapter 4 Low Incidence Disability**  
Sep. 20- Sep. 26
-  **Part 2 Review (Chapter 3-4) --For ALL students**  
Part 2 review activities due by midnight Sep. 26
-  **Part 2 Assignment (Students with last name beings with N through Z should complete web activities inside)**  
Due by midnight Sep. 29, 2005.
-  **Test #1 (Study guide and more...)**  
Exam 1: Sep. 27, 2005
-  **Chapter 5: Introduction to ABA and Classroom Management**  
Oct. 4 - Oct. 10
-  **Chapter 6: ABA and Positive Interventions**  
Oct. 11 - Oct. 17
-  **Chapter 7: Behavior Reduction and Punishment Strategies**  
Oct. 18 - Oct. 24
-  **Chapter 8: Specific Applications**  
Oct. 25 - Oct. 31
-  **Part 3 Review (Chapter 5-8) --For ALL students**  
Part 3 review activities due by midnight Oct. 31
-  **Part 3 Assignment (Website Activity and Team Assignment)**  
If your team number is odd, please complete folder. Due by midnight Nov. 3.
-  **Part III: The Lab Activity and the Online Test**  
The lab activity and the online test information, and its bulletin board....
-  **Chapter 9: Learning and Research**  
Nov. 1 - Nov. 7
-  **Chapter 10: Adaptive Instruction**  
Nov. 8 - Nov. 14
-  **Chapter 11: Technology**  
Nov. 15 - Nov. 21
-  **Part 4 Review (Chapter 9-11) --For ALL students**  
Part 4 review activities due by midnight Nov. 28
-  **Part 4 Assignment (Website Activity and Team Assignment)**  
If your team number is even, please complete this folder. Due by midnight December 1.
-  **Test #2 (Study guide and more...)**  
Exam 2: Nov. 29, 2005
-  **Grade Report**  
Summary of website activities and final grade report
-  **How to?**  
Questions regarding how to use certain functions in ANGEL? Check this out! (updated regularly)
-  **Syllabus and Administration Bulletin Board**  
Please Post your syllabus and administration related questions here
-  **Schedule a Meeting with TA**  
Schedule your appointment with the TA here. Be sure you are using "Threaded View" before posting a reply!
-  **Report ANGEL Technical Problems**

Figure3-1. SPLED 400 course web site map.

### *Participants*

The study was implemented in fall semester 2005. Among the 282 participants, 276 were undergraduates, one non-degree, and 5 graduate students. Females comprised 78.4% ( $n= 221$ ) of the participants, and 21.6% ( $n= 61$ ) were male. Students were enrolled in 30 different majors. These majors included elementary education, arts, science, etc. Further demographic information is provided in Table 3-1. The major code is shown in Appendix C. (Table 3-1 also includes a demographic description of the post hoc comparison group.) Of the 279 students who completed the online short-term test, which was one of the primary dependent measures, 10 students were excluded because of late submission. Thus, 269 submissions were regarded as usable cases. As for the long-term test (the final exam), 282 students successfully completed that measure.



Table 3-1

*Demographic Information for Fall and Spring Students*

Semester	Sex			Major		Status		
	Male (%)	Female (%)	Total	Edu (%)	Non-Edu (%)	NC (%)	UG (%)	GR (%)
Spring	64 (21.7%)	231 (78.3%)	295 (100%)	229 (77.6%)	66 (22.4%)	1 (0.3%)	269 (91.2%)	25 (8.5%)
Fall	61 (21.6%)	221 (78.4%)	282 (100%)	181 (64.2%)	101 (35.8%)	1 (0.4%)	267 (97.9%)	5 (1.8%)

*Note.* NC= No degree; UG=undergraduate; GR= graduate

### *Instructional Material*

Course materials were developed by the course instructor using many resources, including texts, websites, journal articles, commercially produced learning materials, and anecdotal materials gathered from other professionals. Course content was validated by a team of experts from Research I universities in the U.S. The instructor has been a teacher of children and adults with mental retardation, emotional disturbance and physical disabilities and has more than 37 years experience in the field, including 15 years teaching SPLED 400.

### *Video*

Video cases are often used in teacher development (Copeland & Decker, 1996; Sherin, 2004) because these case images reflect authentic classroom settings and teaching practice since they may be filmed in actual classrooms. Video simulations are an integral part of this investigation and have been used in the course since its inception. Video used in this research is a series of classroom-based vignettes illustrating behavior problems typical in U.S. classrooms. The Council for Exceptional Children produced the video as a teaching tool for pre-service and in-service teachers in 1972. Although the video is thirty years old, no more current similar video exists and it still enjoys

widespread acceptance and usage because it was based on extensive research about classroom and behavior problematic to teachers. The only noticeable outdated aspects of the video are student and teacher clothing and hairstyles.

In each vignette, a teacher is presented with a challenging behavior or behaviors from a student, e.g., refusing to do assignments, destroying another's work, bullying, etc. The specific vignettes used for this study were "Joe" and "Amy", which were used with an online activity (as practice) and the long term post-test, respectively. "Joe" was used as a teaching tool; it runs two minutes and forty-one seconds. It depicts a teacher seated behind a desk lecturing to a group of fifth-grade students enrolled in American Colonial History. "Joe" is seated in the back of the room and does not open his book or listen to the teacher. He makes funny faces with broad smiles and grimaces, and bumps up and down like he is dancing to music. The teacher doesn't stop Joe and attempts to ignore him initially, but gradually the whole class notices Joe's behavior and begins to laugh. Finally, the teacher in frustration tries to stop Joe by using sarcasm, and then asks him to open the book to p. 28. The video "Joe" transcription is included in Appendix D.

The second video, "Amy", is a part of the assessment. "Amy" is one

minute and fourteen seconds long. In “Amy”, students are working on their own individual seatwork. The teacher walks around the classroom and checks the progress of individual students. Amy leaves her seat, goes to the teacher, grabs the teacher’s arm and clothes, and demands help. Amy says, “You never help me. You have to help me some times!” The teacher calls Amy’s name several times, takes Amy back to her seat, and asks her to work on her own. However, soon after the teacher goes to check other students, Amy again leaves her seat and asks for her teacher’s help. This time, Amy drags the teacher back to her seat. The video “Amy” transcription is included in Appendix E.

### *The Simulation Assignment*

All students were required to do the Part 3 online simulation assignment (the lab activity). Students went to the assigned computer lab and received instruction about the activity. Once students clicked on the assignment link, they were then taken to another page containing the statement, “Please view the video and then answer the questions below”, and a “Begin chapter web activity” link. Once students began their assignment, they were taken to an activity that included a streamed video, task instructions, and a text box (see Appendix F-1). The task asks students to play and view the video, and then,

in the text box, write down (a) the identified potential problems or challenges the instructor is facing, (b) the causes of the challenge, and (c) suggested solutions based on the behavioral paradigm, classroom and behavior management principles presented in the lectures. After students completed their response, they clicked the “submit” link and received feedback.

### *Experimental Material*

Experimental material consisted of two components: an advance organizer and feedback. Feedback was developed in two formats: scripted and individualized. Each is described below.

#### *The Advance Organizer*

The advance organizer comprises three components: a narrative, a concept map, and a series of guided questions. The advance organizer was created by the researcher and revised by the expert to ensure that it served the prescribed functional behavior analysis framework, guided learners in how to analyze pupils’ behavior problems, and facilitated generation of potential solutions based on classroom and behavior management principles.

Theoretically, the advance organizer activates students’ prior knowledge and links the known to the unknown, allowing them to analyze and apply knowledge acquired through readings and lectures to the teaching practice

problem. The advance organizer is presented in Appendix F-2. Each specific component is discussed below.

The narrative statement explains the human learning paradigm and how it is applied to teaching practice; then follows a flow chart depicting procedures to conduct an ABC analysis and related classroom management and behavior management rules and principles.

The concept map is a diagram of concepts and directional or relationship links. The map is a visual display of the expert's knowledge of concepts and relationships between and among principles, and concepts and procedures in conducting an ABC analysis. The purposes of the concept map are to: (a) activate learners' prior knowledge, (b) provide a visual holistic conceptual framework under which later information can be subsumed, and (c) provide an expert model from which students can visualize how experts organize the applicable concepts, principles, and procedures.

The advance organizer also contains ten guided questions developed based on Wassermann's (1994) suggestions for guided questions for case-based instructions. Wassermann suggested that study questions should help students examine the main ideas in the case. Furthermore, questions should "be sequenced according to some logical progression" (p.

608).

Guided questions help learners analyze the video in a logical manner, and to think and follow the same logic experts would use to solve the problem. Moreover, these questions help students focus attention on specific knowledge, useful information, and problem patterns, which are essential to restructuring their knowledge in order to be able to develop general approaches applicable to a variety of specific cases.

### *Scripted Feedback*

Scripted feedback is designed to provide students with a model or scripted response. This response provides a complete solution to the simulation problem, but it is only one model among many correct responses that might be applicable. Students are directed to compare their responses to the model using a specific guide for comparison. Scripted feedback for “Joe” is presented in Appendix G. Scripted feedback contains a series of guided questions with answers. The model was written by the researcher and verified by the expert to ensure appropriateness and effectiveness.

Scripted feedback used in this study provides learners with examples about procedures for identifying the function of student misbehaviors, and potential solutions based on classroom management and behavior

management principles taught in lectures. Once learners submit their response, they receive scripted feedback immediately and may compare their responses to the model.

### *Individualized Feedback*

Individualized feedback was provided based on each student's response, and consisted of identification of the student's misconceptions and errors with correct solutions. With individualized feedback, students were able to determine errors they committed and what they should have done. In addition, they were provided with a rationale for the error and a rationale for the correction. The rubric was developed based on diagnostic feedback (Schimmel, 1988) for tasks involving complex intellectual processes. Schimmel pointed out that feedback for tasks involving complicated mental processes, and multiple principles and theories should provide learners with information to identify errors and provide guidance for future performance improvement in terms of correctiveness or efficiency. The rubric was also verified by the expert. The rubric is presented in Table 3-2.



Table 3-2

*Feedback Rubric*

1. Did you systematically analyze the function of the target behavior?
2. Did you identify the function of the target behavior?
3. Did you generate an adequate solution(s) based on learned CM or BM principles?
4. Did you provide specific strategy (strategies) to eliminate the consequence that may be reinforcing the problem behavior?
5. Did you provide justification for the specific Classroom Management & Behavioral Management recommended?
6. Did you use terminology correctly?
7. Specific improvement suggestions:

### *Instrumentation*

Criterion measures included the short-term test and the long-term test. A total of 41 multiple-choice questions were developed by the researcher based on the behavioral paradigm, ABC analysis, classroom management, and behavior management principles from the course lecture and simulation video. Specifically, the researcher and the expert identified the principles, concepts, and procedures covered in lectures, course package, course objectives and video vignettes, and developed cases accordingly (see Table 3-3).

Table 3-3

*The Constructs Measured in This Study*

<b>Topics</b>	<b>Main Constructs</b>	<b>Unduplicated</b>	<b>Duplicated</b>	<b>Total</b>
Human behavior paradigm	Antecedent control consequence		2	2
Classroom management	1. Prerequisite knowledge/ task selection		2	2
	2. Task organization		1	1
	3. Task transition time		1	1
	4. Space		1	1
	5. Proximity control	1	3	4
	6. Communication of classroom rules		2	2
	7. Premack principle		1	1

Table 3-3 (continued)

*The Constructs Measured in This Study*

<b>Topics</b>	<b>Main Constructs</b>	<b>Unduplicated</b>	<b>Duplicated</b>	<b>Total</b>
Individual behavior management	1. ABC analysis	3	3	6
	2. Reinforcement	1	15	16
	3. Punishment		4	4
	4. DRI		7	7
	5. DRO		2	2
	6. DRA		1	1
	7. DRH		7	7
	8. DRL	1	4	5
	9. Response Cost		5	5
	10. Time Out		6	6
	11. Positive-practice Overcorrection	1	1	2
	12. Token economy		3	3
	13. Extinction	1	8	9

The instrument was verified by the expert and by validation through the pilot studies. Items aimed at assessing how well students apply the behavioral paradigm, classroom management, and behavior management principles and procedures in various situations. This type of assessment is called context dependent assessment, and is used to assess higher-order thinking, and problem solving. Nitko (1996) defined a context-dependent item set or an interpretive exercise as introductory material, along with the corresponding assessment tasks that require learners to “think about and process the information in the introductory material to answer the questions, solve the problems, or otherwise complete the assessment tasks” (p. 177). Learners are required to utilize learned knowledge to interpret, analyze or process the given scenario in order to answer the question (Nitko, 1996). For example, one of the test items describing Cassie states that she completes less than 50% of her class work each day. With this information, students are then asked to identify the best approach to use in improving her performance from four suggested behavioral management techniques.

### *Short-term Test*

The short-term test contained ten multiple-choice questions. Each test item represents a scenario commonly occurring in a classroom setting (see

Appendix H-1). Students took the short-term posttest one week after they completed the online simulation assignment, and had to complete the test within 24 hours.

### *Long-term Test*

In the long-term posttest, items were divided into two sections (see Appendix H-2). Section one contained sixteen test items in multiple-choice format; these items were designed based on the “Amy” video. The purpose of the first section is to assess how well students are able to apply learned knowledge, analyze the “Amy” case in a manner similar to that followed with “Joe”, and make decisions using suggested options. This part of the assessment was designed to be directly analogous to the simulation exercise “Joe”. However, the format was forced-choice rather than open-ended. Students viewed the “Amy” video and answered section one questions. Once students completed section one, they moved on to section two, which contains fifteen test questions. Ten of the items in section 2 were based on the items used in the short-term test. Wording was changed for these items, but they measured the same constructs and procedures. Each test item represents a scenario commonly occurring in a classroom setting. These scenarios reflect teaching demands in terms of classroom or behavior problems and extend the

principles to additional situations not dependent on the video. The purpose of the second section is to assess students' ability to apply learned knowledge to various conditions, and make decisions about potential options. Students had to analyze the question and select the best response to the presented problem.

### *Validity and Reliability*

Validity is most important characteristic of an instrument. Fishman and Galguera, (2003) defined test validity as "the degree to which any instrument really measures what it intends to measure" (p. 19). It is also the appropriateness and wellness of the interpretations and usages made from the test scores (Gay & Airasian, 2000; Nitko, 1996). In this study, the instrument was developed based on the constructs (see Table 3-3) identified from course objectives, course lectures, the course packet, and the vignette. Fishman and Galguera (2003) also suggested that expert opinion is one way to validate instrument validity. Previously, the pool of items had been validated by a team of five special education professionals who were asked to determine if the items measured the concepts and principles of applied behavior analysis and if they were representative of the kinds of issues encountered by teachers working with special needs students. In this study, the criterion measures were

also validated by the course instructor and two special education doctoral students with experience as teacher assistants in this course. The tests were revised based on their feedback to reflect the intended constructs, such as the effective use of the behavioral paradigm, and classroom and behavior management principles to solve problems encountered in various educational settings.

The reliability coefficient value for the short-term test was 0.4525. The reliability coefficient value for the long-term test was .598. The long-term test was split into two sections, and their reliability coefficient values were also calculated. The reliability coefficient value for the section 1 was .365; the reliability coefficient value for the section 2 was .491.

Sax (1989) argued that in educational practice, reliabilities of around .50 are acceptable for first-generation instruments. Previous and additional measures of reliability of the pool of items from which these items were drawn ranged from .69 to .80. Thus the instruments represent a valid and reliable measure of the application of the constructs.

### *Experimental Design*

The research design was revised based on the pilot studies. A posttest-only control group, two-by-two factorial design was used to evaluate



the effects of the treatments on students' performance on the criterion tests.

There are two factors, each with two levels. The first factor is the presence/absence of an advance organizer—a pre-instructional activity. The second factor is the type of feedback, scripted or individualized—a post-instructional activity. The dependent variables were students' grades on the short- and long-term tests. The overall research design is provided in Table 3-4 and the research procedure is provided in Figure 3-2.

The two-by-two factorial design systematically allowed the researcher to measure and compare the effects of four treatment combinations. Based on the design, the researcher was able to determine which treatment had the greatest impact on learners' knowledge application across the four groups, and further determine whether advance organizers are able to diminish an anticipated difference in the effects of different forms of feedback.

