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The Effectiveness of Examples in Learning Textual Material

by

Fariya Syed

A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfillment of
the requirements for the degree of

Master of Arts

Department of Psychology

**Carleton University
Ottawa, Ontario**

January 14, 2000

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Acceptance of the thesis:**

The Effectiveness of Examples in Learning Textual Material

submitted by

Fariya Syed

**in Partial fulfillment of the requirements for
the degree of Master of Arts**

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Abstract

This study examined whether the inclusion of examples in text teaching qualitative concepts increases the amount learned and improves individuals' evaluations of the material presented to them. Forty undergraduate university students enrolled in an introductory psychology class participated in the study. The effects of examples were assessed in two separate disciplines, abnormal psychology and organizational behaviour. Results indicate modest support for the hypothesis that including examples in text increases learning. No significant differences were found in how participants evaluated material with examples and material without examples on how interesting, clear, related to real life and understandable the material was.

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Introduction

Students receive information from various sources throughout their academic careers. One principal source of information is textbooks. Textbook authors vary different features of their texts in hopes of making the material presented both interesting and informative to students and, ultimately, to facilitate learning. Authors commonly include examples to illustrate concepts in text books. Examples are supposed to “illustrate abstract principles in concrete terms” (Walczyk & Hall, 1989, p. 435). There are several different types of examples, including author’s personal experiences or anecdotes, photographs or cartoon images, case studies, dialogue between individuals, descriptions of real or fictitious establishments, places or situations. The importance of examples in learning is expressed by Decker (1978, p.1), “Not only do good examples put into clear, concrete form what otherwise might remain vague and abstract, but the writing also becomes more interesting with a better chance of holding the reader’s attention.”

Despite the regular use of examples throughout textbooks, few studies have directly explored their effects on learning. The purpose of the present experiment was to examine whether the inclusion of examples in educational text facilitates learning from the text and improves the readers’ reactions to the material presented to them. Readers’ reactions include whether they find text material with examples more interesting, clear, related to real life and understandable than text material with no examples.

Before describing the present experiment, I will survey past literature. In order to examine how examples may affect the learning of concepts I will first examine theories of cognitive psychology and mental imagery. I will then review the literature on the

effectiveness of examples in learning instructions. This will be followed by an examination of how examples that readers generate themselves affect learning educational material. I will also examine research on the effects of examples in educational material from both quantitative and qualitative disciplines. For the purpose of the present study, quantitative material refers to material from disciplines in which concepts can be expressed primarily in numbers and mathematical symbols. Examples of quantitative disciplines include mathematics, physics, and statistics. In contrast, qualitative material refers to material from disciplines in which most concepts are not presented in numbers or mathematical symbols. Examples of qualitative disciplines include sociology, English literature, political science, abnormal psychology, and organizational behaviour. Quantitative concepts can be applied to qualitative concepts and vice versa. An example of this is testing a theory in psychology (a qualitative discipline) using statistics (a quantitative discipline). The effectiveness of examples in quantitative and qualitative disciplines will be examined separately in this study because the types of examples included in quantitative material differ from those included in qualitative material.

Research in the area of seductive details, interesting but unimportant information in text, will be related to the assumption that individuals view educational material with examples as interesting. Finally, the present study investigates issues related to the confidence with which individuals answer test questions. Therefore, relevant research in this area will also be described.

Learning and Examples

Cognitive psychology explains how examples may enhance learning of concepts. Cognitive psychology defines teaching as “changes that occur in the learner” (Sandoval, 1995, p. 356). Learning involves the learner building new schemata or modifying existing schemata. Schemata can be defined as, “cognitive structures of organized prior knowledge, abstracted from experience with specific instances” (Fiske & Linville, 1980, p. 543). Students learn from a variety of sources such as teachers, textual material and computers (Sandoval, 1995).

The theory of constructivism further explains the cognitive processes in learning. It assumes that learners construct their own understanding of phenomena. When new knowledge is received, the learner adds it in some way to old knowledge with some change in constructs or understanding. Learning occurs through a process of progressively changing conceptual schemes or constructs (Sandoval, 1995).

Providing learners with examples may help induce an abstract schema containing features that are essential to the concept being taught (Brown, 1992). Examples relating to a concept can provide the learner with information that can modify and elaborate on constructs or conceptual schemas (Sandoval, 1995). In fact, the inclusion of examples in educational material may be necessary to ensure learning of various concepts. A general schema is a group of specific concepts relevant to a particular domain. If the domain is complicated, it may be difficult for a teacher to express their knowledge of that domain orally or in text. Presenting examples to the learner could help convey this knowledge (Gick & Holyoak, 1983).

The theory of similarity-based learning can also explain how examples facilitate

learning. Similarity based learning methods explain that concepts are induced from several examples illustrating a concept and counter examples contrasting a concept (Medin, Wattenmaker, & Michalski, 1987). Examples may also provide learners with an opportunity for self-assessment or self-test. In this way, examples provide learners with necessary information to determine whether they have understood the principle being taught (Walczyc & Hall, 1989). Including examples in text may also aid a learner in learning a concept by signifying that the text accompanying an example is important (Blanchard & Carey, 1992).

Blanchard and Carey (1992) conducted two experiments examining text-based features that made text seem important to readers. They investigated the effects of these features on learning. In their first experiment, university students studied an excerpt from a scientific magazine. They were then asked to indicate the 22 sentences they thought were the most important to learn from the text. Participants of the study then completed recall tests consisting of written answers to questions.

Results of the first experiment indicate that ten sentences were selected as important with high enough reliability to permit analysis. The most distinguishing feature of these sentences was that they were preceded by or followed by examples or numbered in text with the use of words like 'first'. When sentences participants selected as important were examined for common features, it was found that six of the ten important sentences were followed by examples or numbers. This seems to indicate that learners consider text surrounded by examples important information. This result however, may also be due to the fact that many of the examples in the text were numbered and this numbering made the sentence seem important to the reader (Blanchard & Carey, 1992).

Findings of the recall tests in this experiment indicated that although the inclusion of examples in text facilitated recognition of sentences previously selected as important, participants had trouble recalling the content of these sentences. These results were replicated with another university undergraduate sample in the second experiment (Blanchard & Carey, 1992). Thus, the inclusion of examples in text facilitated recognition of sentences but not understanding of these sentences.

As mentioned above, constructivism and similarity-based learning theories suggest the potential benefit examples may have on learning. Research in the area of mental imagery may also help explain the effect examples may have on learning.

Mental Imagery

Examples are usually concrete illustrations of more abstract concepts, and thus may generate mental images in readers' minds to accompany the concepts. Such mental imagery has been explored by Paivio (1971) who developed a dual-coding model of memory. This model provides an explanation for how concrete and abstract information is processed and stored.

The dual-coding model of memory (Paivio, 1971) proposed that two independent systems are responsible for the encoding, organization, storage and retrieval of stimulus information. The first system, the imagery system, specialises in processing nonverbal information that is stored in the form of images. In other words, it stores sensory representations of concrete things. The second system, the verbal system, processes linguistic units and stores abstract and concrete material. Because these two systems are independent, both nonverbal and verbal memories are available and activated differently and in varying degrees by the imagery and verbal systems. Although the imagery and

verbal systems are independent, they remain partly connected. Depending on the attributes of the stimulus, verbal and nonverbal codes can have additive effects on an individual's ability to recall stimulus information (Paivio, 1971). The connection of imagery and verbal systems implies that one code may activate the other, so that an image can be labeled and a word can produce nonverbal mental images. For example, cat may be a concrete imageable word. The process in which an image is labeled or a word produces nonverbal images is called referential processing (Paivio, 1971).

According to the dual-coding model, comprehension of abstract sentences which do not contain words evoking imagery is principally based on individual word and intraverbal associations. In contrast, concrete sentences containing words which evoke imagery may be comprehended on the basis of a "holistic" idea represented by a mental image (Kuiper & Paivio, 1977). Forming images for concrete words simply requires retrieving the perceptual representation from the concept, whereas forming an image for abstract words takes more time as it requires additional memory search (Paivio, 1971). Paivio (1980) uses a metaphor of audiovisual aids in instructional programs to describe mental images. He indicates that information is represented in mental images which are conscious mental representations. Mental images can be involved in making judgments, computations and inferences. These functions can be consciously manipulated for problem solving and creative purposes. They can also be used as learning and memory aids.

Some examples may provide a concrete image to accompany an abstract concept. Therefore, examples may be coded in nonverbal (concrete) memory whereas abstract concepts not accompanied by examples are likely to be coded in verbal (abstract)

memory. Referential processing may explain that examples in text format can produce images that are stored in concrete memory. Perhaps examples serve to facilitate producing an image to accompany an abstract concept.

The results of many studies have provided support for the dual-coding model (Kuiper & Paivio, 1977; Katz & Paivio, 1975; Paivio, 1978). Kuiper and Paivio (1977) asked undergraduate University students to rate a series of concrete and abstract sentences on comprehensibility or ease of understanding. Concrete sentences evoked imagery while abstract sentences did not. Subjects also rated pairs of abstract and concrete sentences on similarity of meaning. Based on these ratings, pairs of abstract sentences and pairs of concrete sentences were constructed with each pair having similar ratings on similarity of meaning as other pairs. Participants were tested on recognition confidence indicating how sure they were that the sentence had been presented to them in a previous session. Results indicated that when presented with synonyms of concrete sentences, participants falsely recalled having seen these sentences before with more confidence for concrete sentences than for abstract sentences. The findings support the dual-coding model as exact wording of concrete sentences was not recalled as well as exact wording of abstract sentences. The imaginal system preserved the meaning but not the specific wording of concrete sentences (Kuiper & Paivio, 1977).

These findings can be applied to the case of examples. Concrete examples may help code the meaning and not specific wording of concepts in the imaginal system. Understanding the meaning of concepts beyond the wording of text, may aid learners to apply this knowledge and, therefore, enhance learning.

Katz and Paivio (1975) found support for the idea that concepts can be coded as

images. They asked undergraduate university students to compare concept names according to the ease with which they evoked an image. Concepts rated as high in imagery included concepts like "four footed animal" while "an optical instrument" was found to be a low imagery concept. The three concepts rated highest in imagery and the three concepts rated lowest in imagery were presented to participants in different ways including simple line drawings and verbal labels of drawings. Participants were asked to free recall as many drawings and labels as they could after being presented with them. They were then asked to sort the order the drawings and labels were presented in and to provide verbal names for the concepts.