Table 3-4

*Research Design*

	<b>Pre-activity: Advance organizer</b>	
	<b>Present</b>	<b>Absent</b>
Post-activity: Scripted Feedback feedback	G1: Advance organizer + Scripted feedback	G2: Scripted feedback
Individualized feedback	G3: Advance organizer + individualized feedback	G4: Individualized feedback

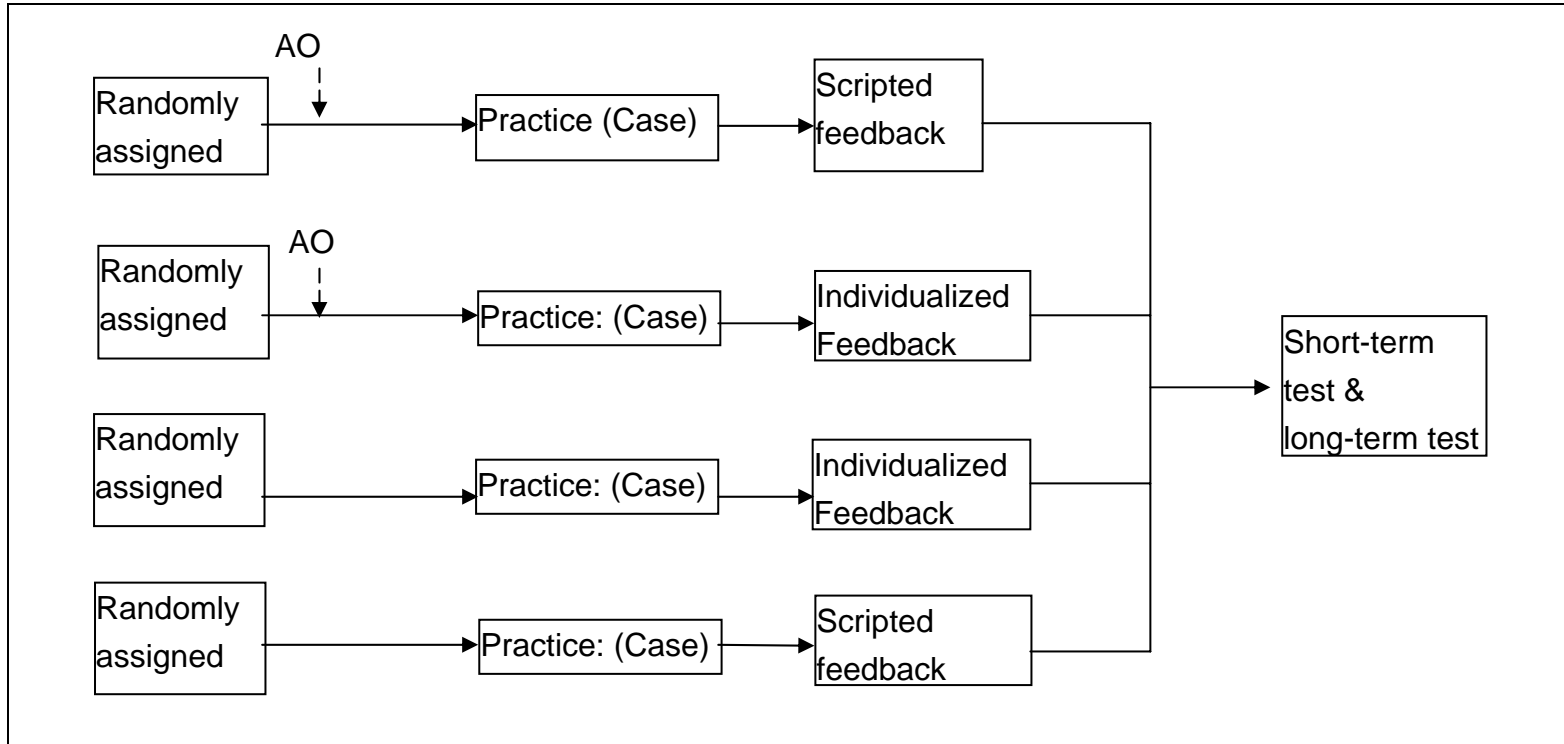


Figure 3-2. Research procedures

### *Procedures*

Participants were students who took SPLED 400 in spring 2005. The procedures were as follows:

1. Recruit participants. Students were recruited during a class period. Once students entered the class, they received two copies of a color-coded informed consent form and a lab schedule sheet. The lab schedule sheet contained 12 sections for students to choose from for the online simulation assignment. The researcher orally explained the study purpose, the procedures, and voluntary participation. The researcher collected signed informed consent forms and the signed lab schedule sheet.

2. Randomly assign students to a group. Students were assigned to one of four groups according to their color-coded signed consent form. Then students were informed of the assigned group by e-mail. Experimental materials were differentially delivered to each of the four groups:

- (1). Group 1 received the advance organizer and scripted feedback. They were provided with the advance organizer at the same time they received the assignment. Once they submitted their response, they immediately received scripted model feedback.

- (2). Group 2 received no advance organizer and only scripted feedback.

Participants in this group received no advance organizer to assist with the assignment. After they submitted their response, they immediately received scripted feedback.

(3). Group 3 received the advance organizer and individualized feedback.

They received the advance organizer at the same time they received the assignment. Once they submitted their response, they received specific and individualized feedback written by the researcher and the expert based on the prescribed rubric within forty-eight hours of the participants' submissions.

(4). Group 4 received no advance organizer but instead, they received only individualized feedback. After they submitted their response, they received specific and individualized feedback written by the researcher and the expert based on the prescribed rubric within 48 hours of the participants' submissions.

3. Attend instructor-led lectures. Participants attended the instructor's lectures on the topics of classroom management and behavior management theories and principles for three weeks.

4. Complete the simulation assignment in the assigned lab. One week after the instructor's lectures, students went to one of five assigned on-campus labs to work on the simulation assignment. In each computer lab, there was at least one trained assistant to administer the lab activity. Assistants were all

graduate students majoring in instructional systems. Assistants received a training session before administrating the lab activity. In the training section, the researcher explained the research purpose, the procedures, logistic and facility issues, etc. These assistants also received a protocol to guide them through the activity (see Appendix I).

After students entered the lab, they were asked to sign in and sit in a certain section. To prevent students from peeking at the computer screen next to him/her, students who received similar treatments were seated together. Groups 1 and 3 were seated in the same section; likewise, groups 2 and 4 were seated together. After the students settled down, the researcher or the assistant read a statement about the research purpose and the procedures. Students then began the activity.

After completing the online activity, students submitted their responses online. Students in groups 1 and 2 received immediate scripted feedback; students in groups 3 and 4 had to wait for the individualized feedback. Individualized feedback was provided within 48 hours, and was posted on the ANGEL course web site. After feedback was given, an e-mail reminder was sent out to students. In the e-mail, students were informed that their individualized feedback was ready for review and they were asked to check

the feedback. All students also received another e-mail that reminded them about the time of the online test and informed them that the online simulation assignment was only available until the day before the online test.

One week after completing the online activity, students took the online short-term posttest, which was restricted to a period of 24 hours. The test submission was automatically scored by ANGEL and students received their overall scores immediately. However, students did not know which questions were right or wrong, nor did students receive answer keys. Answer keys were given after all students completed the online short-term test.

5. Complete the long-term test (the final exam). Eleven days after the short-term test, students took the long-term test in a large classroom. The instructor explained the procedures for taking this exam. There were two sections to the exam. The first part involved analyzing the video case “Amy” along with 16 items based on the video. The second part contained an additional fifteen test items related to the same concepts. Items in the second part were based on brief written cases (situations). Students were required to apply the same procedures and concepts to these items as for the first part.

Students were instructed to (a) read the first 16 items, (b) view the video projected onto the large screen at the front of the room (the video was shown

twice), (c) take notes on the video, and (d) return to the test items and respond to them. Students were permitted to and did request additional opportunities to view the video. After completing the section based on the video, students moved on to the next exam section. After the exam was completed, the answer sheets were sent to the Penn State University Testing Service for scanning and grading. The grading report included grades, item analysis, and test reliability values.

### *Data Analysis*

#### *The Effectiveness of the Treatments*

The researcher used a two-way ANCOVA to determine if there were any significant differences across the four conditions. Prior knowledge, the midterm scores, was used as a covariate. Research has shown that prior knowledge influences students' academic performance. To make sure that ANCOVA was an appropriate technique to use in this study, a correlation test was used to determine if the midterm scores were significantly related to the dependent variables (the short-term and long-term tests). ANCOVA functions very much the same as analysis of variance (ANOVA) to determine if there is a statistical difference in means between/among two or more groups. Moreover, ANCOVA reduces the influence of the potential variate and hence



increases power (Munro, 2001). Thus, a two-way analysis of covariance was utilized to determine if:

1. The advance organizer has a main effect on students' performance on the short-term test and overall long-term test;
2. The type of feedback has a main effect on students' performance on the short-term test and overall long-term tests; and
3. There were interactive relationships between the advance organizer and the type of feedback on short-term test scores and overall long-term test scores.

Furthermore, for the long-term test, the researcher separated scores for sections 1 and 2. Two-way ANCOVA was utilized to analyze scores for sections 1 and 2. This is because section 1 contains test questions based on the video and hence was more analogous to the lab activity, and section 2 contained items similar to those on the short-term test. ANCOVA was used to determine if in sections 1 and 2:

1. The advance organizer has a main effect on students' performance on section 1 and section 2 tests;
2. Feedback has a main effect on students' performance on sections 1 and 2; and

3. There were interactive relationships between the advance organizer and the type of feedback on section 1 and 2 scores.

#### *Efforts of Students in Accessing and Using Feedback*

From the instructor's perspective, it was important to understand students' behavior when feedback was provided. The course management system recorded students' online performance by their link-clicking behaviors. Each "click" on the mouse represents one time that the student accessed the feedback. The system provided the frequency of "clicking on feedback" for each student, thus producing an estimate of engagement/the number of times a student clicked on the feedback link with the provided feedback. However, under the scripted feedback condition, the system automatically provided feedback immediately after Group 1 and Group 2 students submitted their responses. Thus for the scripted feedback condition, the researcher excluded the one attempt that automatically was provided by the system. Only additional "clicks" were counted.

The researcher analyzed the "clicking behavior" using a two-way ANOVA to determine if there were differences in the number of times students' clicked on feedback across different treatment conditions.

### *Ancillary Post hoc Analysis*

For the post hoc second analysis, a comparison was employed to compare long-term test performance of fall 2005 students and spring 2005 students who did not receive any of the experimental treatments. The two groups were also compared on demographics.

### *Procedures*

After the primary experiment was completed, the principal investigator compared the performance of students from fall 2005 (all of whom had received some form of experimental intervention) with the performance of students from spring 2005 who had not received the experimental intervention or the short-term test, but did complete the same long-term exam items. Mean scores from the long-term test (final exam) for spring 2005 were compared to mean scores from the long-term test (final exam) for fall 2005.

### *Ancillary Data Analysis*

The researcher ran a cross-tabulation to compare the demographic distribution of the two classes, and identify potential factors that could affect students' performance. Then, the researcher compared means scores for the long-term test across the spring and fall classes.

## CHAPTER 4

### Results

In this chapter, results regarding the effectiveness of the treatments, the comparison of efforts made by students, and the ancillary analyses are presented. Prior to completing the statistical analysis, the data statistical assumptions for ANCOVA usage were examined. The statistical assumptions for ANCOVA were met.

The hypotheses were tested for both the online short-term test and the long-term test by using ANCOVA. The hypotheses for the short-term test follow:

1. Are there differences in the online test scores between students who received the advance organizer and students who received no advance organizer? ( $H_{01}$ : There are no significant differences in the online test scores between students who received the advance organizer and students who received no advance organizer.)
2. Are there differences in the online test scores between students who received scripted feedback and students who received individualized feedback? ( $H_{02}$ : There are no significant differences in the online test scores between students who received scripted feedback and students who received

individualized feedback.)

3. Is the relationship between the advance organizer and the online exam grades different depending on the type of feedback provided? (HO<sub>3</sub>: The relationship between the advance organizer and the online exam grades does not differ depending on the type of feedback.)

The hypotheses for the long-term test follow:

1. Are there differences in the long-term test scores between students who received the advance organizer and students who received no advance organizer? (HO<sub>4</sub>: There are no significant differences in the long-term test scores between students who received the advance organizer and students who received no advance organizer.)

2. Are there differences in the long-term test scores between students who received scripted feedback and students who received individualized feedback? (HO<sub>5</sub>: There are no significant differences in the long-term test scores between students who received scripted feedback and students who received individualized feedback.)

3. Is the relationship between the advance organizer and the long-term test grades different depending on the type of feedback provided? (HO<sub>6</sub>: The

relationship between the advance organizer and the long-term test grades does not differ depending on the type of feedback)

### *The Assumptions for the Use of ANCOVA*

#### *Test for Relationship between Covariate and Dependent Variables*

The relationship between the covariate and dependent variables should be statistically significant to use ANCOVA. Data were collected for both the short-term and the long-term exams. Midterm scores were also collected and served as a measure of prior knowledge (the covariate). Midterm scores were significantly correlated to the online test ( $r=.270$ ) and the final test scores ( $r=.445$ ); see Table 4-1. Thus midterm scores were deemed to be statistically appropriate to use as a covariate and was used as a proxy.

Table 4-1

*Correlations for Covariate and outcome variables.*

		<b>MIDTERM</b>	<b>Long-term Test</b>	<b>Short-term Test</b>
MIDTERM	Pearson Correlation	1	.445**	.270*
	Sig. (2-tailed)	.	.000	.000
	<i>N</i>	275	275	260
Long-term Test	Pearson Correlation	.445**	1	.331*
	Sig. (2-tailed)	.000	.	.000
	<i>N</i>	275	577	267
Short-term Test	Pearson Correlation	.270**	.331**	1
	Sig. (2-tailed)	.000	.000	.
	<i>N</i>	260	267	267

\*\* Correlation is significant at the 0.01 level (2-tailed).

### *The Univariate Normality Assumption*

The researcher examined normality for both the short-term test and the long-term test. A skewness value between  $-1$  to  $+1$  is considered to reflect a fairly normal distribution (George & Mallory, 2001; Huck, 2000). However, in the four experimental groups, only Group 1 had a long-term test skewness value ( $-1.450$ ) exceeding the guideline, which is also considered acceptable in most cases according to George et al. (2001).

### *Homogeneity Assumption*

The researcher used Levene's test results to test this assumption on both the short-term test and the long-term test. The results showed equal variances across the four groups on the long-term test; however, such was not the case for the short-term test. The data (see Table 4-2) indicated that for the short-term test, the four groups were heterogeneous ( $p=.013$ ).

Table 4-2

#### *Levene's Test of Equality of Error Variances<sup>(a)</sup>*

F	df1	df2	Sig.
3.645	3	256	.013

*Note.* Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

<sup>a</sup> Design: Intercept+midterm+advance organizer+feedback+advance organizer  
\* feedback



Therefore, the researcher further ran two transformation techniques (LN, and LG10) to transform the data and to further test homogeneity across the four groups. Both transformations yielded identical results (see Tables 4-3 and 4-4). That is, the type I error rates for main effect and interaction were statistically identical at  $p < .001$ . These results supported Glass, Peckham, and Sander's (1972) assertion that when the  $n$  of cases in each cell is equal or similar, the effects of the violation of normality and homogeneity assumptions underlying ANOVA and ANCOVA on the type I, and type II error are very minimal. The  $\alpha$  value is not seriously affected, and the F-test remains a robust and appropriate test.

Table 4-3

*Tests of Between-Subjects Effects**Dependent Variable: The short-term test (LN)*

<b>Source</b>	<b>Type III SS</b>	<b>df</b>	<b>MS</b>	<b>F</b>	<b>Sig.</b>	<b>Partial <math>\eta^2</math></b>
Corrected Model	1.164(a)	4	.291	6.970	.000	.099
midterm	.924	1	.924	22.145	.000	.080
AO	.214	1	.214	5.137	.024	.020
feedback	.025	1	.025	.595	.441	.002
AO * feedback	.001	1	.001	.018	.894	.000
Error	10.643	255	.042			
Corrected Total	11.807	259				

a R Squared = .099 (Adjusted R Squared = .084)

*Note.* AO = Advance Organizer.

Table 4-4

Tests of Between-Subjects Effects

*Dependent Variable: The short-term test (LG10)*

Source	Type III SS	df	MS	F	Sig.	Partial $\eta^2$
Corrected Model	.219(a)	4	.055	6.970	.000	.099
midterm	.174	1	.174	22.145	.000	.080
AO	.040	1	.040	5.137	.024	.020
feedback	.005	1	.005	.595	.441	.002
AO * feedback	.000	1	.000	.018	.894	.000
Error	2.007	255	.008			
Corrected Total	2.227	259				

a R Squared = .099 (Adjusted R Squared = .084)

*Note.* AO = Advance Organizer

### *The Effectiveness of Treatments on Students' Achievement*

#### *The Short-term Test*

Table 4-5 shows the original means and adjusted means for each condition. By using ANCOVA, the original score was adjusted to account for differences on the midterm in order to reduce potential error attributable to differences in prior knowledge. For the short-term test, the group receiving an advance organizer and individual feedback outperformed the other three groups (adjusted mean: 8.394). The group receiving scripted feedback only had the lowest achievement among four groups (adjusted mean: 7.908).

Table 4-5

*Unadjusted and Adjusted Short-term Test Scores Using Prior Knowledge as a Covariate*

	<i>n</i>	Original Mean	<i>SD</i>	Adjusted Mean
Group condition				
AO + Scripted Feedback	62	8.223	1.40	8.265
AO + Individualized Feedback	67	8.417	1.12	8.394
Scripted Feedback	67	7.970	1.66	7.908
Individualized Feedback	64	7.953	1.61	8.005

*Note.* The mean scores are actual scores based on a perfect score of 10.

From Table 4-6, we can also see that the group with the advance organizer ( $\bar{X} = 8.329$ ) outperformed the group without the advance organizer ( $\bar{X} = 7.957$ ). The group with individualized feedback ( $\bar{X} = 8.200$ ) outperformed the group with scripted feedback ( $\bar{X} = 8.087$ ). Thus both advance organizers and individualized feedback have positive effects.