Results indicate that some concepts can be coded as images. It is thus possible that some examples in text format may be coded as images. Further results indicate that concepts rated high on imagery were better recalled from memory than concepts rated low on imagery (Katz & Paivio, 1975). If examples evoke images relating to a particular concept, text with accompanying examples may be recalled more easily from memory than text without examples. Pictures were not found to produce superior learning over words (Katz & Paivio, 1975). Therefore, examples provided in text format may enhance learning of text material whether or not they are accompanied by a picture as an example.

Paivio (1978) asked undergraduate university students to rate highly concrete and highly abstract items on pleasantness or on monetary value. He then equated pairs of concrete nouns, abstract nouns and pictures on pleasantness or monetary value and presented them to participants simultaneously, asking participants to select the more pleasant item in the pair or the more valuable in each pair. He measured both response time and accuracy. Results indicated that response times were faster for concrete nouns

than abstract nouns (Paivio, 1978). Relating this result to examples suggests that concrete examples may be retrieved from memory more quickly than abstract examples.

Results from Paivio's (1978) study provide support for the dual-coding hypothesis. He claims pleasantness and value are concrete attributes. They are therefore represented in and processed by the imagery system rather than the verbal system. As indicated by Paivio's dual coding model and the theories of cognitive psychology mentioned above, individuals may benefit from examples when learning concepts. However, it is important to investigate whether or not individuals would rely on examples for information when presented with them.

Examples and Instruction

Research in the area of examples and instruction has indicated that individuals rely on the information provided by examples, sometimes to a greater extent than other information provided (LeFevre & Dixon, 1986). LeFevre and Dixon (1986) provided undergraduate university students with a conflict situation in which written instructions to a task were provided along with example information. The written instructions and example information described different procedures. Six experiments were conducted in which participants were provided with the written instructions and example information and then asked to take a fifteen item test examining performance on two tasks, series completion and classification. It was found that subjects consistently used example information and disregarded the written instructions. This example effect was not related to the order of presentation of written instructions and example information or the type of the information in the written instructions or examples. When the written instruction information was emphasized as very important, the example effect was reduced but not

eliminated. These results suggest that individuals did not fully process written instructions because they believed examples to be more useful and important (LeFevre & Dixon, 1986).

LeFevre (1987) also examined the processing of instructional texts with different strategies. One of the strategies, indirect retrieval through analogy was explained by Sternberg (1977). Sternberg's (1977) theory of analogical reasoning explains how examples are interpreted by individuals and applied to instructions they are referring to. Analogical reasoning involves an individual mapping a rule that they infer from an example and generalizing it to the task at hand. Analogical processing of an example involves the individual inferring the rule used to produce a solution to interpret an example. The individual then maps the example onto the task and generalizes the rule that was inferred to the task. Finally, the generalized procedure is applied to solve the task problems (Sternberg, 1977, 1982).

LeFevre (1987) examined the processing of instructional tests with the following strategies: indirect retrieval through analogy, direct retrieval of a procedure and construction of a procedure from the information provided. In this experiment undergraduate university students were presented with one of four types of instructional information. There were two types of instructional texts, a text that included the name of the procedure and a text that included instructions regarding the series of steps for the procedure without the name of the procedure. There were also two types of examples. The first were specific examples that were sample test items while the second were short descriptions of what correct answers to a type of problem would be that did not resemble test items. Participants could view the instructional text or example on a video screen

by pushing a button. It was found that participants spent more time processing an example than processing text. They also referred back to examples more than they referred back to text. Results of the experiment indicate that selection of a strategy to process text was directly related to the type of instructional information received. Providing a name for the procedure in a written instructional set cued the reader to directly retrieve the procedure. Indirect retrieval through analogy was the strategy used when given a specific example. Participants who did well on an inductive reasoning task were more likely to use examples successfully than those who performed worse on an inductive reasoning task. This indicates that retrieval through analogy is important in understanding examples (LeFevre, 1987).

LeFevre (1988) found that skilled readers were more likely than less skilled readers to successfully retrieve the appropriate procedure to perform a task by reading an instructional text. In LeFevre's (1988) experiment, undergraduate university students completed a standardized reading comprehension test as well as a test designed to reflect their processing of an instructional text and an example. The same conflict situation was used from LeFevre and Dixon's (1986) experiment where the text and example described different procedures. A no conflict situation was also included in which the text and example described the same procedure. Results indicate that participants who had a high score on the reading comprehension test were more likely to notice the difference between the example and text in the conflict situation than participants who scored low on the reading comprehension test (LeFevre, 1988).

In examining learning to program with the computer language LISP, Anderson, Farrell and Sauers (1984), found that prior programming skill affected the procedure

individuals used to learn the program. Anderson et al. (1984) found that novice LISP programmers relied heavily on specific examples and disregarded general written instructions, while expert programmers did not. Anderson et al. (1984) suggested that an individual must convert (information) into a procedure and then use it in performing a task. They also claimed this indirect conversion process can be difficult. Therefore, individuals who are not very skilled in a domain can use examples as models from which they can extract necessary procedures. In this way, examples may be more useful than written instructions in constructing a procedure (Anderson, et al., 1984).

Pepper (1981) asked university students enrolled in a computer programming course to evaluate a textbook that contained instructions for computer programming. He presented students with excerpts from two text books, one text book was concise while the other was verbose and conversational in style. Almost all students preferred the verbose text. However, students' performance on comprehension tests for material from both texts was poor.

Students were then asked what changes they would make to the texts. Among the suggestions was that the texts should illustrate all points with a lot of examples. A sample chapter of text was written based on the students' suggestions to include more examples. It was found that students who read the new chapter performed better on comprehension tests than students who read other text books. The sample chapter based on the students suggestions was also preferred by students over the concise and conversational texts (Pepper, 1981).

Although the effectiveness of examples in processing instructional material is described in the experiments above (LeFevre & Dixon, 1986; LeFevre, 1987, LeFevre,

1988; Anderson et al., 1984; Pepper, 1981) it is also important to examine the effectiveness of examples in learning other educational material. Examples in educational material can originate from different sources including examples that students generate themselves.

Learning Educational Text Via Self-generated Examples

Researchers have examined the effects of examples that learners generate themselves on learning (Gorrell, Tricou & Graham, 1991; Hamilton, 1989). In Gorrell et al.'s experiment, fifth-grade science students were instructed to generate their own examples to illustrate thirteen of twenty-six concepts related to the topic of energy. Material was presented to the students over three weeks in a normal classroom setting. Students were tested on this material with two multiple choice tests, one after the unit was completed and one six months later. There were two multiple choice questions for each concept taught. One tested the student's knowledge of the definition of the concept while the other tested students ability to recognize exemplars of the concept. Results indicate that participants performed better on definition type questions for which they had generated examples than for which they had not generated examples on both tests. No such difference was found for the test of recognition of exemplars (Gorrell et al., 1991).

Hamilton (1989) also assessed the effects of self-generated examples on learning. His experiment included undergraduate university students. They were asked to study a text on four psychological principles. Selected paragraphs in the text contained questions asking the reader to identify examples of concepts as well as questions asking the reader to generate definitions of concepts. Half of the subjects were instructed to write down two personal examples related to the concept. The ability of each participant was

measured by prior knowledge, reading efficiency and mental skills tests. Participants were divided into high and low ability groups. Participants then took a test consisting of three parts: free recall, classification and problem-solving. Results indicated that higher ability participants recalled more examples and correctly classified more new examples than lower ability participants. These results suggest that higher ability learners may benefit more from learning from self-generated examples than lower ability learners (Hamilton, 1989).

The effects of self-generated examples seem to indicate that the inclusion of examples in educational material can help higher ability students perform better on definition type items testing the material they have studied (Gorrell et al., 1991; Hamilton, 1989).

Use of Examples in Quantitative Educational Material

Beyond asking readers to generate their own examples, teachers often include examples they themselves create in both quantitative and qualitative educational text. As referred to earlier, quantitative disciplines are those in which concepts can be expressed primarily in numbers and mathematical symbols whereas qualitative disciplines are those in which most concepts are not presented in numbers or mathematical symbols. The majority of research investigating issues related to examples and learning has focused on quantitative educational material. Mayer (1978) argued that presenting mathematical concepts in a story format rather than in abstract numerical form enhances post test performance. He presented mathematical concepts to university students and examined their performance on subsequent tests of the material. Material presented as stories resulted in better performance on problems that were phrased as examples rather than

problems stated in abstract numerical terms. When text material was presented to participants in abstract numerical form they performed better on problems stated in abstract numerical terms than on problems phrased as examples (Mayer, 1978).

Relating examples in educational material to that which is familiar to the reader also improves learning (Ross & Bush, 1980). Ross and Bush (1980) attempted to relate educational material to groups of students by incorporating examples related to students' academic majors. They presented statistical concepts to university students majoring in education in two conditions: adaptive, with examples relating the material to the familiar context of the student's academic major, and abstract, with abstract numerical terms and symbols and no examples. Tests administered to participants included three types of questions or test items, abstract items which appeared as symbols, items which were related to a familiar context with educational examples, and items which were related to the unfamiliar context of medicine. The abstract context group did not obtain significantly different scores on any of the three test item types. The adaptive context group scored significantly better on education test items than on abstract test items or test items related to the unfamiliar context of medicine.

Ross and Bush (1980) also asked participants to rate material as interesting or dull, boring or fun, and relevant or irrelevant. No significantly different ratings were found for abstract material as compared to material related to the familiar context of participants' academic major (Ross & Bush, 1980).

Ross (1983) replicated the results of the Ross and Bush (1980) study in two experiments and extended his findings to students in two different disciplines. This time he tested university students in both education and nursing. Results from Ross and Bush

(1980) were replicated for both education majors and nursing majors. When presented with statistical concepts through examples related to their academic major, both groups of participants performed better on test items related to their academic majors than on test items related to an unfamiliar major or test items appearing as symbols. Participants in both groups presented with material with no examples performed better on test items appearing as symbols. The inclusion of examples in text can improve test performance on certain types of test items over others (Ross and Bush, 1980; Ross, 1983). Therefore, the inclusion of examples in quantitative text seems to affect learning.