Table 4-6

*Unadjusted and Adjusted Test Scores by Advance organizer and Feedback Status Using Prior Knowledge as a Covariate*

	<i>n</i>	<b>Unadjusted Mean</b>	<b>SD</b>	<b>Adjusted Mean</b>
Advance organizer				
Presence	129	8.326	1.263	8.329
Absence	131	7.962	1.629	7.957
Feedback				
Scripted Feedback	129	8.093	1.543	8.087
Individualized Feedback	131	8.191	1.393	8.200

After accounting and adjusting for prior knowledge through ANCOVA, the data (see Table 4-7) revealed a statistically significant effect of the advance organizer,  $F(1, 255) = 4.535, p = .034$ . Thus,  $H_{O1}$  was rejected.

The group with the advance organizer ( $\bar{X} = 8.329$ ) significantly outperformed

the group without the advance organizer ( $\bar{X} = 7.957$ ) in the online test.

Thus, we concluded that for research question 1, there was a significant

difference in the online test scores between students who received the

advance organizer and students who did not receive the advance organizer.

Table 4-7

*ANCOVA Results of Between-Subjects Effects for the Short-term Test*

Source	Type III SS	df	MS	F	Sig.	Partial $\eta^2$
Corrected Model	50.718 (a)	4	12.679	6.377	.000	.091
MIDTERM	40.920	1	40.920	20.580	.000	.075
AO	9.018	1	9.018	4.535	.034	.017
FEEDBACK	.828	1	.828	.417	.519	.002
AO * FEEDBACK	1.684E-02	1	1.684E-02	.008	.927	.000
Error	507.017	255	1.988			
Total	17795.000	260				
Corrected Total	557.735	259				

a R Squared = .091 (Adjusted R Squared = .077).

*Note.* The results were calculated using SPSS; Alpha = .05.

Advance organizer is abbreviated as AO.

Based on the data, the advance organizer was effective in facilitating students' knowledge application on the short-term test. However, no significant main effect is attributable to feedback (scripted feedback vs. individualized feedback) in facilitating students' knowledge application. Although data revealed that students with individualized feedback ( $\bar{X} = 8.200$ ) had higher scores than students with scripted feedback ( $\bar{X} = 8.087$ ), the difference is not significant ( $p = .519$ ). Therefore, for question 2, there are no significant differences on the online test scores between students who received scripted feedback and students who received individual feedback. The null hypothesis ( $H_{O2}$ ) is not rejected. The data also revealed that no interactive relationships existed between the advance organizer and type of feedback,  $F(1, 255) = .008$ , sig. = .927, thus, the  $H_{O3}$  is not rejected.

#### *The Overall Long-term Test*

Table 4-8 shows means and adjusted means of the long-term test scores for each condition. After using the midterm as a covariate, the mean score of the group with the advance organizer and scripted feedback was 23.96. The mean scores of the group with the advance organizer and individualized feedback was 24.56. The mean score of the group with scripted feedback only was 24.35, and the mean score of the group with individualized feedback



only was 23.98.

Table 4-8

*Unadjusted and Adjusted Overall Long-term Test Scores Using Prior Knowledge as a Covariate*

	<i>n</i>	Original Mean	<i>SD</i>	Adjusted Mean
Group condition				
AO + Scripted Feedback	68	23.90	3.770	23.96
AO + Individualized Feedback	69	24.62	3.005	24.56
Scripted Feedback	70	24.51	3.040	24.35
Individualized Feedback	68	23.81	3.338	23.98

*Note.* The means are actual scores based on a perfect score of 31

From Table 4-9, we can see that the group with the advance organizer ( $\bar{X}$  =24.26) slightly outperformed the group without the advance organizer ( $\bar{X}$  =24.17) and the group with individualized feedback ( $\bar{X}$  =24.27) outperformed the group with scripted feedback ( $\bar{X}$  =24.16).

Table 4-9

*Unadjusted and Adjusted Overall Long-term Test Scores by Advance Organizer and Feedback Status Using Prior Knowledge as a Covariate*

	<i>n</i>	Unadjusted Mean	<i>SD</i>	Adjusted Mean
Advance Organizer				
Presence	137	24.26	3.413	24.26
Absence	138	24.17	3.198	24.17
Feedback				
Individualized Feedback	137	24.22	3.189	24.27
Scripted Feedback	138	24.21	3.421	24.16

The data analysis (see Table 4-10) indicated no main effect of the advance organizer,  $F(1, 270) = .065, p = .795$ , or type of feedback,  $F(1, 270) = .099, p = .753$ , on the long-term test. Results also indicated no interactive effect between the advance organizer and the type of feedback on the long-term test,  $F(1, 270) = 1.754, p = .186$ .

Table 4-10

*ANCOVA Results of Between-Subjects Effects for the Overall Long-Term Test Scores*

<b>Source</b>	<b>Type III SS</b>	<b>df</b>	<b>MS</b>	<b>F</b>	<b>Sig.</b>	<b>Partial <math>\eta^2</math></b>
Corrected Model	557.845	4	139.461	15.505	.000	.187
Midterm Scores	521.986	1	521.986	58.034	.000	.177
AO	.609	1	.609	.068	.795	.000
Feedback	.894	1	.894	.099	.753	.000
AO * feedback	15.779	1	15.779	1.754	.186	.006
Error	2428.497	270	8.994			
Total	164231.000	275				
Corrected Total	2986.342	274				

*Note.* Advance organizer was abbreviated as AO

Thus, we concluded that for research question 4, both students with or without the advance organizer performed statistically equally in the final test (long-term test). Similar equivocal results were attained for question 5—types of feedback (scripted feedback vs. individualized feedback). Furthermore, the data also did not support a significant interaction between the advance organizer and different types of feedback (question 6).

The researcher further examined students' test performance in each individual section in the long-term test. The results are presented below.

#### *Treatment Effects for Section 1*

Section 1 test items were based on the “Amy” video and contained 16 items. Data revealed the four groups did not perform differently on the section 1 test. The scores ranged from 6 to 16. The adjusted mean scores for the group with advance organizer and scripted feedback, the group with scripted feedback only, the group with advance organizer and individualized feedback, and the group with individualized feedback were 12.57, 13.27, 12.89, and 12.64, respectively (see Table 4-11).

Table 4-11

*Section 1 Unadjusted and Adjusted Mean Using Prior Knowledge as a Covariate*

	<i>n</i>	Unadjusted Mean	<i>SD</i>	Adjusted Mean
Group				
AO + Scripted Feedback	68	12.54	1.912	12.57
AO + Individualized Feedback	69	12.91	1.721	12.89
Scripted Feedback	70	13.33	1.501	13.27
Individualized Feedback	68	12.57	2.039	12.64

*Note.* The mean scores are actual scores based on a perfect score of 16.

Data showed that neither the advance organizer,  $F(1, 270) = 1.149, p = .285$ ,

nor type of feedback,  $F(1, 270) = .550, p = .459$ , had main effects on the

section 1 scores (see Table 4-12). However, data did show that the advance

organizer and type of feedback had interactive effects (see Figure 4-1) on the

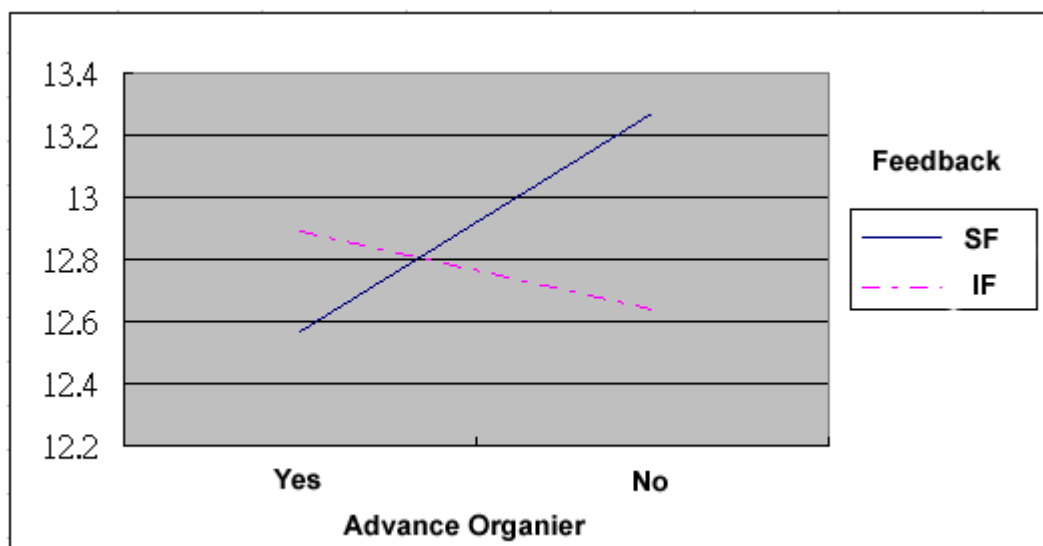
section 1 test scores,  $F(1, 270) = 5.153, p = .024$ .

Table 4-12

*ANCOVA Results of Between-Subjects Effects for the Section 1 Test*

Source	Type III SS	df	MS	F	Sig.	Partial $\eta^2$
Corrected Model	97.454 (a)	4	24.364	8.113	.000	.107
MIDTERM	69.599	1	69.599	23.176	.000	.079
AO	3.452	1	3.452	1.149	.285	.004
FEEDBACK	1.652	1	1.652	.550	.459	.002
AO *	15.475	1	15.475	5.153	.024	.019
FEEDBACK						
Error	810.822	270	3.003			
Total	46272.000	275				
Corrected Total	908.276	274				

a. R Squared = .107 (Adjusted R Squared = .094)



*Figure 4-1.* The disordinal interaction between the advance organizer and feedback.

### *Treatment Effects for Section 2*

Section 2 test items were based on scenarios that reflected teaching problems that focusing on classroom and individual behavior management principles and procedures. Section 2 contained 15 test items. Test scores ranged from 2 to 15. The adjusted mean scores for the group with the advance organizer and scripted feedback, the group with scripted feedback, the group with the advance organizer and individualized feedback, and the group with individualized feedback were 11.39, 11.08, 11.67, and 11.35, respectively (see Table 4-13).

Table 4-13

*Section 2 Unadjusted and Adjusted Mean Using Prior Knowledge as a Covariate*

	<i>n</i>	Unadjusted Mean	<i>SD</i>	Adjusted Mean
Group condition				
AO + Scripted Feedback	68	11.35	2.430	11.39
AO + Individualized Feedback	69	11.71	1.741	11.67
Scripted Feedback	70	11.19	2.182	11.08
Individualized Feedback	68	11.24	2.045	11.35



Data revealed that the treatments had no effects on the section 2 test scores. For the advance organizer,  $F(1, 270) = 1.879, p = .172$ ; and for the type of feedback,  $F(1, 270) = 1.344, p = .247$ . Treatments also had no interactive effects on the section 2 test scores,  $F(1, 270) = .000, p = .984$ . See Table 4-14.

Table 4-14  
*ANCOVA Results of Between-Subjects Effects for the Long-term Test Section 2*

Source	Type III SS	df	MS	F	Sig.	Partial $\eta^2$
Corrected Model	221.992 <sup>a</sup>	4	55.498	14.982	.000	.182
MIDTERM	210.378	1	210.378	56.792	.000	.174
AO	6.961	1	6.961	1.879	.172	.007
FEEDBACK	4.978	1	4.978	1.344	.247	.005
AO * FEEDBACK	1.479E-03	1	1.479E-03	.000	.984	.000
Error	1000.175	270	3.704			
Total	36779.000	275				
Corrected Total	1222.167	274				

Note. a R Squared = .182 (Adjusted R Squared = .170)

AO is the abbreviation of advance organizer

MANCOVA was used to maintain the overall alpha (Type I) error. The MANCOVA omnibus overall Hotelling's  $t$  for feedback ( $HT^2 = .010, df = 2, 269, p = .248$ ) for advance organizer ( $HT^2 = .017, df = 2, 269, p = .104$ ) and for the

interaction term ( $HT^2 = .021$ ,  $df = 2$ ,  $269$ ,  $p = .057$ ), all were not significant.

### *Comparison of Efforts Made by Students*

The researcher used a two-way ANOVA to determine whether there were statistically significant differences in the numbers of times the student clicked on the feedback link (the frequency with which the student initiated a feedback review). The data revealed that the advance organizer group,  $F(1, 278) = 16.976$ ,  $p < .001$ ) and feedback,  $F(1, 278) = 55.434$ ,  $p < .001$ ) had main effects on students' frequency of clicking behavior (see Table 4-15). However, no significant interactive effect existed between advance organizer and feedback on the number of times feedback clicks was found.

Table 4-15  
 ANOVA Results of Between-Subjects Effects for Number of Time Access  
 Feedback

Source	Type III SS	df	MS	F	Sig.	Partial $\eta^2$
Corrected Model	75.507(a)	3	25.169	24.698	.000	.210
Advance Organizer	17.299	1	17.299	16.976	.000	.058
Feedback	56.491	1	56.491	55.434	.000	.166
Advance Organizer *	1.640	1	1.640	1.609	.206	.006
Feedback						
Error	283.302	278	1.019			
Total	584.000	282				
Corrected Total	358.809	281				

a R Squared = .210 (Adjusted R Squared = .202)

That is, students receiving no advance organizer ( $\bar{X} = 1.14$ ) accessed the feedback more than students receiving the advance organizer ( $\bar{X} = .65$ ).

Moreover, students receiving individualized feedback more frequently accessed the feedback ( $\bar{X} = 1.34$ ) than students receiving scripted feedback ( $\bar{X} = .44$ ). For more information, please see Table 4-16.

Table 4-16  
*Descriptive Statistics—Number of Time Access Feedback by Advance Organizer \* Feedback*

	<i>n</i>	Mean	Std. Deviation
With Advance Organizer			
Individualized Feedback	71	1.01	.765
Scripted feedback	70	.27	.850
Total	141	.65	.887
No advance organizer			
Individualized Feedback	71	1.66	1.276
Scripted feedback	70	.61	1.067
Total	141	1.14	1.285
Total			
Individualized Feedback	142	1.34	1.097
Scripted feedback	140	.44	.976
Total	282	.89	1.130

#### *Ancillary Findings*

In the spring semester class, an instrument similar to the final exam was used. Later, the researcher decided to use this class as a control group to further explore the efficacy of the treatments. First, the researcher compared the characteristics of the two classes (fall semester vs. spring semester). Then, the researcher compared test performance for the two semesters to determine if there were any differences between these two classes.

### *The Background Comparison between the Semester Classes*

To better understand the demographic structure in the sample, the researcher compared the student majors and sex in fall ( $N=282$ ) with spring semester ( $N=295$ ). In the aggregate of both semesters, students were enrolled from 30 different majors; however, 17 majors appeared in only one semester. The majors were then grouped into two categories (education majors and non-education related majors). A Chi-Square was utilized to test the association in dependence in students' major distribution by semester. The data revealed a significant difference association in students' majors between these two semesters (see Tables 4-17 and 4-18). The fall semester class had significantly more non-education-related major students than the spring semester class.

Table 4-17  
*Cross-tabulation Between Major and Semester*

		Semester		Total	
		Spring	Fall		
Major	Education	Count	229	181	410
		% within Major	55.9%	44.1%	100.0%
		% within semester	77.6%	64.2%	71.1%
		% of Total	39.7%	31.4%	71.1%
	Non	Count	66	101	167
	Education	% within Major	39.5%	60.5%	100.0%
		% within semester	22.4%	35.8%	28.9%
		% of Total	11.4%	17.5%	28.9%
Total		Count	295	282	577
		% within Major	51.1%	48.9%	100.0%
		% within semester	100.0%	100.0%	100.0%
		% of Total	51.1%	48.9%	100.0%

Table 4-18  
*Chi-Square Tests (Semester \* Major)*

	<b>Value</b>	<b>df</b>	<b>Asymp. Sig. (2-sided)</b>	<b>Exact Sig. (2-sided)</b>	<b>Exact Sig. (1-sided)</b>
Pearson	12.668(b)	1	.000		
Chi-Square					
Continuity	12.023	1	.001		
Correction(a)					
Likelihood Ratio	12.729	1	.000		
Fisher's Exact				.000	.000
Test					
Linear-by-Linear	12.646	1	.000		
Association					
N of Valid Cases	577				

a Computed only for a 2x2 table

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 81.62.

The researcher further utilized an independent t-test to determine if in the primary experiment, there was a statistically significant difference association in the long-term test by student major. The data (see Tables 4-19 and 4-20) revealed no statistically significant difference in the scores on the long-term test between students with an education major ( $\bar{X}$  =24.12) and students with a non-education major ( $\bar{X}$  =24.39).

Table 4-19

*Summary Statistics for Spring Semester Long-term Test*

<b>Dichotomy</b>	<b><i>n</i></b>	<b>Mean</b>	<b><i>SD</i></b>	<b>Std. Error Mean</b>
Education	181	24.12	3.473	.258
Non Education	101	24.39	2.939	.292

Table 4-20

*T-test Results for Long-term Test by Major*

	<b><i>t</i></b>	<b><i>df</i></b>	<b>Sig. (2-tailed)</b>
Long-term test performance	-.647	280	.518

The researcher also utilized Chi-Square to determine if there was a statistically significant association in sex distribution between the two classes.

The data revealed no statistically significant association in sex distribution between the spring and fall classes (see Table 4-21).



Table 4-21  
*Chi-Square Results for Sex by Semester*

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson	.000(b)	1	.985		
Chi-Square					
Continuity	.000	1	1.000		
Correction(a)					
Likelihood Ratio	.000	1	.985		
Fisher's Exact Test				1.000	.533
Linear-by-Linear Association	.000	1	.985		
N of Valid Cases	577				

a Computed only for a 2x2 table

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 61.09.