Ross and his colleagues further attempted to relate the context of educational material to individuals rather than groups by providing individuals with a choice of the type of example they were presented. Ross, McCormick, Krisak and Anand (1985) and Ross, McCormick and Krisak (1986) accomplished this by allowing individuals to rank four contexts in their order of preference. They replicated the design of Ross (1983), again teaching statistics to education majors and nursing majors, but adding two conditions, one in which individuals received their preferred choice of context and one in which individuals were given their least favoured context. There were four conditions in total: standard adaptive, which related material to subjects' majors, standard nonadaptive, which presented abstract concepts with no examples, learner control adaptive, in which subjects rank ordered contexts and received their first choice, and learner choice nonadaptive, in which subjects were given their lowest ranked choice. Tests included items related to participants' academic majors and abstract items. The two conditions of the four which presented the learner with choice (learner choice adaptive and learner choice nonadaptive) were found to make no significant difference in test performance on

any type of test item. Results from Ross (1983) were replicated as those in the standard adaptive condition performed better on all items of a post test than any of the other three groups demonstrating that familiarity with the context that material is presented in can enhance learning.

Ross et al. (1986) also assessed participants' evaluation of the material presented to them. Nursing majors given material on statistics that included medical examples rated the material more positively than did nursing students who received material with no examples or examples unrelated to medicine. Nurses rated the material with medical examples as moving quickly, interesting, easy to learn, fun, relevant to interests, and easier to remember. However, these results were not replicated with education majors using education examples.

Ross and Rakow (1981) explored the idea of matching instructional support to individual learners' abilities, again using material teaching statistics. They defined instructional support according to the number of examples provided, such that high support incorporated more examples than low support. They created four conditions to present educational material on statistics to university undergraduate students. These four conditions consisted of: (1) program control, which adapted the number of examples provided to participants' based on their scores on a pretest with more examples provided in areas where participants performed poorly on the pretest, (2) learner choice, in which participants could select the number of examples they desired from a maximum of six examples, (3) nonadaptive, in which the number of examples provided was kept constant at five examples, and (4) lecture, in which a standard number of examples (five) were presented in lecture format. Results indicated that learners who selected the number of

examples they desired received lowest scores on both an immediate and delayed post test, whereas learners given a standard number of examples in either text or lecture format, in the nonadaptive condition or lecture condition received higher scores than the learner choice group but lower scores than the program control group. Participants in the program control group where more examples were provided for areas in which participants performed poorly in a pretest had highest scores. This indicates that instructional support can be provided using examples in text such that the more examples provided in educational material, the greater the educational support. Increasing educational support can facilitate learning of concepts individuals are having difficulty with.

Ross and Rakow (1982) continued research in the area of instructional support adding the variable of incentives to their 1981 experimental design. They used university undergraduate students as participants and mathematics as the topic of material presented. Incentives were provided using points allotted on a post test with more points providing higher incentive. According to a pretest, they varied the number of points allotted to each post test question with more points allotted to post test questions assessing concepts which participants had performed poorly on in the pretest. This was done to provide incentive for the learner to perform well in areas they had demonstrated difficulty with on the pretest. When incentives (number of points) alone were varied, they were found to produce significantly higher achievement on a post test. Furthermore, when both incentives and instructional support (number of examples) were varied in accordance with participants pretest score such that more incentive and instructional support accompanied areas where participants received lower scores on the pretest, participants achievement

was improved on a post test. This suggests that increasing educational support by providing more examples and increasing incentives by increasing points allotted on a test can help individuals learn concepts they are having difficulty with.

The development of computer-aided instruction allowed researchers to personalize examples in educational material to personal characteristics of learners. Context of presentations, instructional support and incentives were again examined by Ross (1984). This time he incorporated learning mathematics and algebra through computer-aided instruction to Ross and Rakow's 1981 and 1982 designs. He replicated the findings of Ross and Rakow (1981) and Ross and Rakow (1982) and found that adapting instructional support where more examples were included to accompany concepts which participants performed poorly on in a pretest, improved participants' post test scores. Adapting incentives by providing more points for post test questions on which participants were predicted to perform poorly along with adapting instructional support to individual participants also resulted in improvement on a post test.

Ross (1984) also personalized examples in material presented on a computer for individuals by adapting examples to characteristics of the individual reader like their academic major. He found that presenting examples to participants which were related to individual characteristics of each participant resulted in greater achievement on a post test than presenting examples to participants which related to a group to which they belonged (academic major).

Ross (1984) discussed how examples can influence students' evaluation of the material presented to them. He suggested that presenting material in a context familiar to students may serve to generate interest in the material. Also, it may add meaning and

activate relevant past experiences to relate the material to (Ross, 1984).

Anand and Ross (1987) created contexts of mathematical instruction that were personalized for fifth and sixth grade students by including information about their friends, interests and hobbies. Students who received personalized examples achieved higher test scores on recognition and problem solving items than students who did not receive these personalized examples. Material that was not personalized included either (a) realistic but hypothetical contexts with a theme that was not specific to the learner or (b) abstract contexts with no theme. Learners' ratings of the material they were presented with was also examined. Personalizing information with details of individual hobbies, friends and interests produced favourable ratings of educational material over abstract or unrelated contexts (Anand & Ross, 1987).

Further research indicates that providing meaningful and interesting contexts, personalizing material to individual learners and providing choice in details of material presented through computer programs teaching mathematics enhanced learning in elementary school children (Cordova & Lepper, 1996). Embedding mathematical material in fictional fantasy story contexts through computer-based programs has also enhanced learning in college students (Parker & Lepper, 1992).

The research on examples in quantitative educational material suggests that the inclusion of examples in quantitative educational material can increase individuals' test performance on certain types of test items.

Use of Examples in Qualitative Educational Material

Although examples are frequently incorporated into educational material for qualitative subjects such as psychology, business and sociology, few researchers have

explored the effects of these examples on learning. Armento (1977) examined how teachers' behaviors affect learning in elementary school children. Elementary school classes were randomly divided into two groups and pre-tested on a true false test on economic concepts. Different teacher behaviors, including the inclusion of examples in the lecture, were varied for the two groups of students such that one group received examples and one group did not. Results of the post test indicated that students who received examples in the lecture had significantly better test score improvement over pre test scores than students who did not receive examples in the lecture (Armento, 1977).

Grabe and Tabor (1981) included real life examples to illustrate concepts in an undergraduate developmental psychology course. They presented videotaped examples of concepts to one half of the class and not to the other half. Students who received videotaped examples accompanying the concepts presented in class performed better on both a multiple choice examination and a lab practical examination than students who were not presented with videotapes. The lab practical examination included short answer questions based on taped material presented in the examination period.

Grabe and Tabor (1981) also examined whether students' reactions toward learning concepts in developmental psychology were affected by presentation of accompanying videotaped examples. They found that students who watched the video found examples interesting, and meaningful. Also, the use of examples was rated as helpful in understanding concepts by those who viewed the videotaped examples. Students who were shown the videotaped examples attended more classes than students from the other half of the class that were not shown videotaped examples. Students in Grabe and Tabor's (1981) experiment rated the examples incorporated in educational

material favourably. This favourable view of material with examples can be investigated by examining research on seductive details.

Seductive Details

Many researchers have sought to examine the features of textbooks that make the text interesting to readers. Their research has included examination of seductive details. Seductive details refer to interesting but unimportant information that is added to text (Garner, Gillingham & White, 1989). An example of a seductive detail added to history text is mentioning that Samuel de Champlain had a beard. Garner et al., found that adding interesting but unimportant information to text hindered readers' ability to retain important details in the text. Results of this experiment indicated that readers who read short texts without interesting but unimportant information (no seductive details) recalled more of the important details of the text than readers who read text with added interesting but unimportant information (seductive details).

Wade and Adams (1990) also examined the concept of seductive details. They found that college students who read biographical text remembered more interesting but unimportant information (seductive details) than important but uninteresting information from the text. Interest was measured on a four-point Likert scale. All students remembered more interesting than less interesting information (Wade & Adams, 1990).

Duffy et al. (1989) found results that dispute the idea that readers recall seductive details of text more than important but uninteresting information. They presented readers with a history text prepared in one of three ways: with the structure and cohesion of the information maximized (by composition teachers), with a vivid anecdote (by a Time-Life books editor), and a version that improved cohesion in that one point lead logically to the

another within the text (written by linguists). Seductive details added by the editor did not improve recall in this experiment. Instead, the composition teacher's version was best recalled (Duffy, et al., 1989).

The research mentioned above provides mixed results of whether or not seductive details are better recalled by readers than important, less interesting information (Garner et. al, 1989; Wade & Adams, 1990; Duffy, et. al, 1989). These findings can relate to examples in educational text in the following ways. Examples in text often include interesting, personal, or real life information illustrating a point. Therefore, text without examples may be less interesting, personal, or related to real life than text without examples. In this way, examples are similar to seductive details. As a result examples may be interesting to read and may be recalled better than abstract text. In contrast to seductive details, because examples provide important information by illustrating a concept, recall of examples may facilitate understanding of a concept.

Confidence

In addition to influencing learners' reactions toward text material they review, the inclusion of examples in educational text may influence learners' confidence in understanding the material. Including examples in text may effect the confidence with which individuals answer questions relating to the text. Oskamp (1965) presented information about a case study to clinical psychologists, psychology graduate students and undergraduate university students in four stages. Each participant was presented with cumulatively increasing amounts of information in each of the four stages. Participants completed a test regarding the case study after each of the four stages and estimated their percentage correct on the test.

Results indicated that although there was no significant increase in test scores with an increase of information, participants' estimates of their scores increased with an increase of information. By stage two most participants were significantly overconfident about their judgments (Oskamp, 1965). Thus, when examples provide learners with more information about a topic they may unduly increase learners' confidence about responding to questions regarding the material.

Walczyk and Hall (1989) directly assessed the effects of examples and embedded questions on ratings of perceived performance on a comprehension test. In Walczyk and Hall's experiment, undergraduate university students read text discussing descriptive statistics in one of four study conditions: text, text with examples, text with questions, and text with examples and questions. They found that participants who received examples believed they had comprehended more and scored higher on the comprehension test than participants who did not receive examples. Walczyk and Hall (1989) stated that these results indicate examples provide learners with the ability to test whether they have understood a concept. The inclusion of examples, therefore, results in increasing a learner's confidence in how well they understand a concept as well as better understanding of that concept (Walczyk & Hall, 1989).