### *The Long-term Test Comparison*

The researcher compared the long-term test performance of students who received the treatment (fall semester) with the final exam performance of the spring semester students who did not receive the treatment. In the past, the mean scores for the long-term test were very stable. The spring semester

was selected because the semester was closest to the semester in which the main study took place. The test contained 31 test items. The spring class ( $\bar{X} = 25.13$ ) slightly outperformed the fall class ( $\bar{X} = 24.22$ ).

## CHAPTER 5

### Discussion

This study examined the individual and combined effects of an advance organizer and two types of feedback on pre-service teachers' ability to apply knowledge in a blended learning environment. This study was designed to answer the following questions.

1. Do the criterion test scores differ between students who received the advance organizer and students who received no advance organizer?
2. Do the criterion test scores differ between students who received scripted feedback and students who received individualized feedback?
3. Are there interactive relationships between the advance organizer and the type of feedback on the criterion test scores?

### *Review of Results*

This study examined six null hypotheses on the short-term test, the overall long-term test, and the separated long-term test. The results and conclusions are shown in Tables 5-1, and 5-2, respectively.

Table 5-1

*Conclusion of the Hypotheses Test for the Short-term Test*

<b>Null Hypotheses</b>	<b>Conclusion</b>
HO <sub>1</sub> : There are no statistically significant differences on the short-term test scores between students who received the advance organizer and students who received no advance organizer.	Rejected
HO <sub>2</sub> : There are no statistically significant differences on the short-term test scores between students who received scripted feedback and students who received individual feedback	Not rejected
HO <sub>3</sub> : There are no interactive relationships between the advance organizer and the type of feedback on the short-term test scores.	Not rejected

Table 5-2

*Conclusion of the Hypotheses Tests for the Overall Long-term Test*

<b>Null Hypotheses</b>	<b>Conclusion</b>
HO <sub>4</sub> : There are no statistically significant differences on the long-term test scores between students who received the advance organizer and students who received no advance organizer.	Not rejected
HO <sub>5</sub> : There are no statistically significant differences on the long-term test scores between students who received scripted feedback and students who received individual feedback	Not rejected
HO <sub>6</sub> : There are no interactive relationships between the advance organizer and the type of feedback on the long-term test scores.	Not rejected

*Discussion: Effectiveness of Independent Variables*

Results show that, in general, the advance organizer had a facilitative effect, especially in the short term test, it has significant positive effect on

students' test performance; however, no effects were found for feedback.

The following discussion first focuses on the results for each of the treatment variables. The advance organizer and feedback variables are discussed in relation to the existing literature. Second, the discussion focuses on the combination of these two variables and their general trend on test scores.

The third section contains a discussion of important issues related to efficiency versus effectiveness from a broader perspective (ancillary information).

### *The Advance Organizer*

Data indicated that the advance organizer had significant effects only on the students' short-term performance. On the short-term test, the students who received the advance organizer outperformed the students who did not receive an advance organizer. This finding reconfirms previous studies that advance organizers have facilitative effects on learning (Ausubel & Fitzgerald, 1961; Dinnel & Glover, 1985; Glover, Bullock, & Dietzer, 1990). The advance organizer facilitated the learning process from the beginning (activating prior knowledge) to the end (restructuring existing knowledge and to-be-learned knowledge). Specifically, the advance organizer was effective with the short-term test because it provided: (a) a general conceptual framework, (b) visual presentation, and (c) focuses attention to the central concepts. Most

importantly, students had opportunities to cognitively engage with the advance organizer. Students first viewed the advance organizer before proceeding to the simulation activity. The advance organizer oriented students and activated their relevant knowledge. Furthermore, this expert-created concept map helped learners move toward an expert's mental model and quickly grasp how such an expert structures knowledge. The model served as a conceptual framework to help learners organize and assimilate incoming information, acting as what Ausubel called an ideational anchor. Ausubel et al. (1961) and Mayer (1978) proposed that advance organizers are effective in facilitating meaningful learning because they can provide an ideational anchor serving as a conceptual framework that subsumes/ assimilates new information. Thus, in the extant study, the advance organizer may have served to allow the students to acquire a conceptualization of the procedures/ applications that is more akin to that of an expert (at least temporarily).

The second explanation is the presentation form used in this study. The advance organizer is presented in narration and graphic form. Students benefit from both narration explanatory and visual computation effect. Specifically, learners not only get an explanation but also see how these concepts relate to each other and further visualize the procedures. Thus,

learners need to expend less effort in grasping the complicated concepts and procedural knowledge with the advance organizer. This finding affirms the suggestion of Langan-Fox et al. (2000) that the format of the advance organizer depends on the type of target knowledge. As Langan-Fox et al. (2000) suggested, narration and graphics are two main types of advance organizers. Graphic organizers have greater effect when the content involves multiple concepts; narration is suitable for continuous and linear content. That is, text and narration convey simple descriptive, explanatory and within-concept knowledge. In contrast, graphic organizers utilize "...a spatial format to convey concept relations" (p. 26). Thus, a graphic organizer may be best used when presenting information and relationships across concepts by helping students efficiently grasp complex relationships between and among such concepts. Since both linear and graphic organizers were used, students were expected to apply what they learn. In this study, they did indeed, but only for the short term, not in the long term.

Attention to central concepts and cognitive engagement are other explanations for the results. Research shows that providing advance organizers before viewing a video can help learners focus their attention on the central concepts (Herron, York, Cole, & Linden, 1998; Kreiner, 1997),

especially when learners are tasked with "...general processing rather than just attention to specific points" (Kreiner, 1997, p. 185). In this case, it appears that learners used the advance organizers to focus on the video presented in the short term and performed accordingly on the short-term test. This strategy leads students to actively engage in the conceptual framework, and gives them the opportunity to reorganize their knowledge accordingly. This finding supports previous studies and reaffirms the essential role of encoding strategies for effective advance organizers. Many researchers caution that merely presenting advance organizers to learners does not guarantee learning (Alvermann, 1981; Dinnel & Glover, 1985; Griffin, Malone, & Kameenui, 1995; Kloster & Winne, 1989; Snapp & Glover, 1990). The effectiveness of the advance organizer depends on whether learners use advance organizers appropriately, and whether learners reorganize their knowledge with the ideational anchors provided by advance organizers, that is, whether learners cognitively engage with advance organizers.

The advance organizer yields significant effect on the short-term test, but this is not the case for the long-term test. Reasonable explanations could include low motivation and the lack of practice. In the extant research, the researcher observed that some learners engaged with the advance organizers



only briefly and even reluctantly, viewing the advance organizers as just another task rather than as a path to learning. Thus, although the advance organizers were available to the learners, many chose not to avail themselves of the support after the initial (and in some cases perfunctory) engagement in the computer lab. Students did not refer back and even internalize the organizer in preparation for the long-term test. This failure to engage could be due to a lack of practice. With the passage of time, the effect of the advance organizer may fade away or even worse, students may confuse it with what they are trying to deal with. Research has indicated that concept acquisition and transformation require more than one instance of practice (Andre & Thieman, 1988; Park & Tennyson, 1980). Thus, low motivation and lack of practice seem reasonable explanations for the rapid loss of effect.

### *Feedback*

Data revealed that types of feedback did not yield significantly different effects on any dependent measures. That is, scripted feedback and individualized feedback yielded no different effects on the short-term and long-term test scores. Thus, the current study shows the promising role of scripted feedback in instructional efficiency. This finding is contradictory with that reported by Roccomini (2002). Roccomini found that students benefit

more from individualized feedback than from scripted feedback. The explanation for this discrepancy may depend on: (a) the components included in the scripted feedback, (b) working memory overload, and (c) practice and feedback encoding. In this study, the scripted feedback was designed based on previous students' error patterns and includes several components that made it as effective as the individualized feedback. These components include guided questions and answers. The step-by-step questions represent the procedures for learners to use in analyzing a case or a classroom problem. The answer contains explanation (advice) and examples. The explanation clarifies complicated areas students usually misunderstand. These examples demonstrate procedures for identifying the function of student misbehaviors, and provide appropriate classroom management or behavior management technology and tactics for the case. These components contain content knowledge (what to do), and procedure knowledge and strategy/ tactic knowledge (how to do) that make scripted feedback effective. Novice learners especially need procedure and strategy knowledge when learning to apply concepts and principles. The other possible explanation is that the complexity of individual feedback content resulted in students' working memory overload. Researchers argue that the level of complexity of

instructional tasks should be taken into account in the design of feedback (Andre & Thieman, 1988; Birenbaum & Tatsuoka, 1987; Tait, Hartley, & Anderson, 1973). Simple, factual feedback is effective in improving performance on simple learning tasks (Andre & Thieman, 1988) but is ineffective in improving performance on rule-application tasks, because rule-application tasks involve cross-concepts and complex cognitive skills. However, very disappointingly, complex feedback does not warrant corrective effects either. Research has shown conflicting results of complex feedback in correcting errors and improving learning (Kulhavy, White, Topp, Chan & Adams, 1985; Phye and Bender, 1989). Phye and Bender (1989) explained that this ineffectiveness could be the result of the limited capacity of working memory. In this study, learners may have read the feedback but did not register the information because the content was too complicated to use.

Another explanation for the lack of effect is practice. The current findings reaffirm the critical need for multiple practice occasions and feedback in higher order learning. Learning how to apply concepts is not as easy as learning how to acquire factual knowledge. The process for correcting misconceptions is a series of confirmation actions and is more complicated than correcting factual error. In this study, students experienced only one set

of “practice and feedback”, yet research has suggested that one-time feedback is not sufficient to enhance learning involving complex cognitive processes (Andre & Thieman, 1988). Learners may need at least four sets of “practice and feedback” in order to acquire a concept (Park & Tennyson, 1980).

Furthermore, learners need to specifically seek confirmation and clarification if they find gaps between their answer and feedback; however, in this case, none did. Therefore, the explanation for the lack of effect is also related to the students’ failure to use the feedback effectively, and then seek clarification and interaction (i.e., practice). The fact that not one student sought clarification is evidence of this position.

Furthermore, we also have to consider that feedback is effective only for a repeated question (Andre & Thieman, 1988). The conditions under which students can generalize feedback content are very limited. In this case, the most likely reason is that students were not able to generalize feedback content to various case conditions; thus, feedback did not yield significant effects on test scores.

#### *General Trend and the Combination Effects of Treatments*

The rank order of treatment effects is presented in Table 5-3. The treatment of the advance organizer plus individualized feedback yielded the

highest effect on both criterion tests. This was to be expected because (a) the advance organizer provided an anchored framework that guided learners along the learning activity, so that learners restructured and stored knowledge correctly, and (b) the individualized feedback provided those learners with the opportunity to verify and correct specific information. However, we should note that the role of the advance organizer was paramount on the short-term test. The advance organizer was responsible for an approximate .37 point difference in the short-term test results regardless of the form of feedback.

On the long-term test, the treatment effect is equivocal, but the combination of advance organizer and individual feedback continued to be the most powerful although data revealed that the advance organizer and types of feedback had a significant interactive effect on section 1 of the Long-term Test.

Data also indicated that the advance organizer interacted with type of feedback; however, this relationship only existed for section 1 of the Long-term Test. The  $p$  value of the interaction is .024. The differences among adjusted mean scores for four groups in the section 1 (13.27, 12.89, 12.64, and 12.57) are very small. The partial  $\eta^2$  value for this interaction effect is .019, which indicates that this interaction power is quite small. A possible explanation is that random error may contribute to this interactive effect.

Table 5-3  
*Rank of Performance across Two Tests*

<b>Performance Rank</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>NOTE</b>
<i>Short-term</i>	AO+ IF (8.394)	AO+SF (8.265)	IF (8.005)	SF (7.908)	AO has main effects
<i>Long-term Overall</i>	AO+IF (24.56)	SF (24.35)	IF (23.98)	AO+SF (23.96)	
<i>Long-term (Section 1)</i>	SF (13.27)	AO+IF (12.89)	IF (12.64)	AO+SF (12.57)	AO*Feedback has interactive effects
<i>Long-term (Section 2)</i>	AO+IF (11.67)	AO+SF (11.39)	IF (11.35)	SF (11.08)	

Note. AO = Advance organizer; IF = Individualized Feedback; SF = Scripted Feedback

#### *The Efforts Made by Students*

Data also revealed that two factors influenced the frequency of students' feedback access. These two factors were: (a) absence/presence of the advance organizer and (b) type of feedback. Students with no advance organizer tended to access the feedback more frequently than students who received the advance organizer. Also, students who received scripted feedback tended to access the feedback more frequently than students who received individualized feedback. Perhaps without an advance organizer, students were uncertain about how to apply what they have learned and how to evaluate their own performance, because there were no cues to help them retrieve related concepts and no guidance about how to tackle the task while

they worked. Thus, they may have practiced errors and then relied more on feedback to correct their errors.

### *Ancillary Information*

#### *Efficiency Versus Effectiveness*

Although not directly examined in this research, technology has been adapted to higher education. Researchers have consistently shown that online teaching and learning take more time than in conventional education (Dibiase, 2000; Visser, 2000). Thus, instructors must be concerned about the effectiveness of instruction as well as its efficiency. At some point, attempts to add more features as support for learning become cost-prohibitive, especially in large classes, which appears to be one of the “administratively” claimed benefits of the online instruction. In this study, 142 students received laboriously created individualized feedback, consuming some 96 hours of instructional effort beyond the time required to design the rubric for the feedback. However, results showed that scripted and individual feedback yielded the same effects on learning. Although the advance organizer was less costly and can be used over and over again with minimal additional instructional time, it too used additional time from the students. Considering the disappointing results for individualized feedback and the slightly less

disappointing results for the advance organizer, time and effort spent by the instructor and students, and the use of advance organizers (with more opportunity to practice) and scripted feedback are the most efficient solution for an online large section course. However, multiple opportunities for practice are essential.

### *Implications*

Case methodology continues to gain in popularity in teacher education. Researchers agree that feedback is a necessary component of an effective case study. Although feedback is an important instructional component, it is not clear how to use feedback effectively and efficiently. Some researchers have provided ways to adapt technology to enhance case method instruction (Hsu, 2004; Pindiprolu, Peterson, & Rule, 2003; Schrader, Leu, Kinzer, Ataya, Teale, Labbo, & Cammack, 2003; Smith & Diaz, 2002). For example, Hsu (2004) reported that experienced teachers could communicate with and provide feedback to novice teachers through online discussion, thus freeing instructor time for other activities. However, blending resident and online instruction presents new challenges. For example, designers must consider components such as learners, the level of the complexity of the tasks involved, technology limitation and the characteristic of the course. This is further



compounded in large classes with complex tasks.

This study revealed the utility of the advance organizer as a pre-instruction activity for complex learning tasks, at least in the short term. The advance organizer not only had facilitative effects on comprehending text materials but also higher-order instructional tasks. The advance organizers provide ideational frameworks that assist learners in applying their knowledge. Thus, when learners are engaged in application types of learning tasks, the advance organizers should be provided; results showed that the learning of complex application tasks is a progressive process. Learners must have several opportunities for practices and experience with various cases in order to derive sustainable effects.

#### *Limitations and Recommendation for Future Research*

There were several limitations in this study. These limitations could be categorized into four aspects.

#### *The Research Design*

*Selection interactions.* This study used a convenient sample; thus, the sample could be biased, resulting in limited generalizability. Subjects were from a research university, and were relatively more concerned about their

academic performance and time in the lab and less concerned about the activity.

More than half of the students enrolled in both spring and fall classes were education majors. Future research should examine academic major as a moderating variable, including potential interaction effects with the advance organizer and the type of feedback. All participants in this study were novice student-teachers. Researchers might determine if more experienced teachers might be more motivated and make more effective use of the independent variables.

*Treatment diffusion.* There are three possibilities for treatment diffusion.

1. Although the researcher asked students not to discuss the content of the lab activity, it is very likely that students communicated privately and perhaps even shared details about the different treatments. This was made less likely by the fact that students were unable to access the treatments after completing the short-term test.
2. Due to the facility availability and the lab space, students were able to peek at other students' computer screen. This was evidenced by students' comments about the differences on the screens.

3. It is possible that the short-term test gave students information about the long-term test. This was more powerful than the individual treatments.

Thus, based on the short-term results, students prepared for the long-term test, reducing the influence of the independent variables.

*Treatment duration.* This was a one-shot treatment, so although the advance organizer had a main effect on students' learning, its effects disappeared in the long term. Practice under the varied conditions was not possible in this study. Thus, future researchers may wish to provide students more practice opportunities, but such an undertaking does create both ethical and practical concerns.

#### *Logistical Issues*

*Technology limitations.* Technology limitations posed some threats in this study. This study lacked a means to directly measure students' actual behavior, such as how they used the advance organizers, how carefully they read and used feedback or how they arrived at and reasoned their responses. Thus, the researcher cannot determine the extent to which learners actively engaged in the feedback or the advance organizer. The course management system recorded students' online performance; however, performance was recorded only by the learner's mouse "clicking" action. That is, the system

can indicate whether the students clicked on the feedback link or opened the advance organizer screen, but it cannot tell whether learners read the feedback or advance organizer, or for how long. The researcher also could not determine students' behavior after accessing the feedback. For example, it is unclear whether students went back to check the course materials after receiving the feedback. Evidence indicates that most probably did not, since none sought clarification or asked follow-up questions. The research also cannot determine if learners' misconceptions were corrected through feedback. Hence to fully understand the effects of the feedback, future studies should employ a system capable of recognizing whether students cognitively engage the advance organizers and feedback, such as how much time students spend in accessing and assessing the feedback, and exclude students who do not engage treatments. The data collection technique should also include an interview in order to better understand students' learning behavior after receiving feedback.