Beyond the association of examples in material and confidence in answering questions related to the material, the relationship between confidence in test performance and actual test performance has also been researched (Pressley & Ghatala, 1988; Costermans, Lories & Ansay, 1992). Research has explored learners' awareness of their performance on multiple choice tests. Pressley and Ghatala (1988) had undergraduate University students rate their certainty in correctly responding to each item on a multiple

choice test of reading comprehension. The texts they read had literary, scientific, and social studies content. Participants were provided with the question, potential answers, the answer they had given and text they had read when rating their certainty. Results indicated that accuracy ratings were above chance indicating participants were able to assess their performance on the multiple choice questions with some accuracy (Pressley & Ghatala, 1988).

Costermans et al. (1992) examined whether the level of confidence in the correctness of a recalled answer is a reliable predictor of recognition. As part of their experiment, they presented participants with general information. They then asked them questions about this information. If they could provide an answer, they were asked to indicate how confident they were that the answer was correct on a five point scale. Results indicated confidence was an adequate predictor of recognition such that high confidence was associated with correct answers (Costermans et al., 1992).

In summary, the theories of constructivism, similarity based learning and analogical processing have explained that examples may help individuals learn abstract concepts (Sandoval, 1995; Meddin et al., 1987, Sternberg; 1977). Paivio's (1971) dual-coding model explains that concrete material may be more easily recalled than abstract material. Therefore, concrete examples in educational material may help individuals recall the more abstract material. Examples may also help individuals learn concepts because they provide them with an opportunity to test their understanding of the concept (Walczyk & Hall, 1989) or because they indicate that the text surrounding the examples is important (Blanchard & Carey, 1992).

Research on the effectiveness of examples in instructional material indicates that

individuals rely on the information provided by examples, sometimes to a greater extent than other information presented (LeFevre & Dixon, 1986). The inclusion of examples in instructional text can increase scores on comprehension tests of the material (Pepper, 1981). Less skilled individuals in a domain may be more likely to use examples than more skilled individuals in that domain when presented with examples and written instructions (LeFevre, 1988; Anderson, et al., 1984).

Examples that students generate themselves may help them learn concepts (Gorrell et al., 1991). However, higher ability learners may benefit more from self-generated examples than lower ability learners (Hamilton, 1989).

The research summarised above indicates that examples can be helpful to individuals in learning concepts. These examples also seem to be relied upon by individuals when presented to them. Therefore, it is not surprising that examples have been found to help individuals learn concepts from different disciplines.

Research has predominantly focused on the effectiveness of examples in quantitative material and not qualitative material. This research indicates that the inclusion of examples in educational material can improve test scores on certain types of test items (Mayer, 1978; Parker & Lepper, 1992; Ross & Bush, 1980; Ross, 1983; Ross et al., 1985; Ross et al., 1986). Examples in quantitative material can also provide instructional support for concepts (Ross & Rakow, 1981; Ross & Rakow, 1982; Ross, 1984). Providing individuals with examples to support concepts that they have trouble understanding can help them learn these concepts (Ross & Rakow, 1981; Ross & Rakow, 1982; Ross, 1984). Relating examples in quantitative educational material to an individual's personal characteristics by giving them a choice of the context material is

presented in can also improve test scores on that material over relating examples in the material to a group to which the individual belongs, like, for example, their academic major (Ross et al., 1985; Ross et al., 1986).

Few studies have examined the effectiveness of examples in learning qualitative educational material. Research that has been conducted has indicated that including examples in qualitative educational material can help individuals learn the concepts presented (Armento, 1977; Grabe & Tabor, 1981). These studies, investigating the effects of examples in qualitative material, have not included a controlled experimental setting. This makes it difficult to isolate the findings on the affects of examples from other confounding variables in the study. Research in this area has also neglected to investigate the effectiveness of examples in qualitative material that is presented in text format.

Studies have investigated how individuals rate educational material with examples and educational material without examples. Research has indicated that individuals prefer quantitative and qualitative material with examples over quantitative and qualitative material without examples (Ross & Bush, 1980; Ross, et al., 1986; Anand & Ross, 1987; Grabe & Tabor, 1981).

Research in the area of seductive details (i.e. interesting but unimportant information) may be related to readers preference for material with examples over material without examples. Researchers have found mixed results on whether or not individuals remember seductive details better than important, less interesting information (Garner, et al., 1989; Wade & Adams, 1990; Duffy et al., 1989). Examples may add interesting information to educational material and therefore be recalled better than other

material presented that is less interesting.

Research in the area of confidence and learning has indicated that individuals may be more confident about answering questions on material when they have more information about that material (Oskamp, 1965). Examples included in material may provide readers with more information and thus improve their confidence in answering questions regarding the material. Research has revealed that individuals are more confident about understanding material with examples than material without examples (Walczyk & Hall, 1989). Individuals seem to be able to accurately predict how well they performed on a test, and have higher confidence about answering questions they answered correctly than questions they answered incorrectly (Pressley & Ghatala, 1988; Costermans, et al., 1992).

Although researchers have examined confidence in learning they have neglected to examine whether the addition of examples in qualitative educational text affects confidence on performance on a test of that material. These issues were investigated in the present study.

The Present Study

The present experiment was designed to examine whether the inclusion of examples in text teaching qualitative concepts increases the amount learned and improves participants' evaluations of the material presented to them. The major hypothesis of the experiment is that individuals who study texts from qualitative disciplines that include examples would achieve higher scores on a quiz that tested understanding of the material than individuals who studied the text without examples. It is expected that the inclusion of examples will facilitate learning of text material in more than one discipline.

The experiment extends previous research in many ways. First, despite the fact that examples are found throughout text books of qualitative disciplines, almost no research has examined the use of examples in qualitative educational material. The few studies that have assessed the effects of including examples in qualitative material on learning did not include a controlled experimental setting. Also, these studies did not assess examples in text format (Armento, 1977; Grabe & Tabor, 1981). The proposed study directly assesses the value of incorporating examples in qualitative text on learning.

Second, the experiment is geared specifically to examples. In past research on quantitative and qualitative educational material, examples were only a feature of the overall design of studies. They did not focus on the effects of examples. The present study takes a specific look at examples as it isolates the effects of examples in text by providing text with examples versus text with no examples without manipulating many other variables. Therefore, this study allows a close look at examples and also allows for the comparison of effects of different examples.

A second hypothesis of the present experiment is that participants will have more positive reactions to text material with examples and rate it as more interesting, clear, related to real life and understandable than they rate text material without examples. Some studies found that learners rate quantitative material with examples more positively than quantitative material without examples whereas other studies found no such differences in ratings (Ross & Bush, 1980; Ross et al., 1986, Anand & Ross, 1987). Research has indicated that qualitative material with examples is rated more positively than qualitative material without examples (Grabe & Tabor, 1981). Furthermore (depending on the example), examples can have similar features to seductive details and may therefore be similarly rated as interesting (Garner et al., 1989; Wade & Adams, 1990).

In investigating this second hypothesis, the present study extends previous findings on learners' reactions to educational material presented to them. Past research has not assessed learners' ratings of qualitative text material with examples versus qualitative text material without examples in a controlled experimental setting. The present study assessed participants' reactions to qualitative text with examples and reactions to qualitative text without examples in a controlled experimental setting.

A third hypothesis of this study is that participants' will be more confident about their performance on answering test questions related to text material when the text material included examples than when the text material did not include examples. This hypothesis is based on various research findings. First, researchers have found that concrete sentences are recalled with more confidence than abstract sentences (Kuiper & Paivio, 1977). Other findings indicate that the more information individuals receive

about a case study, the more confident they are about making decisions regarding that case study (Oskamp, 1965). Finally, reviewing examples in material helps learner's more accurately predict how well they understood the material than not reviewing examples (Walczyk & Hall, 1989).

Another hypothesis in this experiment is that participants will be more confident about correctly answering quiz items which they answered correctly than quiz items which they answered incorrectly. Researchers have indicated that learners can make above chance predictions of their performance on tests (Pressley & Ghatala, 1988; Costermans, et al., 1992).

A final exploratory hypothesis is included in this experiment. It predicts that participants who consider themselves more knowledgeable in a particular discipline will be more confident about their performance on a quiz testing concepts in that discipline than participants who consider themselves less knowledgeable in that discipline.

Method

Participants

A sample of 40 undergraduate students participating in an introductory psychology class at Carleton University participated in the study. In exchange for their participation they were given partial course credit. Participants of the study were from a range of academic majors. The most frequently cited majors were undeclared/ special students (25%), psychology (20%), and commerce/business (20%). Most of the students were in their first year (52.5%). The remainder were in second year (12.5%), third year (15%), fourth year (15%) or special students (5%).

Research Material and Design

A computer program displaying pages extracted from a text book in each of two different disciplines, abnormal psychology (AP) and organizational behaviour (OB), was presented to subjects in hypertext format on a computer screen. Each participant read text for both of the topics, AP and OB. Both texts presented qualitative material. Because all individuals volunteering to participate in the study were enrolled in an introductory psychology course they may have been familiar with some of the AP material presented. However, in consultation with the instructor of the psychology course participants of the study were enrolled in, it was determined that the topics covered in the material used in this experiment had not yet been covered in the course at the time of data collection. Furthermore, as mentioned earlier, an equal number of psychology students ($n = 8$) and business/commerce students ($n = 8$) participated in the experiment. Testing participants

in two disciplines, OB as well as AP, helped determine whether any significant effects of examples were found across disciplines.

The excerpt from the AP text deals with characteristics of Schizophrenia (Davison & Neale, 1994, p. 389 - 391) (see Appendix A). The excerpt from the OB text deals with issues related to management (Schermerhorn, Hunt & Osborn, 1991, p. 20 - 25) (see Appendix B). Although there are fewer pages in the AP text than the OB text, both texts cover six separate concepts or subtopics and contain six examples.

Text material was selected from the two text books mentioned above because they are used in undergraduate university classes and are therefore written at an appropriate level of difficulty for undergraduate students. In addition, each subtopic in the text is accompanied by only one example. These examples can be easily deleted from the text without leaving noticeable gaps in the flow of the material.

Examples were inserted throughout the AP and OB material according to the original format of the text. Examples in AP include excerpts of dialogue from schizophrenic patients displaying different symptoms of Schizophrenia. Examples in OB describe real business situations which illustrate accompanying concepts of management. Each participant read either AP text with examples or AP text without examples. Each participant also read either OB text with examples or OB text without examples. Each participant received examples in one text (AP or OB) and not the other (AP or OB). Half the participants read material with examples before reading material without examples while the other half read material without examples before material with examples. AP material was presented to participants before OB material for half the participants while the other half of the participants received OB material before AP material. In order to

maximize efficiency of the research design, each participant in the experiment received one of the AP texts: (1) AP with examples or (2) AP without examples, and received one of the OB texts (1) OB with examples or (2) OB without examples in one of four different orders. Table 1 illustrates the research design.

Table 1

Research Design

	Condition #1	Condition #2	Condition #3	Condition #4
	Subjects 1-10	Subjects 11-20	Subjects 21-30	Subjects 31-40
Material Presented First	AP with examples	OB without examples	OB with examples	AP without examples
Material Presented Second	OB without examples	AP with examples	AP without examples	OB with examples

n = 10 for each cell

Note. Subjects were randomly assigned to each condition.

The text material (AP and OB) was presented to participants via computer. Each of the two computer programs, one for AP and one for OB, presented the reader with a title page followed by a series of pages of text. The AP text had a total of 12 pages and the OB text had a total of 13 pages. Six of the pages from each text (AP and OB) contained examples. A scroll bar on the side of the screen of each page of text allowed the reader to scroll through the text. A button marked 'previous' and a button marked 'next' allowed participants to maneuver through pages of text (see Appendix C for an

example of a text page).

The amount of time spent reading each page of text each time the participant viewed the page was recorded. These data were not visible to the participant. Examples appeared on separate pages from the text. Therefore, assessment of whether or not a participant attended to the examples in the text could be made by the amount of time they spent reading each page with examples (Appendix D shows an example of a printout of a page of data).

On the last page of text, the reader was provided with an option to return to the first page of text to reexamine the material and an option to inform the experimenter if they were finished reviewing the material (Appendix E shows a printout of the last page).

Measures

Background Questionnaire

A background questionnaire was used to gain information about the participant's academic program. Participants were also asked to provide a subjective estimate of their knowledge of AP and OB, before reading the AP and OB text (see Appendix F).

Quiz

A multiple choice quiz was administered as a measure of the participants' knowledge of text material presented. Quiz items were pre-tested with 10 participants in order to eliminate questions with floor or ceiling effects. A question was discarded if nine or more pretest participants answered it incorrectly. Questions which nine or more pretest participants answered correctly were also discarded. Based on this pilot study, 12 questions were selected for the AP quiz and 12 questions were selected for the OB quiz.

Scores on the quiz constituted the main dependent variable. In previous research on qualitative material, participants who were presented with examples had significantly higher test scores on multiple-choice items than subjects who were not presented with examples (Grabe & Tabor, 1981). Therefore, for the purposes of this experiment, it was considered that multiple choice questions would be adequate in assessing learning of text.

There were two separate quizzes, one related to AP (see Appendix G) and one related to OB (see Appendix H). Participants completed both quizzes. The AP quiz was presented to participants after they had reviewed the AP material while the OB quiz was presented to participants after they had reviewed the OB material. Thus each participant generated two scores, one on a quiz related to text with examples and one on a quiz related to text with no examples. Each score was out of a maximum score of 12 points, one point per question.

Participants' confidence in answering each question on the two quizzes correctly was also assessed in nine point rating scales following each question on the quiz. Twelve rating scales per quiz assessed participants' confidence in answering each question on each quiz separately.

Follow Up Questionnaire

Participants completed two final questionnaires assessing their reactions toward the texts they read (see Appendix I). Participants completed one Follow Up Questionnaire rating each text (AP and OB) separately after completing each quiz.

The questionnaire contained four items with nine-point rating scales. The four items on the rating scale measure how interesting (item 1), clear (item 2), related to real life (item 3) and understandable (item 4) participants found the text. An item addressing

participants' confidence in their quiz performance by asking them to estimate the percentage score thought they received on the quiz (item 5) was also included at the end of the set of four rating scales. As each participant received examples in one discipline (AP or OB) of text and no examples in the other discipline of text (AP or OB), each participant rated text material with examples and text material without examples separately.

Procedure

Individuals interested in volunteering for the study were requested to contact the experimenter and schedule a time for participation. The locale for this experiment was room A428 in the Loeb Building at Carleton University where participants were provided with a computer, a desk and a chair.

Upon arriving to the experimental session, individuals volunteering to participate were informed of the details of the study (see Appendix J) and asked to sign a letter of informed consent (see Appendix K). In order to ensure that participants did not become biased to attend to examples in the experiment, they were not informed that the experiment dealt specifically with the effectiveness of examples in educational text. Instead participants were informed that the experiment involved how the style of text writing affects learning. They were also informed that they could cease to participate at any time if they wished.

Participants were randomly assigned to one of four conditions and received either: (1) AP text first with examples then OB text second with no examples, (2) OB text first with no examples then AP text second with examples, (3) OB text first with examples then AP text second with no examples, (4) AP text first with no examples then OB text

second with examples. (Recall Table 1 illustrates the research design).

Participants were given the Background Questionnaire and asked to complete it. It was then taken away and participants were presented with the appropriate text (AP with examples, AP without examples, OB with examples or OB without examples) depending on the condition they were in. Participants were allotted half an hour to study the text. When they had finished studying the text, they were moved away from the computer and the text material, presented with the quiz and asked to complete it. They were allotted 15 minutes to complete the quiz. Upon completion, the quiz was taken away and participants were given the Follow Up Questionnaire and asked to complete it.

The entire procedure (from the point where participants received text material) was then repeated and participants received their second set of material and measures for: AP with examples, AP without examples, OB with examples or OB without examples (depending on the condition they were in). Finally, participants were debriefed and their questions were answered following their participation in the study (see Appendix L).

Results

Did Participants Read Examples in Text?

Before any analyses of data were conducted, data revealing whether or not participants of the study read the examples in the text was considered. In order to assess whether participants read examples in the text, the amount of time participants spent on each page of text with examples was examined. If a participant spent less than two seconds on a page with an example, it was considered that she/he had not attended to the example. The criterion of two seconds was based on both personal judgment and the informal feedback of others who examined the program. All participants viewed each page of examples for two or more consecutive seconds.

In addition, analyses were conducted comparing how long each participant spent on pages that displayed examples versus how long they spent on the rest of the material. Recall, each participant read two types of material. One included examples and the other did not. The material which included examples was either AP text or OB text. For this analysis, I considered the text material participants read which included examples rather than the other text material they read that did not include examples.

As mentioned earlier, examples were distributed throughout the text and appeared on separate pages than the rest of the text. The amount of time that each participant spent on each page of the text was recorded. The total time spent studying the text was divided into time spent on pages with examples and time spent on the rest of the text. The amount of time participants spent on each page with examples was added up. This cumulative time was then divided by the total number of words in all the examples in the text to determine a reading speed. The same was done to calculate a reading speed for the

rest of the pages of text (excluding examples). Table 2 displays the mean amount of time spent on examples and the mean amount of time spent on the rest of the text as well as the number of words in examples and in the rest of the text. An examination of means of reading speed indicates that participants spent less time on examples than the rest of the text (Table 3).

Table 2

Mean Number of Words and Mean Time (sec.) Spent on Examples and on the Rest of the Text

	AP	OB
Number of Words in Examples	513	454
Seconds spent on Examples (M, SD)	254.1, 100.7	268.8, 79
Number of Words in Rest of the Text	706	1378
Seconds spent on Rest of the Text (M, SD)	597, 219.2	882.9, 252.8

Table 3

Mean Reading Speed (sec/ word) for Examples and for the Rest of the Text

	AP	OB
Examples (M, SD)	0.5, 0.2	0.59, 0.2
Rest of the Text (M, SD)	0.84, 0.3	0.64, 0.2

A 2 X 2 (Discipline X Example) mixed ANOVA was conducted on reading speed. The between-subject variable Discipline had two levels: AP and OB. The within-subject variable Example had two levels: examples and the rest of the text (excluding examples). Results of the ANOVA indicated a significant main effect of Example ($F(1, 38) = 55.3$, $p < .05$). The mean reading speed for examples ($M = 0.54$, $SD = 0.2$) was significantly less than the mean reading speed for the rest of the text ($M = 0.74$, $SD = 0.3$). No main effect of Discipline was found ($F(1, 38) = 0.7$, $p = ns$). However, a significant (Discipline X Example) interaction was found ($F(1, 38) = 31.7$, $p < .05$). Participants' mean reading speed for AP text excluding examples ($M = 0.84$, $SD = 0.3$) was greater than their mean reading speed for OB text excluding examples ($M = 0.64$, $SD = 0.2$). However, participants reading speed was almost equal for AP examples ($M = 0.5$, $SD = 0.2$) and OB examples ($M = 0.59$, $SD = 0.2$). There was also more variation in how long participants spent on AP examples ($M = 0.5$, $SD = 0.2$) and the rest of the AP text ($M = 0.84$, $SD = 0.31$) than between how long participants spent on OB examples ($M = 0.5$, $SD = 0.2$) and the rest of the OB text ($M = 0.64$, $SD = 0.18$).

Effect of Examples and Presentation on Quiz Scores

In order to assess the main effect of example and presentation order on quiz scores, two 2X2 (Example X Order) between-subject factorial ANOVAs were conducted: one for AP material and one for OB material. A main effect of example was found for AP material ($F(1, 39) = 4.04$, $p < .05$). The mean quiz score for the AP text with examples ($M = 7.6$ out of 12, $SD = 2$) was significantly greater than score on the quiz related to AP text without examples ($M = 6.4$ out of 12, $SD = 1.7$). This finding supports

the major hypothesis of this study, that individuals who study a text that contains examples will achieve higher scores on a quiz testing understanding of that material than individuals who study a text without the examples.

Results of the ANOVA for OB material did not support the hypothesis. Although individuals who received examples in OB text ($\underline{M}$ = 7.8 out of 12, $\underline{SD}$ = 2.3) scored higher than individuals who did not receive examples in OB text ($\underline{M}$ = 7.2 out of 12, $\underline{SD}$ = 2.1), the difference was not significant ($\underline{F}(1,39) = 0.83$, ns).