Riccomini (2002) pointed out that learners' abilities influence the effectiveness of scripted (model) feedback. The weakness of scripted (model) feedback is the assumption that after reading the feedback, learners are capable of identifying their own misconception and errors and taking

corrective action. However, this is not likely to occur when learners with low prior knowledge are involved in complex tasks such as in the study.

### *The Characteristic of the Course*

*A large-enrollment course.* This study was conducted in a large class ( $N=282$ ). Finn, Pannozzo, and Achilles (2003) reviewed several studies and concluded that class size influences students' academic behavior. Students are less engaged in large classes, negatively influencing their academic performance. Thus, class size and the resulting impact on motivation likely reduced students' fidelity to the directions and their motivation to follow-through.

*The practice effect.* In this study, the knowledge application was a one-shot practice. Although the data revealed that the advance organizer had a main effect on the short-term test, the relationship between the advance organizer and the short-term test was relatively small (partial  $\text{Eta}^2$  value was .017). It is possible that the effect was attenuated by time. Moreover, in this study, only one class case was provided in addition to the case used in the experiment. The case may not have been sufficient for learners to learn how to apply their knowledge. Thus, in this study, learners did not have sufficient cases and practice, and knowledge transfer was not as successful as

expected. In future research, researchers should examine the effectiveness of the treatment when students are given more practice and cases.

### *Summary*

This study investigated individual and combined effects of the advance organizer and two types of feedback on students' test performance on criterion tests measuring knowledge application in a blended learning environment.

Students who received the advance organizer performed better on the short-term test. However, the research revealed no effect of the advance organizer on the long-term test. No effects were found for two types of feedback on tests. The study also identified several factors with a potential influence on the effectiveness of the treatments. Most importantly, instructional designers, instructors and administrators should note the following:

1. It is vital to provide an advance organizer to novice learners when they are involved in complex tasks that involve the application of what they have learned.
2. Feedback is an important instructional component. Instructors or instructional designers should take learner ability, information - learners' need

match, and the level of complexity of the task into account. Furthermore, correcting complicated concepts is a set of affirmations and clarifications.

3. A blended instruction environment is a complicated learning system; several factors such as class size, class characteristics, technology limitations, and student motivation can interact and compound learning results. Designers, instructors and administrators should be aware of these factors and impacts, and may have to choose between effectiveness and efficiency. This study suggests that for a blended large section course, advance organizers (like those used here) and scripted feedback pose potentially efficient solutions.

In future studies, researchers should also replicate the study with in-service teachers who have a higher level of expertise and motivation to determine if the advance organizer and feedback have a different impact on learning. Such experienced persons may be better able to use the supports provided by the methods.

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APPENDIX A  
PILOT STUDY REPORT



## Pilot Study Report

### *Introduction*

The researcher conducted three pilot studies to verify the instrument, the advance organizer, feedback, the research design and the research logistic. In the following sections, each pilot study and the resulting modifications are discussed.

### *The First Pilot Study*

#### *Purpose*

The goals of this study were to test the research design, treatment, and the research logistic.

#### *Participants*

The researcher conducted the first pilot study in Special Education 402, "Human Rights: Historical and Current Issues in Special Education", spring 2005. Sixteen undergraduate students voluntarily participated in this study and one student dropped the course during the semester. Among these students, 12 students were in special education, 2 were in elementary and kindergarten education, and one was an art history major. Participants had a general understanding of special education gained from an introductory special education course. Twelve were female and three were male.

### *Research Design*

A posttest-only comparison group design was utilized in this study (see Figure A-1). Students were randomly assigned to two groups. One group received the advance organizer and scripted feedback; the other group received both scripted and individual feedback. Posttest scores from both groups were compared to determine the relative effectiveness of the treatments.

### *Instrument*

The instrument contained 2 parts with 30 test items designed to measure students' performance on knowledge application tasks; 28 items were multiple-choice and 2 were true-false questions. Part 1 contained 14 test items based on the concepts; Part 2 contained 16 test items based on the concepts and a video.

### *Procedures*

This study was conducted in spring 2005. The researcher went to the class, explained the study, and invited students to participate. Students who agreed to participate signed a consent form. Participants were randomly assigned into two groups (green and orange). At the beginning of the class, the instructor gave a supplemental lecture in class pertaining to the concepts.

One week after the lecture, students logged onto ANGEL and worked on the online activity. Participants in the green group ( $n = 7$ ) received the advance organizer and immediate, scripted feedback; participants in the orange group ( $n = 8$ ) did not receive the advance organizer. After they submitted their responses, they received both the scripted feedback and the specific individual feedback provided by the instructor. In the third week, students took the paper-based posttest in class.

During the posttest, the instructor first told students to read the part II test items, and informed students he would play the “Amy” video after they completed reading the items. After viewing the video, students worked on the test. After all students completed the test, the instructor asked students if anyone needed to view the video again; no students made the request. Then the instructor and the researcher collected the tests.

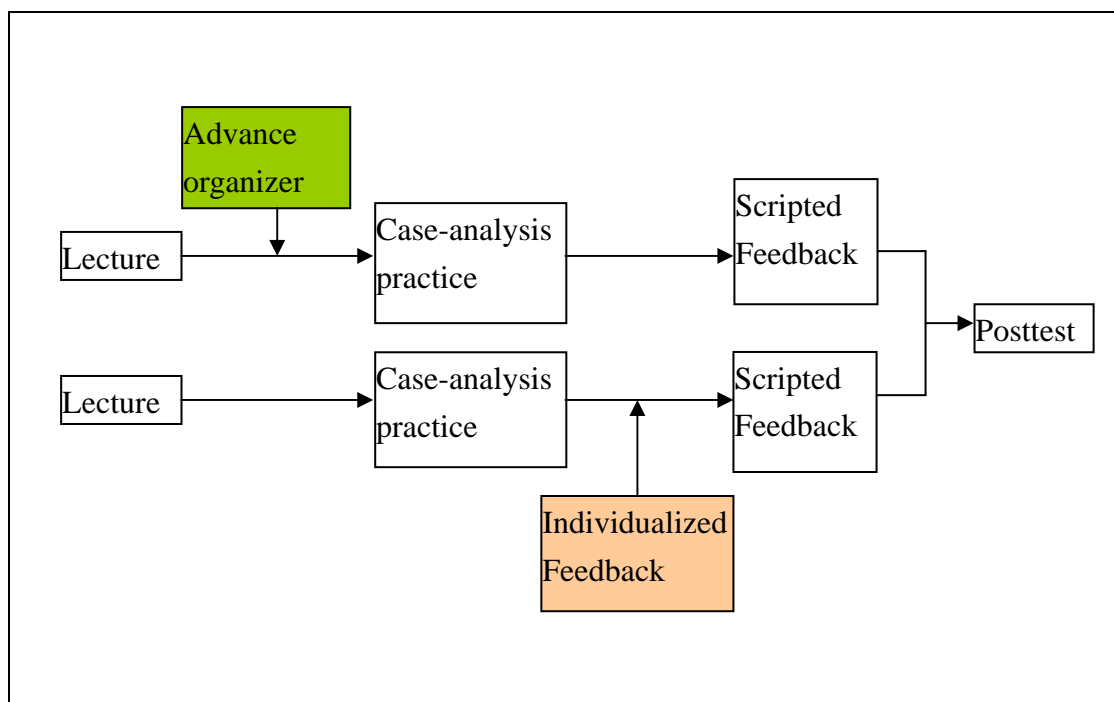


Figure A-1. Pilot 1 Research Design.

### Results

The researcher hypothesized that there would be no statistically significant difference in the posttest grades between the green and orange groups using an independent samples t-test. These two groups were homogeneous groups with equality of variances ( $p = .945$ ). The data further revealed that the hypothesis was accepted (see Table A-1). No significant differences occurred in test performance between the green group ( $\bar{X} = 23.00$ ,  $SD=2.94$ ), and the orange group ( $\bar{X} = 24.37$ ,  $SD = 2.50$ ),  $t(13) = -.978$ ,  $p = .346$ . The test scores ranged from 17 to 27, and the average was 23.73.

Table A-1  
*Results of the Independent T-test*

	<i>n</i>	<i>M (SD)</i>	<i>t</i>	<i>df</i>	<b>Sig. (2-tailed)</b>
Group			-.978	13	.346
Orange	8	24.37 (2.50)			
Green	7	23 (2.94)			

### *Modifications*

Several modifications were made based on the results from this pilot study.

1. Research design. The original design could not indicate whether types of feedback (the scripted or individual feedback) resulted in differences. Thus, a two-by-two factorial design was proposed (see Table A-2) for the main study.

The first factor is the presence/absence of an advance organizer (a pre-activity instructional support). The second factor is the type of feedback, scripted or individualized, on a post-activity instructional support. This new design could give a finer picture about how each treatment affect students' performances.

Table A-2  
*The New Research Design*

		<b>Advance Organizer</b>	
		<i>Present</i>	<i>Absent</i>
Feedback	<i>Scripted</i>	Group 1: Advance organizer & Scripted feedback	Group 2: Scripted feedback
	<i>Individualized</i>	Group 3: Advance organizer & individualized feedback	Group 4: Individual feedback

2. The advance organizer. The researcher invited three doctoral candidates (two from the special education program, and one from the instructional systems program) to verify the advance organizer. The researcher revised the format and content of the organizer based on their feedback and comments.

3. The validity and reliability of the instrument. The researcher used SPSS to calculate the reliability of the instrument ( $r = 0.441$ ). The researcher also identified several items for revision (questions 5, 9, 18, 26, and 29) based on their discriminability value and the statistic value of alpha-if-item-deleted.

Sax argued that in education practice, reliabilities of less than .50 are acceptable even though early researchers suggested that the reliability of group scores should be no less than .50 (Sax, 1989), but considering the small sample size, the researcher decided to re-examine the revised instrument in a second pilot study. In the version two instrument, the instructor and the

researcher revised questions 5, 9, 18, 26, and 29 and moved the part II questions to the front.

### *The Second Pilot Study*

#### *Purpose*

The purpose of this study was to examine: (a) test administration logistic and (b) instrument reliability and validity.

#### *Background*

The second pilot was conducted in SPLED 400, a blended learning environment combining instructor lectures and online interactive instruction. Online instruction was delivered via a course management system named A New Global Environment for Learning (ANGEL). Students read the assigned chapters, participated in instructor-led lectures, and then worked on chapter activities. Instructional activities included readings, lectures, video simulations, online quizzes and simulation analyses, and exploration of links to related topics. However, students in this course received no treatments,

#### *Participants*

Two hundred ninety-five students voluntary participated in this study: 269 undergraduate, 25 graduate, and one non-degree student from 27 different majors. Majors ranged from earth science and the arts to special

education. The 231 females and 38 males had very limited understanding of special education.

### *The Instrument*

The final exam contained 42 questions; 30 of the 42 questions were the target items to be examined. The final exam was in three forms (A, B, and C). The test items on these forms were identical, and the only difference was the sequencing.

### *Procedures*

Procedures for administering the test were the same as for pilot study 1.

### *Results*

The long-term test (the final exam) was presented in three forms (A, B, and C). Each form contained the exactly same test items but in a different sequence. The average value of the reliability coefficient was 0.636 (0.637, 0.651 and 0.619 for forms A, B and C, respectively). This value showed that the instrument was reliable and met the accepted reliability coefficient value of an instructor-created instrument (Sax, 1989).



### *The Third Pilot Study*

#### *Purpose*

The purpose of the third pilot study was to examine: (a) the modified two-by-two factorial design proposed based on the results of the first pilot study, (b) the experiment logistic, and (c) the instrument.

#### *Background*

The SPLED 400 summer section was a blended course that was similar to the SPLED 400 spring class. Although the instructor offered students chances to meet, few students (5-8 people) attended the face-to-face class section, preferring instead to complete all instruction online. The course web site was embedded under the course management system, ANGEL, provided by Penn State. The course was divided into four parts. Each part contains three chapters. This course contained a syllabus, video simulations, chapter quizzes, online tests and related web site links. Students needed to complete chapter activities and online tests for each part within a period of time.

#### *Participants*

The participants were students who enrolled in Special Education 400, summer section 2005. A total of 102 students enrolled in this course.

### *Recruitment*

Due to the course nature, the researcher distributed an invitation letter through ANGEL course mail. In the letter, the researcher explained the purpose and procedures of the study. The researcher also invited students to give the researcher permission to analyze their part III online test grades. Students submitted their online consent form if they agreed to participate in this study. Of 102 students, 70 agreed to participate in this study, and allowed the researcher to analyze their part III online test grades.

### *Procedure*

At the beginning of the class, students were randomly assigned to one of four groups. Students read part III materials and then did the assigned online activity. To ensure that students read the activity content carefully, a password was embedded at the end of content or the feedback. Students used this password to access the part III online test.

The experimental materials were delivered to each group participant accordingly:

1. Group 1 received the advance organizer and scripted feedback. They received the advance organizer while they worked on the assignment. Once students submitted their response, they immediately received scripted

feedback.

2. Group 2 received scripted feedback only. Participants in this group received no advance organizer to assist them in analyzing the “Joe” video. After they submitted their response, they received immediately scripted feedback.

3. Group 3 received the advance organizer and individualized feedback. They received the advance organizer while working on the assignment. Once they submitted their response, they received specific and individualized feedback written by the researcher and the expert based on the rubric after a delay of approximately 48 hours.

4. Group 4 received only immediately individualized feedback. Once students in group 4 submitted their response, they received specific and individualized feedback written by the researcher and the expert based on the rubric after a delay of approximately 48 hours.

### *Data Analysis and Results*

The researcher used the average scores from the part I and II online tests as the covariate. A two-way ANCOVA was used to examine the effects of treatments on the students’ test performance. The data revealed no statistically significant differences in students’ test performance across the four

conditions (see Tables A-3 and A-4). Neither advance organizers nor feedback showed main effects on students' test scores. The researcher also used SPSS to examine the reliability of the instrument. The reliability coefficient value was 0.588.

Table A-3

*Adjusted Mean Scores of the Online Test by Controlling Midterm Scores*

	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
With the advance organizer				
Individualized feedback	76.40	2.14	72.16	80.64
Scripted Feedback	75.12	2.23	70.70	79.54
Without the advance organizer				
Individualized Feedback	79.69	2.09	75.54	83.84
Scripted Feedback	79.95	2.13	72.71	81.18

Table A-4

*ANCOVA Results for the Online Test Scores*

<b>Source</b>	<b>Type III SS</b>	<b>df</b>	<b>MS</b>	<b>F</b>	<b>Sig.</b>	<b>Partial <math>\eta^2</math></b>
Corrected Model	923.126 <sup>a</sup>	4	230.782	2.029	.097	.079
AVE	647.925	1	647.925	5.697	.019	.057
AO	161.383	1	161.383	1.419	.237	.015
FEEDBACK	99.633	1	99.633	.876	.352	.009
AO * FEEDBACK	13.324	1	13.324	.117	.733	.001
Error	10690.546	94	113.729			
Total	600185.823	99				
Corrected Total	11613.672	98				

a R Squared = .079 (Adjusted R Squared = .040)

*Modification*

The researcher determined that some students did not make efforts to perform the online activity or the online test because they did not apply to the course grade. Thus, the experiment process for the regular study in fall 2005 was modified as follows.

1. The instrument was divided into two: the short-term test and the long-term test.
2. In order to motivate students to cognitively engage in the instructional activity, the short-term test counted towards students' final grades.

3. In this study, students worked on the online assignment using their personal computer. The researcher had no control over factors that might influence students' performance in the online assignment. Therefore, in the regular study, to have better control over this experiment, the researcher decided to ask students go to an assigned lab and work on the practice.

APPENDIX B

SPLD 400 SYLLABUS

## SPLED 400

*Fall 2005***SYLLABUS**Web address:<http://cms.psu.edu>

## Course Prerequisite

Students must complete EDPSY 014 before registering for this course. SPLED 400 is considered an extension of EDPSY 014. If you have not taken EDPSY 014, you will have a great disadvantage in this course.

## Course Description

Special Education 400 is designed to introduce students to education of exceptional children in general education settings. Readings, simulations, website and online activities, and videos will guide students through a survey of issues in the education of children and youth with disabilities. Course objectives-

Students will describe and apply:

1. The legal mandates to provide appropriate education to such children;
2. The nature and impacts of disabilities;
3. Classroom management procedures that can be used to enhance the likelihood of successful inclusion of children with disabilities in general education classrooms; and
4. Effective instructional procedures that improve the academic performance of students with disabilities in general education environments.

This course is delivered through a combination of live and online activities. Students must have a valid PSU ID and access to a computer and an internet connection. All students registered for this course can obtain an account ID and password by taking your PSU student photo ID card and sign up in any Penn State Access Account Signature Station (visit <http://aset.its.psu.edu/accounts/sigstations.html> for more information). Problems with IDs should be taken to the Center for Academic Computing



(CAC- 863-0421). If you do not have a PSU account and password, you will not be able to access the website. Neither the instructor, nor the TAs will assist you with technical problems related to your web expertise. All students have access to academic computing labs on campus. It is our recommendation that you use the helpdesk in the labs when you encounter a problem. Instructions for the website activities are provided on the course website and we will address all technical problems related to the viability of the website. Please see the ANGEL Guide included in the course packet for additional information about the website and technical needs.