No main effect of Order was found for AP material ($\underline{F}(1,39) = 0.25$, ns) nor for OB material ($\underline{F}(1,39) = 0.24$, ns), indicating that the order of presentation of material with examples and material without examples did not effect quiz score. Furthermore, no significant Example X Order interaction effect was found for AP material ($\underline{F}(1,39) = 0.11$, ns) nor for OB material ($\underline{F}(1,39) = 0.40$, ns) indicating that the effect of examples for AP material was consistent across the order of presentation of material to participants.

Effect of Examples on Ratings of Quality of Material

It was hypothesised that including examples in the text would make participants judge the text as more interesting, clear, related to real life and understandable than text without examples. Therefore, higher positive ratings were expected on the four items of the Follow Up Questionnaire: (1) interest in material, (2) clarity of material, (3) relation of material to real life and (4) how understandable material was. An examination of the mean ratings for these variables (Table 4) suggested the variables were positively correlated. A factor analysis was conducted in order to examine whether the four variables were highly correlated, and components of a related common factor which I shall term, Quality of Material.

Table 4

Means for Reactions to Text

	AP		OB	
	With Examples (<u>M</u> , <u>SD</u>)	Without Examples (<u>M</u> , <u>SD</u>)	With Examples (<u>M</u> , <u>SD</u>)	Without Examples (<u>M</u> , <u>SD</u>)
Interest	6.7, 1.5	6.0, 1.5	5.4, 1.4	5.0, 2.4
Clarity	5.8, 2.0	5.2, 2.1	6.2, 1.4	5.6, 1.4
Related to Real Life	5.0, 2.6	3.9, 2.2	6.4, 1.5	6.4, 1.4
Understandable	6.4, 1.8	6.0, 1.2	6.7, 1.3	6.4, 1.6

Results of the factor analysis indicated that the four variables were significantly correlated (Table 5) and components of one factor, Quality of Material. In addition, the internal consistency reliability for the four variables determined by calculating Cronbach's alpha was moderate ($\alpha = .68$). As such, two 2 X 2 (Example X Order) MANOVAs were run on the Quality of Material made up of the four DVs: how (1) interesting, (2) clear, (3) related to real life and (4) understandable the material was: one for AP material and one for OB material.

No main effect of Example was found for AP material ($F(4, 33) = 0.85$, ns) nor for OB material ($F(4, 33) = 0.2$, ns), indicating that the inclusion of examples in text did not significantly affect ratings of the Quality of Material. Furthermore, no main effect of Order was found for AP material ($F(1, 33) = 0.63$, ns) nor for OB material ($F(4, 33) = 2.02$, ns), indicating that the order of presentation of material with examples and material without examples did not affect ratings of the Quality of Material. Finally, no significant

Example X Order interaction effect was found for AP material ($F(4, 33) = 1.15$, ns) nor for OB material ($F(4, 33) = 1.68$, ns).

Table 5

Correlation (r) Matrix for Reactions Toward Material

	Interest	Clarity	Related to Real Life	Understandable
Interest				
Clarity	0.42*			
Related to Real Life	0.45*	0.12		
Understandable	0.56*	0.42*	0.3*	

Note. * indicates $p < .01$

Confidence

Recall that I hypothesised in this experiment that individuals would be more confident about their performance on a quiz after reviewing text with examples than after reviewing text without examples. The dependent variable, Confidence was measured using item 5 on the Follow Up Questionnaire.

In order to assess whether there was a main effect of Example regardless of the order material with examples and material without examples was presented in, two 2X2 (Example X Order) between factorial ANOVAS were conducted: one for AP material and one for OB material. Although participants were more confident about their performance

on a quiz reviewing AP text with examples ($\underline{M} = 72\%$, $\underline{SD} = 18.6$) than after reviewing AP text without examples ($\underline{M} = 62\%$, $\underline{SD} = 16.1$), the effect of examples was not significant ($F(1,39) = 3.2$, $p=.08$). Nor was there a significant main effect of Order ($F(1,39) = .00$, ns) or a significant Example X Order interaction ($F(1,39) = 0.06$, ns). This indicates that confidence in quiz performance did not vary significantly as a result of whether or not examples were present in AP material or by what order material was presented to individuals.

There was even less variability in participants' mean confidence ratings of their performance on a quiz after reviewing OB text with examples ($\underline{M} = 68\%$, $\underline{SD} = 18.4$) than after reviewing OB text without examples ($\underline{M} = 69\%$, $\underline{SD} = 14.2$) ($F(1,39) = 0.02$, ns). This indicates that whether or not examples were present in OB material made no difference in how confident individuals were in their performance on a quiz of that material. Surprisingly, a main effect of Order was found ($F(1, 39)=4.3$, $p<.05$) indicating that when OB material was presented first individuals were more confident about their quiz performance ($\underline{M}=73\%$, $\underline{SD}=12.1$) than when OB material was presented second ($\underline{M}=63\%$, $\underline{SD}=18.3$) regardless of whether or not examples were present in the material. The effect size of this main effect was small ($\eta^2 = 0.1$). No significant Example X Order interaction effect was found indicating that the effect of Order was generalizable across whether or not examples were present in the material.

Confidence and Familiarity with Discipline

Confidence in this section also refers to item 5 on the Follow Up Questionnaire. It was expected that those who perceive themselves as more knowledgeable in the discipline presented to them (AP and OB) would have more confidence in correctly

answering questions related to the material than those who perceive they are less knowledgeable in the topic presented to them. Item 3 on the Background Questionnaire assesses participants' self ratings of knowledge in the disciplines presented to them (AP and OB) on a 10 point rating scale. A higher rating on the scale indicates higher perceived knowledge in the discipline than a lower rating on the scale. Self ratings of perceived knowledge of AP ranged from 0 To 7 with a mean of 2.3 ($SD = 2.1$) while self ratings of perceived knowledge of OB ranged from 0 To 9 with a mean of 3.3 ($SD = 2.6$).

A correlation between confidence ratings on the AP quiz and familiarity with AP material, as well as a correlation between confidence ratings on the OB quiz and familiarity with OB material, were calculated to determine whether self-rated knowledge in the discipline of material was positively correlated with confidence in performance on the quiz. No significant correlations were found: AP ($r(39) = 0.15$, ns) and OB ($r(39) = 0.27$, ns) indicating that higher perceived knowledge in a discipline was not significantly correlated with more confidence in performance on a quiz testing knowledge of material from that discipline. Surprisingly, there was also no significant relationship found between self-rated knowledge and actual quiz score for AP ($r(39) = .09$, ns) or for OB ($r(39) = -0.03$, ns).

Confidence and Correct vs. Incorrect Quiz Items

For the following analysis, the dependent variable Confidence was measured with the 10 point rating scales following each question on both AP and OB quizzes. A higher rating on the scale indicates greater confidence in answering the question correctly than a lower rating on the scale.

It was expected that participants would be more confident about answering quiz items which they answered correctly than about answering quiz items which they answered incorrectly. In order to examine this, quiz items were divided into two groups, those which participants answered correctly and those which participants answered incorrectly. Average confidence ratings for questions participants answered correctly and average confidence ratings for questions participants answered incorrectly were then calculated. A paired samples t test was conducted on these two average confidence ratings to determine whether participants had greater confidence in their performance on questions they answered correct than in their performance on questions they answered incorrect. Results of the t test indicated a significant difference on mean confidence ratings for questions participants answered correctly and questions participants answered incorrectly ($t(39) = 5.58, p < .01$). As expected participants were more confident about their performance on questions they answered correctly ($M = 6.0, SD = 1.2$) than on questions they answered incorrectly ($M = 5.3, SD = 1.2$).

Discussion

Before discussing results of this experiment in reference to the hypotheses, it is important to acknowledge that all participants in this experiment read the examples in text rather than skipping over them. We can, therefore, be confident that the results of this experiment are related to the inclusion of examples in the text. It is interesting, however that participants spent significantly less time on examples than on the rest of the text. This contradicts past findings that individuals attend to example information over instructional text when they are presented with both (LeFevre & Dixon, 1986). A difference between LeFevre and Dixon's (1986) experiment and the present experiment may explain the contradiction in findings in the two experiments. LeFevre and Dixon's (1986) experiment presented individuals with written instructions and example information that described different procedures. In contrast, the present experiment presented participants with examples that supported and confirmed concepts that had been discussed in pages of text that preceded examples. Examples may have been easier for participants to process than the rest of the text as the examples supported concepts the participant had already read about and processed. If examples were easier to process than the rest of the text, participants would likely read through examples faster than the rest of the text.

Examples & Quiz Score

The major hypothesis of this study was that individuals who study text with examples will demonstrate greater knowledge of that material than will individuals who study text without examples. This finding was expected for material from two separate

qualitative disciplines: abnormal psychology and organizational behaviour. Results of the experiment indicate modest support for this hypothesis. When studying AP material, individuals who received material with examples scored higher on a quiz testing understanding of that material than individuals who received material without examples. This finding supports past research findings that the inclusion of examples in qualitative educational material can help individuals learn the concepts presented (Armento, 1977; Grabe & Tabor, 1981).

The design for the analyses in this experiment had ten participants per cell. This may have resulted in lack of sufficient power of the analyses. Data for OB indicated that participants scored higher on the quiz after reviewing material with examples than after reviewing material without examples. However, no main effect of examples was found. This may have been due to the low power of the analyses resulting from low sample size.

Examples and Quality of Material

The second hypothesis of this experiment was that individuals who read the AP text and OB text with examples will have more positive reactions to the material and rate it as more interesting, clear, related to real life and understandable than AP text and OB text without examples. This hypothesis was based on past research findings that indicated qualitative material with examples was rated more positively than qualitative material without examples (Grabe & Tabor, 1981). An examination of means indicated that AP text with examples was rated as more interesting, clear, related to real life and understandable than AP text without examples. Findings were in the same direction for OB material. There was, however, no difference in how much individuals rated the OB material with examples and OB material without examples on how much they thought the

material related to real life.

The four variables interesting, clear, related to real life and understandable were correlated and considered components of a common factor, Quality of Material.

Although an examination of means for AP material and OB material indicated that combined ratings of Quality of Material were higher for material with examples than for material without examples, the difference in ratings was not significant.

Examples and Confidence

The third hypothesis of this study was that individuals would be more confident about their performance on a quiz related to educational material with examples than a quiz related to educational material without examples. This result was expected for both AP material and OB material. This hypothesis was based on previous research findings that concrete sentences are recalled with more confidence than abstract sentences (Kuiper & Paivio, 1977) and that the more information individuals receive regarding a case study, the more confident they are in making decisions about the case study (Oskamp, 1965). Contrary to what was expected, the inclusion of examples in AP and OB material made no difference on participants' confidence on a quiz related to the material. Perhaps the previous findings cannot be transferred to the case of examples in text. For example, Kuiper & Paivio's (1977) results compared concrete and abstract sentences. Perhaps the examples in this experiment were not sufficiently concrete. Further, Oskamp's (1965) results were related to a case study. Perhaps they are not transferable to the context of examples in qualitative educational text.

Further results indicated a main effect of Order for confidence in knowing OB material. When OB material was presented first, participants were more confident about

their performance on a quiz related to the material than when OB material was presented second, regardless of whether or not examples were present in the material. Although I am uncertain of the reason for this result, fatigue of participants may explain the main effect of Order.

My fourth hypothesis was that individuals who consider themselves more knowledgeable in a discipline would also be more confident about their performance on a quiz in that discipline than individuals who consider themselves less knowledgeable. The results of this experiment indicate that although more perceived knowledge in a discipline was related to more confidence in performance on a quiz in that discipline, the relationship was not strong enough to be considered significant. Furthermore, there was no significant relationship between self-rated knowledge and actual quiz score for AP or OB. This indicates self-rated knowledge is at best weakly associated with actual quiz performance.

The fifth hypothesis of this experiment was that individuals would be more confident about answering quiz items that they got correct than answering quiz items that they got incorrect. This has been found in past research (Pressley & Ghatala, 1988; Costermans et al., 1992). The hypothesis was confirmed in the present experiment as well. As expected participants of the study demonstrated that they could accurately predict their performance on quiz items.

Alternate Design Options

There are some limitations in the present experiment that should be noted. First, although it improved the efficiency of the experimental design to have each participant study and complete measures for both AP and OB, this also created some limitations for

the statistical analyses of data. Each participant read two of four possible texts. They read one of either AP with examples or AP without examples. They also read one of OB with examples or OB without examples. Each set of material was read in a separate order. In order to fit the Procrustean Bed of SPSS, all variables in the design were defined as between-subject variables. Perhaps if each participant read only two similar texts (of the same discipline) with one text including examples and the other text without examples, each participant could generate two scores that could be compared as they would include material from a similar discipline. This would allow for a within-subject design which might be more sensitive than the between-subject design in this experiment. Furthermore, increasing the number of participants in the existing design would have been beneficial in increasing the power of subsequent analyses.

Conclusions

The present experiment provided modest support for the hypothesis that examples in qualitative text can help individuals increase their scores on a quiz testing concepts in that material. The confirmation of this hypothesis suggests that examples do improve learning. An area for future investigation involves the topic of the text presented to participants. It would be interesting to attempt to replicate the finding that individuals who studied abnormal psychology text and organizational behaviour text with examples received higher scores on a quiz than individuals who studied abnormal psychology text and organizational behaviour text without examples. Further, perhaps examples are only helpful in certain qualitative disciplines. As mentioned earlier, there is very little existing research on the effectiveness of examples in qualitative material. Future investigation in this area is desirable.

A finding of the present study indicated that participants spent significantly less time studying examples than the rest of the text. It may be beneficial to further investigate why this occurred.

The present experiment is one of the only investigations of the effectiveness of examples in learning qualitative concepts. Future investigation of this subject matter would be beneficial as it has several practical implications for teachers and authors of educational text. Should teachers and authors include examples in qualitative educational material they prepare for students? If so, what purpose do examples serve for students? Does including examples help students to learn? Do examples make the material more interesting to students? This experiment provides some evidence that examples may be helpful in learning concepts in abnormal psychology and organizational behaviour. Further, examples did not significantly improve individuals' ratings of the quality of the material. The findings of this experiment are some preliminary hints to what should be further investigated regarding examples in qualitative text. Information in this area will help to organize educational material for students to ensure that they will get the most out of the material in regards to learning and their impressions of the quality of material they study.

Examples can have several different characteristics and vary in style and quality. The examples included in the abnormal psychology text and the organizational behaviour text in this experiment had specific features. For example, the examples in the abnormal psychology text included dialogue and the examples in the organizational behaviour text described business situations. The findings of this experiment (based on the examples included in the texts) may not be generalizable to other educational text with many

different kinds of examples. It would be desirable for future research to investigate which kinds of examples are most effective in helping students learn concepts. Researchers could also investigate how many examples would be beneficial to include in educational material as well as where examples would be ideally placed throughout the material. It would be interesting to investigate the characteristics of different examples that make them beneficial to students in learning concepts.

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APPENDICES

APPENDIX A: Educational text for Abnormal Psychology

(Examples appear in italics in the appendix only).

Clinical Symptoms of Schizophrenia

The symptoms of schizophrenic patients involve disturbances in several major areas - thought, perception, and attention; motor behaviour; affect or emotion; and life functioning. The range of problems of people diagnosed as schizophrenic is extensive, although patients who are so diagnosed typically have only *some* of them. The Diagnostic and Statistical Manual (DSM) determines for the diagnostician how many problems must be present, and in what degree, to justify the diagnosis. Unlike most diagnostic categories that we have considered, there is *no essential* symptom that must be present. Thus schizophrenic patients differ from one another more than do patients with other disorders. The heterogeneity of schizophrenia suggests that it would be appropriate to try to subdivide schizophrenics into types who manifest particular constellations of problems. Here we will review the major symptoms of schizophrenia. These symptoms derive from the DSM criteria as well as from information collected in a large-scale investigation of Schizophrenia, the International Pilot Study of Schizophrenia (IPSS), conducted by the World Health Organization (Sartorius, Shapiro, & Jablonsky, 1974). We will present the main positive symptoms of schizophrenia. Although we describe the symptoms in detail, it must be kept in mind that diagnostically the duration of the disorder is regarded as at least as important, if not more so, in distinguishing schizophrenia from the symptomatically similar schizophreniform disorder and brief psychotic disorder.

Positive Symptoms

Positive symptoms consist of excesses, such as hallucinations, delusions, and bizarre behaviour.

Disorganized Speech

Disorganized speech, also known as formal thought disorder, refers to problems in the organization of ideas and in speaking so that the listener can understand.

Interviewer: *Have you been nervous or tense lately?*

Schizophrenic: *No, I got a head of lettuce.*

Interviewer: *You got a head of lettuce? I don't understand.*

Schizophrenic: *Well, it's just a head of lettuce.*

Interviewer: *Tell me about lettuce. What do you mean?*

Schizophrenic: *Well,... lettuce is a transformation of a dead cougar that suffered a relapse on the lion's toe. And he swallowed the lion and something happened. The...see, the... Gloria and Tommy, they're two heads and they're not whales. But they escaped with herds of vomit, and things like that.*

Incoherence is sometimes found in the conversation of schizophrenics: although the patient may make repeated references to central ideas or a theme, the images and fragments of thought are not connected. It is difficult to understand exactly what the patient is trying to tell the interviewer.

Loose Associations

Speech may also be disordered by loose associations or derailment, in which case the patient may be more successful in communicating with a listener but has difficulty sticking to one topic. He or she seems to drift on a train of associations evoked by an idea from the past. Schizophrenic patients have themselves provided descriptions of this state.

My thoughts get all jumbled up. I start thinking or talking about something but I never get there. Instead, I wander off in the wrong direction and get caught up with all sorts of different things that may be connected with things I want to say but in a way I can't explain. People listening to me get more lost than I do...

My trouble is that I've got too many thoughts. You might think about something, let's say that ashtray and just think, oh! yes, that's for putting my cigarette in, but I would think of it and then I would think of a dozen different things connected with it at the same time.

Disturbances in speech were regarded at one time as the principle clinical symptom of schizophrenia and remain one of the criteria for the diagnosis. But evidence indicates that speech of many schizophrenics is not disorganized. Furthermore, the presence of disorganized speech does not discriminate well between schizophrenics and other psychotic patients, such as some of those with mood disorders. For example, manic patients show as much loosening of associations as do schizophrenics.

Delusions

Deviance in the content of thought seems more central to schizophrenia than confusion in speech and in the form of thought. The thoughts of 97 percent of schizophrenics in the IPSS were found disordered in a very fundamental way, through lack of insight. When asked what they thought was wrong or why they had been hospitalized, schizophrenics seemed to have no appreciation of their condition and little realization that their behaviour was unusual.

No doubt all of us, at one time or another, are concerned because we believe that others think badly of us. Perhaps much of the time this belief is well justified. Who, after all, can be universally loved? Fortunately, we either learn to live this belief, or, if it is false, are readily able to dispel it. Many schizophrenics, however are subject to delusions, holding beliefs that the rest of society would generally disagree with or view as misinterpretations of reality.

A schizophrenic patient experiencing delusions may describe their experience as follows:

I am firmly convinced that numbers of people don't like me, indeed they dislike me so much that they are plotting against me. Some of these persecutors have sophisticated listening devices that allow them to tune in to my most private conversations and gather evidence in a plot to discredit me. Nobody around me, including my husband and children, are able to prove to me that they aren't spying on me. In fact, even my closest friends and confidants are gradually joining the tormentors and becoming members of this persecutory community. I am so anxious and angry about this whole situation, so now I am going to start my own counteractions against these persecutors. I always carefully check any new room I enter for listening devices. When I meet a person for the first time, I have to question them at great length to determine whether they are part of this plot against me.

Simple persecutory delusions were found in 65 percent of the IPSS sample. Schizophrenics' delusions may also take several other forms. Some of the most important of these were described by the German psychiatrist Kurt Schneider (1959).

The following descriptions of these delusions are drawn from Mellor (1970).

Somatic Passivity. The patient is passive, unwilling recipient of bodily sensations imposed by an external agency.

A twenty-nine-year-old teacher described "X-rays entering the back of my neck, where the skin tingles and feels warm, they pass down the back in a hot tingling strip about six inches wide to the waist. There they disappear into the pelvis which feels numb and cold and solid like a block of ice. They stop me from getting an erection."

Thought Insertion. Thoughts, which are not the patient's own, have been placed in his or her mind by an external source.

A twenty-nine-year-old housewife said "I look out of the window and I think the garden looks nice and the grass looks cool, but the thoughts of Eamonn Andrews come into mind. There are no other thoughts there, only his... He treats my mind like a screen and flashes thoughts on it like you flash a picture."