### Progress through the Course

Given the format, pace, and content of this course, it will be difficult to meet all of the performance criteria if you do not keep up with the course readings and assignments as they are scheduled in the syllabus. There are assignments and weekly activities that are to be completed on the website. Activity sites will remain active for limited periods of time. Once a site has been made inactive students will not be able to access it and will be unable to complete the activity. Students who participate in PSU sponsored activities (e.g., athletics, performances etc.) requiring time away from campus must provide the instructor with a schedule and an official letter from the sponsoring organization at the start of the semester. Because assignments are available far in advance of deadlines, late assignments are not accepted under any circumstances. Assignments received after the due date/time will be returned ungraded.

You may post any course related questions on bulletin boards (divided by each week). Your questions usually will be answered in 24 hours on weekdays. You are also welcome to respond to other students' postings. Each week's Bulletin Board will remain active until 2 days after the week's activities are due. Once a bulletin board has been made inactive, students will not be able to access it and will not receive any response to their postings.

### Academic Dishonesty

To be successful in this course, you must devote a significant amount of time for careful and systematic study. Unfortunately, a small number of students do not plan adequate time to prepare for class and assignments. Be assured and forewarned that cheating will not be tolerated in this course. Students should take special precautions to ensure that papers, etc. represent their own ideas

and production. Paraphrasing or sharing a conceptual base for a paper are forms of plagiarism and must be avoided. Individual papers must represent your own original work. Students must read Senate Policy 49-20 for further and more detailed information about academic integrity. The Pennsylvania State University insists on strict standards of academic honesty in all courses. Any plagiarism will be penalized severely. The following discussion has been prepared so that no student will commit plagiarism out of ignorance. (For more detailed information, please see Plagiarism section.)

#### Required Readings/Materials

Packets of class notes and CD with videos available from the GotUsed Bookstore 206 E. College Ave.

#### Course Requirements

##### 1. Two Tests:

(1) The tests are based on readings. (Test #1 covers Part 1 and 2; Test #2 covers Part 3 and 4.) All website materials are subjects for the tests.

(2) Tests will be held during scheduled class time. Tests are multiple-choice and True-False format. Please refer to the Activity Timeline for scheduled test dates.

(3) There will be more than one form for each test. Please write your test form on your answer sheet. No adjustment will be made if you do not write down the correct test form.

(4) Students who require an accommodation for a disability must make a request in writing to the instructor at least two weeks before the scheduled exam date.

(5) At his discretion, the instructor may arrange a makeup for an examination for a legitimate reason.

(6) Test grades will be posted on the course website 6 days after the test is completed. Please use your assigned three-digit student code to look for your grade which will be posted on ANGEL. The student code will be sent to you

within the first 3 weeks of the semester. After the test grade is posted, you will have one week to schedule an appointment with the TA to review your tests. Grades will be final after one week.

## 2. Website Activities:

(1) Students must complete all weekly website activities. Please refer to the Activity Log Checklist and Activity Timeline for the activities and the deadlines.

(2) Many of your online submissions will not be graded; however, you will receive grades from multiple-choice type website activities, but the grades will not count toward the final grade. Failure to complete and submit any activity will result in the loss of one point from your final grade for each missing activity.

(3) The website activities are divided into four parts: Syllabus and Part 1, Part 2, Part 3, and Part 4.

(4) Once a website activity is submitted, students are required to check "My Online Grade Report" (under Tools tab) to check whether the submission is completed. If the submission does not appear within five minutes after submission, it could mean that the submission is not successful and students should redo the activity before the deadline. Failure to check "My Online Grade Report" may cause incomplete submission and losing points for not completing the activity. Please check "How To" folder if you have questions regarding how to use "My Online Grade Report" function.

(5) You will be asked to schedule a lab session in the beginning of the semester, and do the part 3 review activities in the appointed lab. Before you work on these activities, you should read part 3 package materials, and notes that you take in class.

## 3. One individual assignment (Part 1 or Part 2 Assignments):

(1) If your last name begins with A through M, you must do the Part 1 assignment. Assignments must be conducted through a Microsoft Word Document. No alternative software will be accepted. Please submit your assignment through the Part 1 Assignment Drop Box.

(2) If your last name begins with N through Z, you must do the Part 2 assignment. Assignments must be conducted through a Microsoft Word Document. No alternative software will be accepted. Please submit your assignment through the Part 2 Assignment Drop Box.

(3) You must check your drop box after you submit the assignment. If your submission is successful, you can view your file as it will appear in the drop box. Failing to check your drop box might result in unsuccessful or late submission at your own risk.

(4) Incorrect assignment submissions will not be graded.

(5) If an assignment is submitted late but within one day, one letter grade will be deducted. If an assignment is submitted more than one day late, the assignment grade will be zero.

(6) Assignment grades will be posted through the drop box within two weeks after the due date.

#### 4. One team simulation assignment (Part 3 or Part 4 assignment):

(1) Teams of two students each will be formed at the beginning of the semester. One of your group members must email the TA and place your request for your team. When you request a team, please include your members' full names and PSU emails. Please refer to the Activity Timeline for team request deadline. If you do not make a request, the TA will assign/adjust your team.

(2) Each team will be assigned a number which will be posted within one week after the request deadline. If your team number is odd, your team will do the Part 3 Team Assignment. If your team number is even, your team will do the Part 4 Team Assignment.

(3) Assignments must be conducted through Microsoft Word Document. No alternative software will be accepted. One assignment will be submitted per group through the Drop Box.

(4) If an assignment is submitted late within one day, one letter grade will be deducted. If an assignment is submitted more than one day late, the

assignment grade will be zero.

(5) Assignment grades will be posted through the drop box within one week after the due date. You must contact the member who is in charge of submission in order to access the grade.

(6) If your team has any communication problems (e.g., a student drops the course, no participation, you have trouble contacting your members....), you must report this problem no later than 2 weeks before the assignment is due. No adjustment will be made for late reporting. If you report the problem to TA before deadline, he/ she will check to see if the student has dropped the course. If the student has not dropped, the TA will instruct the missing team member to contact you within 24 hours. If the missing student does not contact you, you should continue with the assignment and you should inform the course instructor that the missing student did not respond. Even if a problem is reported by the deadline, extension for assignment submission may still not be granted. Missing or late submissions may have a penalty. We highly recommend you contact your team members immediately after the teams are posted.

Total course points- 200

Final grades will be based on points. Except for 4 bonus points on exams, this course will not offer extra credit. Please do NOT send any message requesting grade adjustment, extra activities to get a better grade, or extra credits. These messages will not receive a response.

Tests – Test 1: 30 pts, Test 2: 50 pts.

Individual Assignment- 40 pts.

Team Simulation Assignment- 80 pts.

A = 190-200

A- = 180-189

B+ = 173-179

B = 168-172

B- = 160-167

C+ = 153-159

C = 140-152

D = 120-139

F = Below 120

APPENDIX C

STUDENT MAJORS

## Student Majors

Education-related major	Non-education-related major
1. ED Education	11. KINES Kinesiology
2. EK ED Elementary and Kindergarten Education	12. CSD Communication Sciences and Disorders
3. WL ED World Languages Education	13. AAART Arts and Architecture
4. WF ED Workforce Education and Development	14. REHAB Rehabilitation Services
5. CN ED Counselor Education	15. HD FS Human Development And Family Studies
6. SECED Secondary education	16. SPNBS Spanish Business Option
7. MU ED Music education	17. ART BA ART BA degree
8. A ED Art Education	18. H HD Health and Human Development
9. CI curriculum and instruction	19. RPM Recreation, Park, and Tourism Management
10. AEE Agricultural & Extension Education	20. AAMUS ARTS AND ARCHITECTURE (program)
	21. SOCBA SOCIOLOGY
	22. EARTH Earth
	23. TELCM Telecommunications
	24. VARTS Visual Art (Art Education)
	25. ARBFA ART (B. F. A degree)
	26. ENGL English
	27. LSCPE Landscape Contracting
	28. NDEGC Non degree
	29. AD PR Advertising-Public Relations
	30. E R M Environmental Resource Management
	31. MTHBS Mathematics
	32. PHYS Physics
	33. PL SC Political Science
	34. HIST History
	35. MUSBM Music *College of Arts and Architecture
	36 FRBA French

APPENDIX D

“JOE” VIDEO TRANSCRIPTION



## "Joe" Video Transcription

(A teacher seated behind a desk)

Instructor: Ok. Now let's see. We are supposed to read chapter...on these page from twenty-eight to forty five. It's talking about the time when the colony is together and try to organize to take some kind of action...so everybody open up to page twenty-eight.

Students open book up to page twenty-eight, but Joe does not. He is making funny faces.

Instructor: I think something you should know about that what we are trying to do...that...may make you think a little bite before we can come up some answers. There are some questions that we gonna talk about today, and so um...I was trying to think of how I can make you think what I am thinking. That's very important for you to know about this lesson. So um... can anybody think of one thing that all colony's had at one time?

(Students are quiet and silent).

Instructor: Come on...look around the room, may be you can find out what I am thinking about.

(Students keep quiet and silent).

Instructor: They all had one thing...

(Meanwhile Joe is making his face. Some students see what Joe is doing and laugh at him).

Instructor: Can anybody take any chance and guess?

(Joe is continuing making face. Students seat around Joe are laughing).

Instructor: All right. I'll tell you what I'll do...

(Meanwhile, Joe is continuing making funny face)

Instructor: It's hard to ignore you.

(Some students are laughing. Instructor stared at Joe, and more and more students notice Joe and laugh).

Instructor: Um... that the... Do you know the answer, Joe? What I am trying to find out?

Joe: What? (Smiling)

(At the same time, whole class laughs).

Instructor: What!

(Whole class laughs louder).

Instructor: I suppose you don't know what I am saying ha? All right, come on, let's have more...because we'll have... some body will take over the classroom...Joe, do you know what page suppose to be on? (Joe is smiling)

Joe: No.

(Students laugh loud, and Joe keeps making funny face).

Instructor: Ok. Mike, could you tell him what page suppose to be on? Please, tell him...um...the page, please.

Mike: Twenty-eight.

Instructor: Thank you...um. Do you know which page to turn on? (Instructor looks at Joe, while students laugh).

Joe: Oh, you mean turn it on! (Joe smiles, and pretends that he is surprised that he has to turn page on to twenty-eight)

Instructor: Yes. Turn to page TWO. EIGHT.

Joe smiles. He open the book and turn onto page twenty-eight.

END

APPENDIX E

“AMY” VIDEO TRANSCRIPTION

### “Amy” Video Transcription

The video depicts a classroom, students seat in rows, and are working on their individual work. An instructor is walking around the classroom, and checking the progress of individual students. Instructor moves toward a student, and checking her progress

Instructor: Ok, how are we doing here? Do you need some help? I thought you start to write over here..

(Meanwhile, Amy leaves her seat and standing next to the instructor).

Amy: I can't do this. I don't know how to do it

Instructor: Excuse me. (The instructor pushes Amy away) Can you start on your own? Ok? (then the instructor returns back to the student)

Amy: You never help me

The instructor looks at Amy, put her hands on Amy's shoulder and says:

“Come on, I do so, come on...”

Amy starts drag the instructor's arm and clothes and keeps yelling: “You never, never help me. You never helping me

Instructor: (looks at the student) Wait a minute...I'll be right back.

The instructor takes Amy back to her seat and says: “Amy... Amy come one...you can read it on, you done it before, right? All by yourself, go ahead. Ok.”

The instructor leaves Amy. Amy leaves her seat again and follows the instructor.

The instructor goes to another student who calls for her help.

Instructor: Sure, let me help you.

Amy: You...you always help everybody else, you never help ME. I can't do it. You gotta help me, I don't' know how to do it.

(Instructor ignores Amy).

Amy screams: Can't do it (Amy is striking a the desk, and stomping)

(The instructor stares at Amy for seconds, then she goes back to the student).

Amy: You gotta help me, you never help me

Instructor looks at Amy and says: seat down... seat down.

The instructor goes back to the student.

Amy: You never help me though...You are always helping them

(The instructor stares at Amy).

Amy drags the instructor's arm, and says: “I don't know how to do it!”

Instructor: Amy...

(The instructor is dragged by Amy back to her seat).

END

APPENDIX F  
THE ONLINE SIMULATION ASSIGNMENT

## APPENDIX F-1. The Simulation Assignment without the Advance Organizer

Instruction.

This activity requires you to view the video and then analyze it.

1. Recall what you have learned from Chapter Five, Six, Seven, and Eight.
2. View the video (you can replay it if necessary).
3. Analyze the video case.

After you submit your answer, you will receive IMMEDIATE SCRIPTED FEEDBACK of what a correct response should be. Please compare your response to the feedback, and find out what needs to be improved in your response.

NOTE: This activity will not be graded. However, the online test covers this activity content

Turn on your speaker and click the "play" button to view the video.



View the video clip of Joe and then use what you learned in the class (such as ABC analysis) to analyze the problems displayed and to improve the classroom and behavior management in the class. In other words, what are the problems in the class and if you were the instructor, what would you do to handle the situation?

Submit

Save Answers

## APPENDIX F-2. The Simulation Assignment with the Advance Organizer

### **Instruction**

This activity requires you to view the video and then analyze it.

1. Read the concept map carefully. This holistic part 3 overview can refresh your memory, and help you understand part 3 content better.
2. Recall what you have learned from Chapter Five, Six, Seven and Eight.
3. Watch the video. You can replay it if necessary.
4. Analyze the case by using the structure provided.

After you submit your answer, you will receive IMMEDIATE SCRIPTED FEEDBACK of what a correct response should be. Please compare your response to the feedback, and find out what needs to be improved in your response.

NOTE: This activity will not be graded. However, the online test covers this activity content.

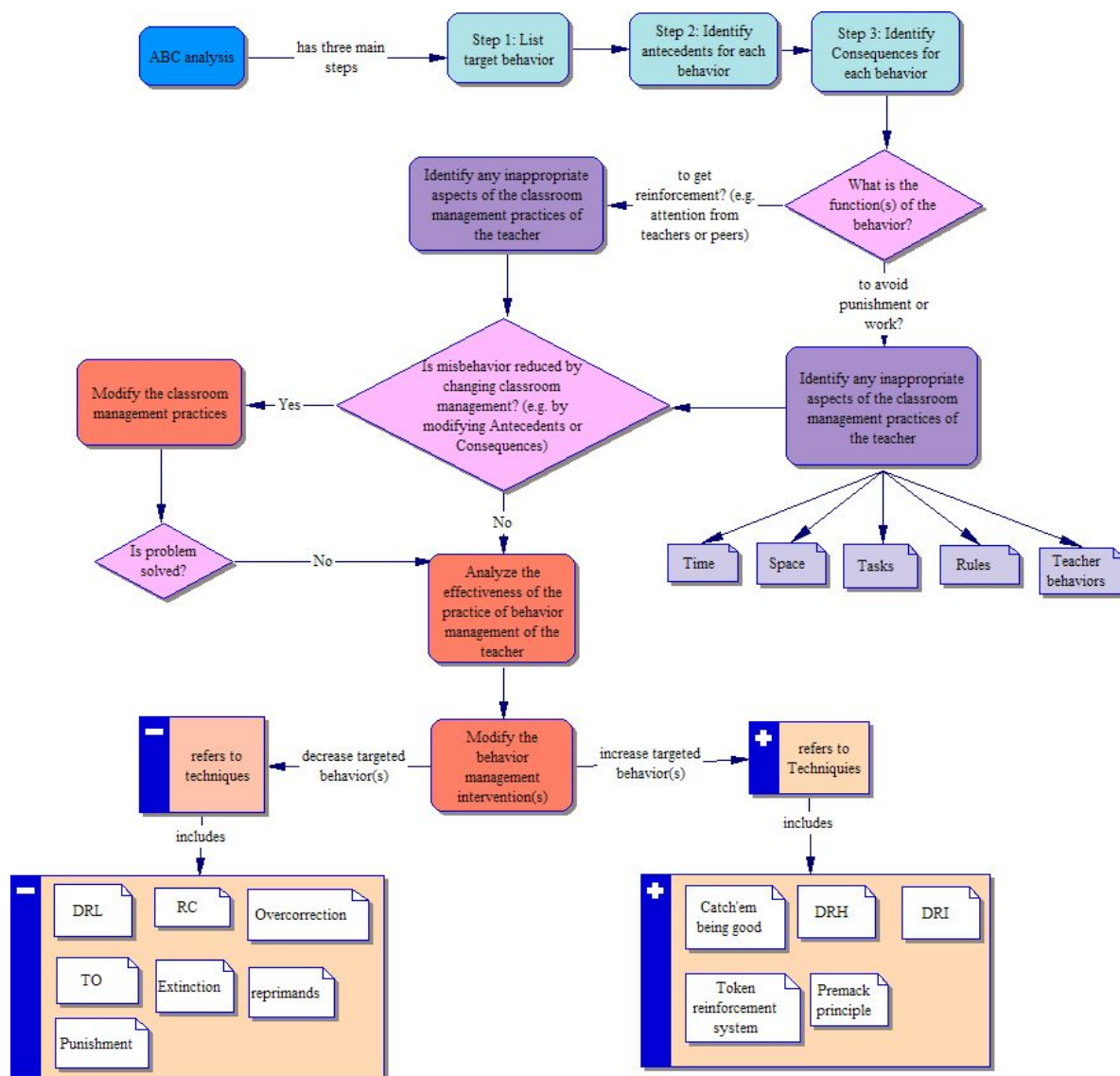


### **Overview**

Human's behaviors are influenced by the environment (antecedents and consequences). When facing challenging behaviors generated by students, a teacher should first conduct an ABC analysis to identify the function of the behavior. With the ABC analysis complete, the teacher can then analyze the effectiveness of his/ her classroom management and behavior



management practice, and make appropriate changes. The procedures are as following:



**First: Conduct an ABC analysis**

1. Please analyze Joe's behavior.

For example:

A-- Teacher states, "OK, we were talking about when the colonies first started to get it together." Tells students to open to page 28.

B-- Joe dances in his seat, does not open book, makes funny faces.

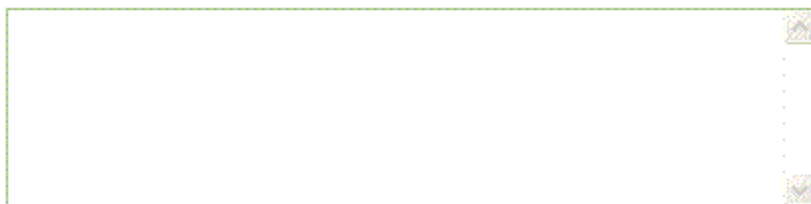
C-- Student next to Joe looks at Joe, smiles, teacher continues to talk about colonies.

... Continue the ABC analysis process.

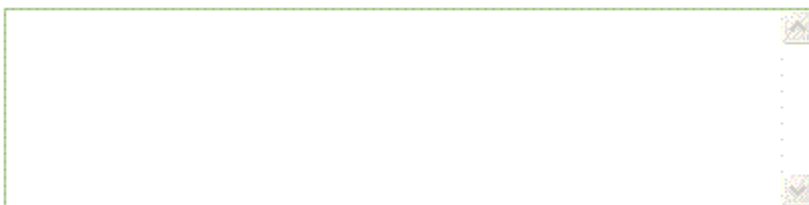
**Hints**

1. An ABC analysis is used to identify the behaviors of a target student and the functions of the behaviors.
2. Behaviors--What are Joe's behaviors?
3. Antecedents--What happens before each of Joe's behaviors?
4. Consequences--What happens after each of Joe's behaviors?

Please write down your ABC analysis below:

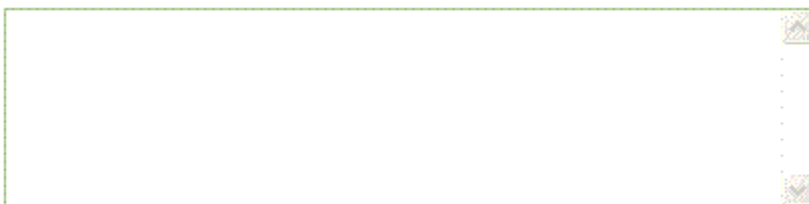


2. At the conclusion, review the antecedents and consequences to determine the function of Joe's behavior. In other words, what does Joe get from his behavior (reinforcement or avoiding punishment)?

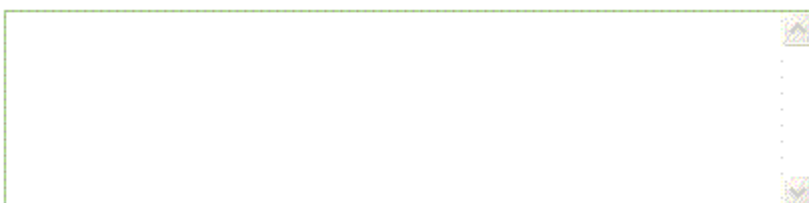


**Second. Analyze the classroom management practices of the teacher.**

3. Time: Does the teacher use time effectively? (Consider transitions, noninstructional time, pacing, task sequencing). What errors does the teacher make?

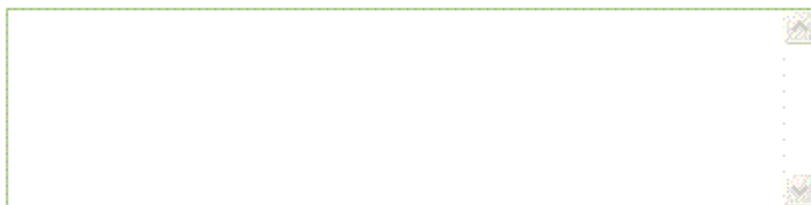


4. Space: Does the teacher use space effectively? (Consider seating arrangements, density, proximity and line of sight.) What errors does the teacher make?

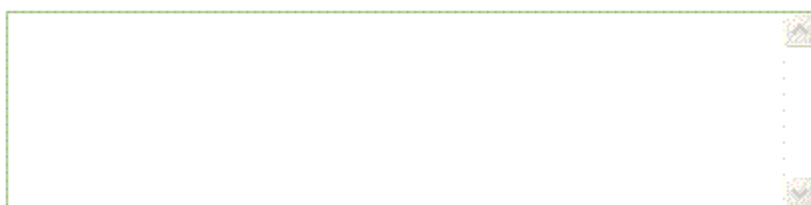


5. Tasks: Does the teacher have well structured, and appropriate sequenced tasks? (Consider prerequisites to task, difficulty of task, organization of task).

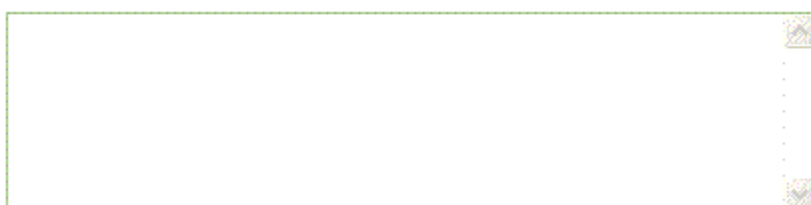
What errors does the teacher make?



6. Rules: Does the teacher use classroom rules effectively? (Consider teacher communication of rules and consequences of rule infractions). What errors does the teacher make?

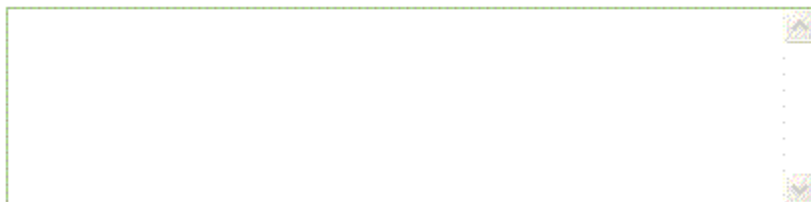


7. Teacher behaviors: Does the teacher respond to Joe appropriately? (What behaviors does the teacher exhibit that enhance or impede learning and desirable behavior? How should the teacher redesign the classroom management practices to be more effective?) What errors does the teacher make? What changes should the teacher make to better manage the class?

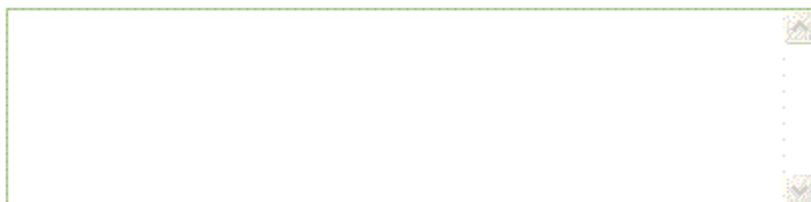


**Third. Analyze the specific behavior management practices of the teacher with respect to his interactions with Joe.**

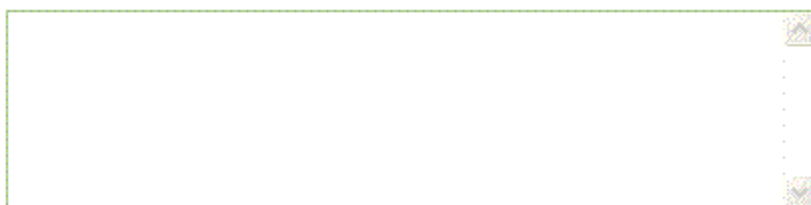
8. How effectively does the teacher use consequences to manage Joe's behavior?

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9. Evaluate the teacher's use of reprimands, reinforcement, and punishment in response to Joe's behavior.

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10. What specific individual behavior management intervention could the teacher use to improve Joe's behavior? (Consider DRH, DRI, DRL, TO, RC, etc)

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Please note.

You will receive IMMEDIATE scripted feedback right after you submit your response. Please NOTE, after you click the submit button, You will first see the overview, concept map and questions, then follows the immediate scripted

feedback, and your response. Please then follow the instruction on how to read the feedback for each question

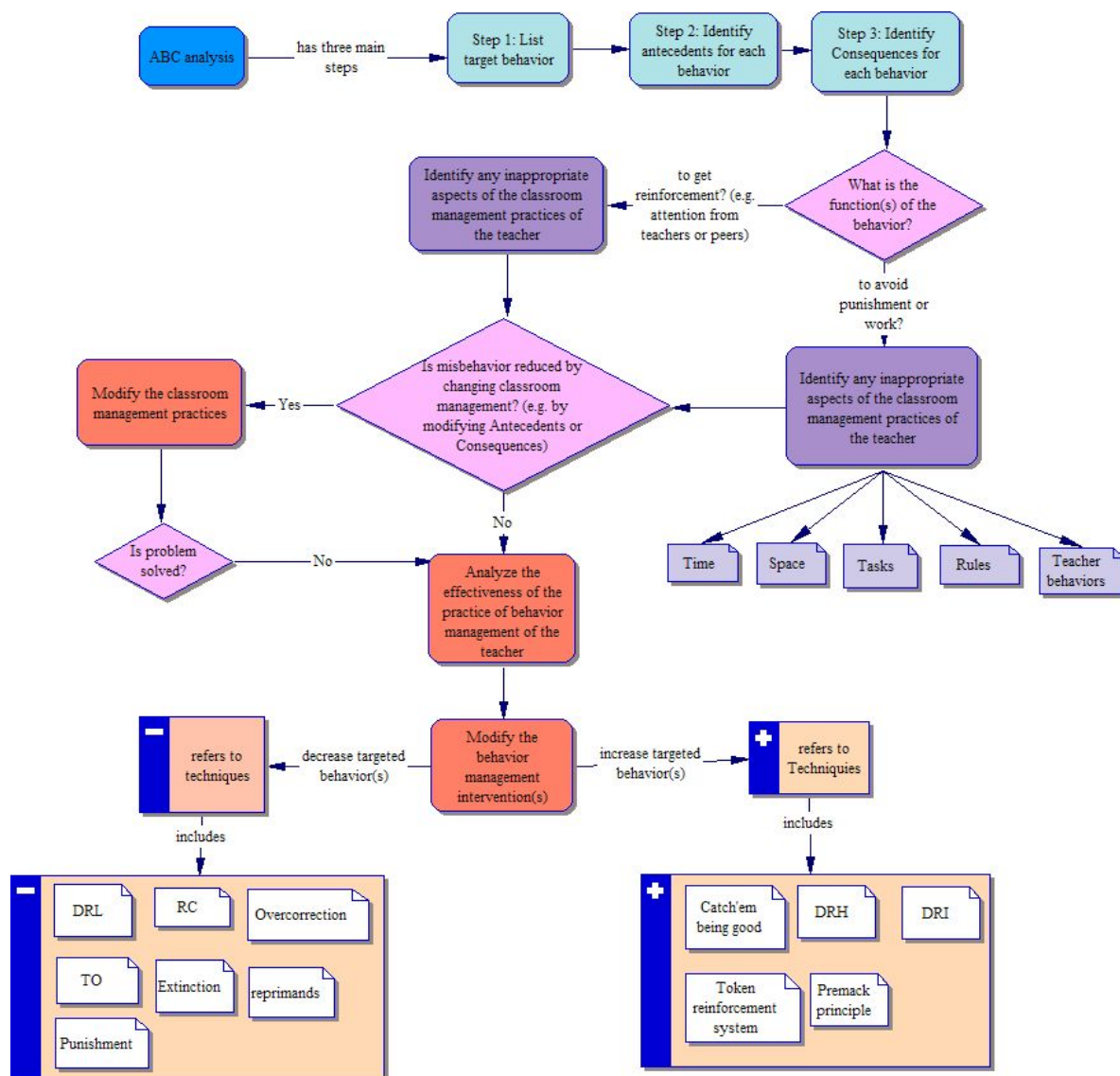
APPENDIX G

THE SCRIPTED FEEDBACK FOR THE SIMULATION ASSIGNMENT

**Overview**

Human behaviors are influenced by the environment (antecedents and consequences). When facing challenging behaviors generated by students, a teacher should first conduct an ABC analysis to identify the function of the behavior. With the ABC analysis complete, the teacher can then analyze the effectiveness of his/her classroom management and behavior management practice, and make appropriate changes. The procedures are as following:





## First: Conduct an ABC analysis

1. Please analyze Joe's behavior.

For example:

A-- Teacher states, "OK, we were talking about when the colonies first started to get it together." Tells students to open to page 28.

B-- Joe dances in his seat, does not open book, makes funny faces.

C-- Student next to Joe looks at Joe, smiles, teacher continues to talk about colonies.

... Continue the ABC analysis process.

#### Hints

1. An ABC analysis is used to identify the behaviors of a target student and the functions of the behaviors.
2. Behaviors--What are Joe's behaviors?
3. Antecedents--What happens before each of Joe's behaviors?
4. Consequences--What happens after each of Joe's behaviors?

Answer:

1. A-Teacher states, "ok, we were talking about when the colonies first started to get it together." Tells students to open to page 28.

2. B-Joe dances in his seat, does not open his book, makes funny faces.

3. C. Student next to Joe looks at Joe, smiles, teacher continues to talk about colonies.

1. A-Teacher states, "ok, we were talking about when the colonies first started to get it together." Tells students to open to page 28. 2. B-Joe dances in his seat, does not open his book, makes funny faces. 3. C. Student next to Joe looks at Joe, smiles, teacher continues to talk about colonies.

A. Teacher asks students to think one thing that all colonies had at one time. B.

Joe continuing making funny faces. C. Teacher continuing asks the same question, and ask students look around and guess. Most of the students notice Joe, and laugh. A. Teacher said: "I'll tell you what I'll do..." then he looks toward Joe. The teacher stares at Joe and states "It's hard to ignore you"

B. Joe smiles.

C. Whole class notice Joe and laugh loudly.

A. The teacher asks Joe whether he knows the answer

B. Joe said: what?

C. Students laugh louder

A. Teacher asked Joe what page he is supposed to be on.

B. Joe said no, and kept making funny faces.

C. Students laugh

A. Teacher ask a student to tell Joe which page to be on. The student says "28."

B. Joe was smiling but didn't open his book.

A. Teacher ask Joe which page to turn on. Then told him to turn on page two-eight.

B. Joe pretends that he is surprised that he has to turn on page 28, and then

he turns to page 28.

C. Students laugh

2. At the conclusion, review the antecedents and consequences to determine the function of Joe's behavior. In other words, what does Joe get from his behavior (reinforcement or avoiding punishment)?

Answer: When Joe makes funny faces, he receives reinforcing attention from peers, and the teacher. When Joe fools the teacher (says "what", etc), he receives reinforcing attention from peers.

**Second. Analyze the classroom management practices of the teacher.**

3. Time: Does the teacher use time effectively? (Consider transitions, noninstructional time, pacing, task sequencing). What errors does the teacher make?

Answer: The teacher uses too much time in task transition. --He is not prepared to begin.

4. Space: Does the teacher use space effectively? (Consider seating arrangements, density, proximity and line of sight.) What errors does the teacher make?

Answer: The teacher didn't use proximity control at well--He stays behind his desk even when Joe first begins to act out. He should walk close to Joe. Joe is seated in back of the class--He should be in front.

5. Tasks: Does the teacher have well structured, and appropriate sequenced tasks? (Consider prerequisites to task, difficulty of task, organization of task).

What errors does the teacher make?

Answer: The instruction is not explicit. Especially, students seems don't have prerequisite knowledge (about one thing that all colonies had) but he still asked students to answer/ guess.

6. Rules: Does the teacher use classroom rules effectively? (Consider teacher communication of rules and consequences of rule infractions). What errors does the teacher make?

Answer: Teacher should have students know that they have to follow the teacher's instruction. He also should state the consequences for the misbehaviors.

7. Teacher behaviors: Does the teacher respond to Joe appropriately? (What behaviors does the teacher exhibit that enhance or impede learning and desirable behavior? How should the teacher redesign the classroom management practices to be more effective?) What errors does the teacher make? What changes should the teacher make to better manage the class?

Answer: In the beginning, the teacher didn't stop Joe making funny faces, and

ask him open book, instead, he initially ignored Joe's aversive behavior. He also asked students to look around which made whole class notice Joe. In the end, Joe even didn't get any consequences for his misbehavior, Moreover, this event tells whole class that it is OK not to follow the teacher's instruction. Joe is reinforced by both teacher attention and peer attention.

**Third. Analyze the specific behavior management practices of the teacher with respect to his interactions with Joe.**

8. How effectively does the teacher use consequences to manage Joe's behavior?

Answer: The teacher didn't use any behavior management technology in respond to Joe's behavior. He engages in argument and sarcasm.

9. Evaluate the teacher's use of reprimands, reinforcement, and punishment in response to Joe's behavior.

Answer: The teacher didn't use any techniques (reprimand, reinforcement, and punishment) in response to Joe's behavior; instead he engaged in sarcasm.

10. What specific individual behavior management intervention could the teacher use to improve Joe's behavior? (Consider DRH, DRI, DRL, TO, RC, etc)

Answer: If carefully managing the classroom still cannot prevent Joe's behavior from occurring, the teacher should use behavior management technology to reduce Joe's misbehavior. For example, the teacher can use DRH technology to increase Joe's behavior (following the instruction), that is, when Joe follows the instruction, he receives teacher's praise. Also, he and the teacher agree that if he follows the instruction at a rate 80% of baseline each day for one week, he earns a reinforcement of his choice.

APPENDIX H  
THE INSTRUMENT



### Appendix H-1 Short-Term Posttest

Instruction: Please select ONE best answer from the suggested options for each question.

1. A teacher plans her math lesson so the first 30 minutes are spent on solving algebraic equations at the black board. The class ends with a 10 minute computer game involving using algebra to find a treasure. This is the use of
  - A. instructional transition time
  - B. proximity control
  - C. Grandma's Law
  - D. Task selection
  
2. Joe is often off-task and makes funny faces in the classroom. The other students laugh when Joe makes faces. His teacher should
  - A. ignore him, then his misbehavior will be extinguished
  - B. develop a response cost plan for him
  - C. ask other students to look at Joe, and tell students that this behavior is inappropriate in his classroom
  - D. have Joe sit as far away from everyone as possible
  
3. Kim usually doodles and resists work when her teacher assigns her tasks. Her teacher always requests her to do her work in sarcastic tones. Kim never completes her assignments but her teacher usually leaves her alone as long as she is not disruptive. Kim's behavior may serve the function of
  - A. escaping from undesirable tasks.
  - B. escaping from feeling she is useless because she may lack the skills to do her assignment.
  - C. getting her teacher off-task.
  - D. gaining her peers' attention.

4. Put the following activities in sequence for effective management of disruptive behaviors. (a). identify the behavior patterns (b). develop an individual behavioral management plan (c). define the target behaviors (d). identify the function of the behavior (e). analyze and change classroom management practices. The procedures a teacher should follow are:
- A. c, b, a, d and e.
  - B. d, c, a, b, and e.
  - C. d, c, a, e, and b.
  - D. c, a, d, e, and b.
5. A teacher who has a high rate of undesirable behaviors in his/her class should first
- A. analyze how the classroom is organized
  - B. Increase punishment significantly
  - C. Introduce a positive reinforcement system
  - D. Introduce self- management systems
6. Gretchen will work hard to get an A in SPLED 400 because she likes to get "A"s; Tammy will work hard only if her parents buy her a new car. Thus, Tammy and Gretchen have different
- A. generalized reinforcers
  - B. primary reinforcers
  - C. secondary reinforcers.
  - D. levels of intelligence
7. Jay doodles in class. We decide to reinforce Jay whenever he is actively taking notes. This is the use of
- A. DRH
  - B. DRI
  - C. Token economy
  - D. self-management system

8. For the past year Abner has "run up" a long distance telephone bill of at least \$150 per month. Abner's parents are going broke paying his bills so they offer him a deal. If he keeps his bill under \$50, they will put \$50 in his new car fund. Abner's parents have used

- A. DRL
- B. DRH
- C. DRO
- D. response cost

9. Norma bullies other students on the playground almost constantly. If we took away a token every time Norma bullies we would be using

- A. DRL
- B. DRI
- C. Negative reinforcement
- D. Response Cost

10. Evan misbehaves in social studies nearly every day. He is sent to the principal's office where he is reprimanded and then placed in a timeout room where he usually falls asleep. His chronic misbehavior is probably

- \_\_\_\_\_.
- A. due to a physical abnormality.
  - B. a way of escaping class work
  - C. an expression of his distrust of teachers
  - D. an expression of boredom

## Appendix H-2 Long-term Test

Instruction. There are two parts, totally thirty one test items, in the test. Please select ONE best answer from the suggested options for each question. Please go over the Part I test items, and then you will be asked to watch a video “Amy”. You have to answer Part I questions based on the video. After you complete Part I, you can move on to the Part II.

### Part I: Video “Amy”

1. Which of the following was the first inappropriate action on the part of the teacher?
  - A. The teacher stared at Amy.
  - B. The teacher did not use proximity control.
  - C. The teacher did not inform Amy about the rule to remain in her seat.
  - D. The teacher reprimanded Amy.
  
2. Amy’s teacher first ignored Amy’s demands, in the end she told Amy to go to her seat, but then allowed Amy to drag her to her seat. Which of the following best describes the teacher’s actions?
  - A. Amy’s teacher used extinction incorrectly
  - B. Amy’s teacher used DRH incorrectly
  - C. Amy’s teacher use negative reinforcement incorrectly
  - D. Amy’s teacher use fading incorrectly
  
3. Even though Amy’s teacher looked at her and said “Amy”, Amy’s misbehavior still continued. This is because
  - A. Other reinforcers competed with the teacher’s attention.
  - B. The reprimand was not specific.
  - C. The misbehavior was reinforced by peer attention
  - D. The reinforcement schedule was intermittent.
  
4. What is the most likely function of Amy’s behavior?
  - A. Amy loudly demanded help because she would like to draw her peers’ attention.
  - B. Amy loudly demanded help because she would like to avoid doing the task
  - C. Amy loudly demanded help because she would like to negatively reinforce her teacher.
  - D. Amy loudly demanded help because she would like to draw the teacher’s

attention.

5. Which of the following is the most likely reason for Amy's increasingly loud and demanding behavior?

- A. The teacher didn't use extinction correctly
- B. The teacher didn't use positive reinforcement correctly
- C. The teacher didn't use DRH correctly
- D. The teacher didn't use Time Out correctly

6. Amy dragged her teacher by her sleeves, screamed "you gotta help me, I don't know how to do it" and hits the desk. This is an example of

- A. A change in topography of behavior
- B. A change in the activity level
- C. A change in the intensity of the behavior
- D. A change in the duration of the behavior

7. If Amy's teacher was considering a change in her initial response to Amy's outbursts, which of the following would be the best approach

- A. Give Amy the assistance she wants whenever she asks for it.
- B. Remind Amy at the beginning of class that she must remain in her seat and she will get assistance at a specified time.
- C. Tell Amy that screaming is not appropriate in the class and if she screams, she will be sent to the principal's office.
- D. Tell Amy that her recess break will be cancelled if she leaves her seat again.

8. If you were the teacher, and decide to use DRI, which of following procedures would you use?

- A. Take Amy back to her seat as soon as she gets out of her seat
- B. Reinforce Amy with a token every time she completes a specified part of an assignment
- C. Tell Amy if she doesn't get up again, she can earn points toward reinforcement
- D. Tell Amy to wait her turn and sit silently at her desk.

9. Amy's teacher tells Amy: "If you don't come back to your seat and work on your assignment within 5 seconds, you will go to the Principal's office and miss your recess". Amy's misbehavior decreases. This is an example of \_\_\_\_\_.

- A. Negative reinforcement
- B. Positive reinforcement
- C. Punishment
- D. DRI

10. Amy is given ten pennies in a cup at the beginning of class. Every time she gets out of her seat, her teacher takes one penny from the cup. Amy gets to keep whatever pennies are left at the end of class. This is the use of \_\_\_\_\_

- A. Response Cost
- B. DRI
- C. DRA
- D. DRH

11. Amy's teacher tells Amy: "Amy, start your work on your own. When you complete it, you can play with your favorite Lego." The teacher is using:

- A. DRI
- B. Overcorrection
- C. Intermittent reinforcer scheduling
- D. the Premack principle

12. On the Tuesday after the episode in the video, Amy's teacher notices that Amy started her work on her own. Amy's teacher should:

- A. Ignore all her behaviors in order to use extinction consistently.
- B. Praise Amy and respond immediately to Amy's later demands.
- C. Analyze why Amy did the work on her own this day
- D. Praise Amy right away, and say: "Great job, Amy!"

13. Amy's teacher would like to change Amy's inappropriate behavior, she kept an ABC analysis of Amy's behavior. Which of the following is a correct statement of one of the steps in the analysis?

- A. B- The teacher attempted to ignore Amy.
- B. A- Amy grabbed the teacher's arm.
- C. B- Amy got out of her seat.
- D. C- Amy didn't like the work she was assigned.

14. Which of the following best describes an antecedent of Amy's problem behavior?

- A. Amy yelled at her teacher.
- B. The teacher walked around the room checking how students were doing.
- C. Amy dragged her teacher's clothes, and demanded help.
- D. The students in the class laugh at Amy.

15. Amy's teacher conducted an ABC analysis and found that Amy's assertive demands for help resulted in attention. Whenever Amy engages in this behavior, the teacher sends her to the back of the class to sit in a study carrel. Which technique is she using?

- A. Extinction.
- B. Time out.
- C. Punishment.
- D. Premack principle.

16. Amy loudly demands that the teacher help her. She follows the teacher around the room and continues to demand help. The teacher ignores her initially and finally tells her to return to her seat. This is likely to result in

- 
- A. louder, more frequent and more severe demands.
  - B. initial increases followed by decreases.
  - C. no change.
  - D. a sudden decrease in demands.

## Part II

17. Evan misbehaves in social studies nearly every day. He is sent to the principal's office where he is reprimanded and then placed in a timeout room where he usually falls asleep. His chronic misbehavior is probably \_\_\_\_\_

- A. due to a physical abnormality.
- B. a way of escaping class work.
- C. an expression of his distrust of teachers.
- D. an expression of boredom.

18. When Tony's teacher asks a question, Tony usually raises his hand even though he doesn't know the answers. The teacher should \_\_\_\_\_
- A. keep asking Tony to respond to questions therefore Tony will continue to participate in the classroom activities.
  - B. tell Tony that these questions are easy. He should be able to answer them, and ask Tony to try again.
  - C. give Tony cues before questions are asked so he is prepared to answer.
  - D. ignore Tony whenever he raises his hand.
19. Cassie completes less than 50% of her class work each day. Which of the following procedures would be most appropriate to increase her work rate?
- A. DRO
  - B. DRI
  - C. DRL
  - D. DRH
20. Monique has a nice little trust fund, but her parents have agreed to provide her with \$900 per month for college (books, tuition, meals etc.). They have also told her that they will remove \$2 from her trust fund for every \$1 over \$900 she spends. Monique's parents are using a form of \_\_\_\_\_.
- A. DRL
  - B. DRI
  - C. Response Cost
  - D. DRH
21. Sarah trips Cindy on the playground. Cindy falls and breaks her pencil. If the teacher decides to use overcorrection, the first step would be \_\_\_\_\_.
- A. Sarah must sit by herself to think about her actions.
  - B. Sarah must give Cindy one of her pencils
  - C. Sarah must do something positive for Cindy
  - D. Sarah must give up some reinforcement she has received.
22. A teacher plans her day so the morning is spent on solving reading, math, writing and social studies at the black board. If everyone in the class finishes the morning work, the entire class gets to pick the afternoon activity. This is the use of
- A. The Premack principle



- B. instructional transition time.
- C. proximity control.
- D. Task analysis.

23. Josh often has problems staying on task during story time. Which of the following seating arrangements would be best to help Josh attend to the story?

- A. Put Josh as far from other students as possible.
- B. Arrange students in a semicircle in front of the teacher with Josh in the center
- C. Put Josh behind the other students so he won't be distracted
- D. Seat all of the students at tables with 4 students per table.

24. Joe sits in the back of the room and makes sarcastic comments under his breath when the teacher is speaking. His teacher should \_\_\_\_\_

- A. ignore him, then his misbehavior will be extinguished
- B. move him to the front of the room
- C. ask other students to look at Joe, and tell students that this behavior is inappropriate in his classroom.
- D. have Joe sit as far away from everyone as possible.

25. Kim usually doodles and resists work when her teacher assigns her tasks. Kim never completes her assignments but her teacher usually leaves her alone as long as she is not disruptive. Kim is receiving

- A. negative reinforcement
- B. Type I punishment
- C. timeout
- D. positive reinforcement

26. Put the following activities in sequence for effective management of disruptive behaviors. (a). identify the behavior patterns (b). develop an individual behavioral management plan (c). define the target behaviors (d). identify the function of the behavior (e). analyze and change classroom management practices. The procedures a teacher should follow are:

- A. c, b, a, d and e
- B. d, c, a, b, and e
- C. d, c, a, e, and b
- D. c, a, d, e, and b

27. Gretchen will work hard to get an A in SPLED 400 because her dad has promised her a credit card (which he will pay) if she receives an A; Tammy, on the other hand, will get \$1000 from her rich uncle for an A. Both Tammy and Gretchen may earn

- A. generalized reinforcers.
- B. primary reinforcers.
- C. interim reinforcers.
- D. None of the above.

28. Jay doodles in class. If we decided to use DRL with Jay we could reinforce Jay whenever he reduces the amount of time he spends doodling.

- A. True
- B. False

29. For the past year Abner has “run up” a long distance telephone bill of at least \$150 per month. Abner’s parents are going broke paying his bills so they tell him that he must reduce the bill to \$50 per month, or they will take the money out of his trust fund. This is an example of

- A. DRL
- B. DRH
- C. DRO
- D. response cost

30. Norma bullies other students on the playground almost constantly. If we took away a token every time Norma bullies we would be using response cost.

- A. True
- B. False

31. Mrs Jones is beginning to teach long division to her third grade students. The first step she should undertake is to

- A. introduce word problems so the students can see the applications
- B. separate the high achievers and low achievers into two groups
- C. review subtraction and multiplication
- D. give a pretest

APPENDIX I

SIMULATION ASSIGNMENT ADMINISTRATION PROTOCOL

### **Lab Activity Script for Lab Administrators**

Arrive in the lab 30 minutes before the lab activity begins. You have to do the following things:

1. Put the door cover page on the lab door.
2. Set up the equipment: projector, the white screen, etc.
3. Open the PowerPoint "procedure"
4. Put the student sign in sheet on a table/ + pens + headphones
5. Put the group section dividers in an appropriate area.

After students enter the lab, ask students to sign in (See sign in form), and instruct them to sit in the according section.

**WHEN:** After most students sit down, give the instruction below:

**WHAT TO SAY:**

Hi students, thank you for coming. I am XXX, the assistant for the section #. Before the activity begins, I will first pass the consent forms to you and explain the activity, and this study.

[Note: Pass the consent form to students, TWO copies for each student, and explain the consent form...]

**Explanation**

For the PART III lab activity, you are assigned to one of four groups with different instructional activity. The goal of this study is to find out which activity is most beneficial for you, therefore, we ask you allow us to analyze your activity response, your test scores (includes the online test, and the exam 2), and the time that you spend on this activity. To ensure the success of this study, please do not discuss your activity content during or after the lab activity. We will debrief this study in the end of the semester. If you are willing to give us permission, please sign your name and date in both consent forms, and return one copy back to us. You should keep another copy as your record. If you have any questions, please raise your hands.

OK. Now I will explain the procedures of this activity:

1. First, check if your ear phone plug in the computer jack?
2. log on to ANGEL/ SPLED 400 course
3. Go to the "Part III: Lab Activity and the Online Test" folder.
4. Click on your online activity.

5. Follow your activity instruction, and do your online activity.
6. Log off ANGEL.
7. The Online Test is on Nov. 17 (Next Thursday) from 12 am-11: 59 PM.

It covers part III and the online activity content.

Also, here are some rules that you have to follow:

1. Please read the activity instruction carefully when you doing your online activity. Please do not look at other student's response, just work on your own.
2. No other web browsing or MSN/ AOL chatting, please.
3. You have to stay in the lab and work on the activity at least 30 minutes.
4. If you finish your activity, don't forget to log off ANGEL. Any questions?

**[Note: If there is no question, then announce that students may begin the activity]**

Ying-Hsiu. Liu  
**CURRICULUM VITAE**

**EDUCATION**

---

**Ph.D.** in Instructional Systems, Pennsylvania State University, 2006

- Dissertation: The Effects of an Advance Organizer and Two Types of Feedback on Pre-service Teachers' Knowledge Application in a Blended Learning Environment.

**M. Ed.** in Instructional Systems, Pennsylvania State University, 2000

- Thesis paper: The Application of a CBR Model in ESL Instruction

**B.A.** in Elementary Education, National Taichung Teachers' College, Taiwan, July 1996

**RESEARCH INTERESTS**

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- Online learning
- Blended learning
- Educational technology Integration
- Succession planning and management/ Talent management

**PUBLICATIONS**

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**The Succession Planning in the Government Sector, 2006**

- Co-authoring a book chapter on the case of Business Development Bank of Canada.
- Manuscript to be submitted to the Human Resource Development Press

**The Effects of an Advance Organizer and Two Types of Feedback on Pre-service Teachers' Knowledge Application in a Blended Learning Environment, 2006.**

- Manuscript to be submitted to the Journal of Teacher Education and Special Education

**The Examination of Online Scaffolding Strategies, 2006**

- Manuscript to be submitted to the Journal of Research on Computing in Education