Thought Broadcast. The patient's thoughts are transmitted, so that others know them.

A twenty-nine-year-old student (found that) "As I think, my thoughts leave my head on a type of mental ticker-tape. Everyone round has only to pass the tape through their mind and they know my thoughts."

APPENDIX B: Educational text for Organizational Behaviour

(Examples appear in italics in the appendix only).

The Manager's Changing Environment

Focus on Productivity

Productivity is defined as a summary measure of the quantity and quality of work performance with resource utilization considered. As a criterion of work accomplishment in and by organizations, productivity has maintained its place in the vocabulary of management as the watchword of the 1990s. It is sure to be an anchor point for management long into the future.

A major part of a manager's job is to establish and maintain the conditions needed to ensure workplace productivity. In complex and challenging times, it is no longer acceptable for managers to simply get a job done (that is, to be effective in accomplishing goals). The goals must be achieved efficiently in the use of both human and material resources as well. The study of Organizational Behaviour (OB) offers many insights in both perspectives.

High productivity, in turn, requires the efforts of what are now being referred to as value-added managers - managers whose efforts clearly improve "bottom-line performance" for the organization as a whole. It also requires the creation of a total performance system in which individuals and groups in an organization truly work well together. *For example,*

Inland Fisher Guide It used to take seven weeks to manufacture one of 15 styles of steering wheels Inland Fisher Guide produces for the automobile industry. Parts were made in batches and stored until needed, and unfinished wheels were stored between production steps. Now, a single model is made in a work shift by groups of workers doing multiple tasks. There is 50 percent less scrap, 85 percent less reworking, 20 percent less labour cost per unit, 99 percent less lead time, and 25 percent less floor space used under the new methods.

The Global Economy

No one can doubt that we live at a time in which many nations and cultures of the world are increasingly interdependent. The global economy is real, and it continues to emerge in shape and power.

Today's managers are being urged to respond to this dynamic environment by "thinking global" and becoming more competitive in pursuing commercial opportunities around the world. More and more senior executives are arriving in their positions with

the benefit of “overseas experience” and knowledge gained from working abroad. More and more junior executives are being asked and encouraged to take such assignments. More and more businesses are integrating themselves through “joint ventures” and “strategic alliances” to become major players in the global economy. No, more and more domestic workers are finding themselves working for “foreign” employers in their local communities. *For example,*

British Petroleum About half of British Petroleum’s assets are from the United States, and it pumps more crude oil from U.S. territory than any oil company. The green and yellow “BP” logo appears over some 8000 U.S. service stations and 22,000 world-wide. The company is also looking for another major acquisition to expand its base in America.

In this complex global economy, there is also a growing recognition that managers around the world can learn a lot from one another. Spurred, in part, by the popularization of “Japanese management” approaches in the 1980s, management scholars now recognize that good management and good ideas about management are not confined to one country or region of the world alone. We all have things to share and learn with one another. Chapter 3 of this book is devoted to international dimensions of organizational behaviour.

Organizational Transitions

Over the last two decades the global economy has not only materialized, it has also demonstrated a tremendous power that for many of us was very new in its demands on organizations and their members - the reality of economic decline as opposed to growth. The emphasis on “downsizing,” “restructuring,” and “demassing” - all which became business buzzwords in the late 1980s- is sure to be with us for some time. And even though we do not offer the prospects of organizational retrenchment and decline as undeniable facts of a future manager’s life, we can and do support the view that tomorrow’s managers must be prepared to succeed in both the peaks and valleys of changing economic times. Among the special challenges in managing decline are the increased conflict within and between organizations and their subunits that accompany decline. Significant, too, are the associated demands for increased adaptation and change, including the need for work-force adjustments and alternative organizational structures.

No longer can the scholar or manager be content to view the management of growth as a predominant concern. Learning to live with, cope with, and manage in situations of decline are now equally significant sources of challenge and concern. Perhaps a situation of decline may even test the manager to the ultimate as a sponsor of “productivity” in the broadest use of the term. *For example,*

Navistar International Corporation Forces of economic decline and management lead Navistar International to the brink of bankruptcy. A successful transition into a streamlined company, now increasingly known as a world-class competitor and innovator, was accomplished when new management downsized the firm, changed the company culture in a positive way, and created a new structure and strategies to compete

in the global economy.

Developments in Information Technologies

Another undeniable aspect of our dynamic work environment is the continued emergence of information and computer technology as a dominant force in our lives. We live at a time when expert systems are increasingly using techniques of artificial intelligence to facilitate complex diagnosis and decision making for businesses; we live in a time when organizations are creating new top management jobs for a position called "chief information officer"; and, we live in a time when managerial work stations are being constructed around personal computers linked together in local and wide area networks to serve a variety of functions. Indeed the modern "computer-literate" worker and manager must - at a minimum - be able to use a "PC" and take advantage of popular word-processing, data-base, spreadsheet, graphics, and networking programs.

Yet most of the technological revolution probably lies before us. As the pace of change in information and computer technology quickens, the results will be revolutionary indeed - for workers, for managers, and for organizations. What it presently means, at a minimum, is that machines are now able to do many routine chores more cheaply and accurately than people; that more information for planning and control is now available at all levels of operations; and that both people and organization structures must now adjust to new ways of doing things. *For example,*

Next, Inc. Steve Jobs - one of Apple Computers' co-founders - has used technology to create a highly advanced manufacturing system at Next, Inc. Computer circuit boards move on an assemble line where robots place tiny components, lasers make the electrical connections, and 1700 tiny dabs of solder are applied. Only after 20 minutes, when the board reaches the end of the line, does a person appear to check the work. Not much checking is needed, since Next, Inc. Circuit boards have a defect rate one-tenth the industry standard.

New Ways of Organizing

One outgrowth of changes in the contemporary environment has been the emergence of new ways of organizing the workplace - and we're talking about more than the introduction of new technologies. *For example,*

Corning Glass, Inc. The company's Blacksburg, Virginia plant was renovated; 7,500 applicants were screened for 100 new jobs. There are no time clocks in the plant and no supervisors; there are just eight managers. Employees spend one-fifth of their time in training and earn pay increases for mastering new skills. The emphasis is on teamwork, job rotation, and self management. Everyone belongs to a team whose six or so workers set their own goals, make schedules, and assign work. All this is a stark contrast to the plant's former assembly-line organization where each worker toiled alone at one, and only one job.

More and more organizations are turning to new ways of bringing people and

technology together to create the “high-performance” systems discussed earlier in this chapter. *Like Corning*, they are experimenting with revised production and service operations that emphasize teamwork and group-based tasks, performance-based incentives and reward systems, intense training and development of employees, continuous learning and improvement for the organization as a whole, reduced external supervision and increased individual responsibilities, fewer levels of management, fewer numbers of staff personnel, and greater emphasis on organizational adaptation, innovation, and performance.

Any manager must be informed about such developments, and be willing and able to fully participate in the new-form workplaces they represent. It may be that the 1990s will become known as the decade that fundamentally changed the way people work.

Changing Demographics and Work Force Diversity

A most significant trend involves developments in population demographics and work force diversity. Changes in population demographics are affecting the job mix and career opportunities in the 1990s and will continue to do so. Whereas reports like “Workplace 2000” note that jobs are growing more complex and demand workers with higher levels of skills, these reports express great concern over the current availability of skilled workers and the quality of education being offered to create future ones. This is a most important issue - both in the United States and elsewhere. *For example,*

Shering-Plough Corp. Management is worried about a shortage of scientists and engineers at this New Jersey medical-products firm. Recruiting strategies are under review, and the company is going to be more aggressive in its efforts to find job candidates on college campuses.

For the 1990s it is expected that:

America’s work force will grow more slowly, the number of people aged 16-24 will fall, and those over 35 will rise

The countries of the European Community - notably Ireland, Britain, France, and West Germany, will have fewer younger workers.

Japan will experience a slight growth in population but will see a steady decline in workers under the age of 25.

Forecasts of where the jobs will be in the 1990s indicate that many will be available, but they will mostly be found in the service sectors of the economy - including business services, professional services, specialized services and financial services. As big business has been losing jobs, job creation includes small - and medium - sized businesses that stress entrepreneurship and innovation.

The manager of tomorrow will work and perform in settings where personal creativity and small organizational size are the norms. This person will also need to be skilled at managing work force diversity, that is a work force consisting of a broad mix of workers from different racial and ethnic backgrounds, of different ages and genders, and of different domestic and national cultures. In the United States alone, the proportion of

native white men in the new work force is decreasing while that of women grows, the proportion of both non - white men and women is also growing, and the proportion of immigrant men and women is also growing. Indeed, nearly two-thirds of the new entrants to the 1990s work force will be women and another 20 percent will be non - white or immigrant men.

APPENDIX C: Example of a Text Page in Hypertext

Page 2 of 14

Clinical Symptoms of Schizophrenia

The symptoms of schizophrenic patients involve disturbances in several major areas - thought, perception, and attention; motor behaviour; affect or emotion; and life functioning. The range of problems of people diagnosed as schizophrenic is extensive, although patients who are so diagnosed typically have only some of them. The Diagnostic and Statistical Manual (DSM) determines for the diagnostician how many problems must be present, and in what degree, to justify the diagnosis. Unlike most diagnostic categories that we have considered, there is no essential symptom that must be present. Thus schizophrenic patients differ from one another more than do patients with other disorders.

The heterogeneity of schizophrenia suggests that it would be appropriate to try to subdivide schizophrenics into types who manifest particular constellations of problems. Here we will review the major symptoms of schizophrenia. These symptoms derive from the DSM criteria as well as from information collected in a large-scale investigation of Schizophrenia, the International Pilot Study of Schizophrenia (IPSS), conducted by the World Health Organization (Sartorius, Shapiro, & Jablensky, 1974).

APPENDIX D: Example of a Printout of a Page of Data

195 seconds on page 2
117 seconds on page 3
146 seconds on page 4
83 seconds on page 5
143 seconds on page 6
50 seconds on page 7
102 seconds on page 8
71 seconds on page 2
79 seconds on page 3
99 seconds on page 4
91 seconds on page 5
59 seconds on page 6
29 seconds on page 7
79 seconds on page 8

TOTAL SECONDS SPENT READING: 1343

APPENDIX E: Final Page of Material in Hypertext

APPENDIX F: Background Questionnaire

1. Educational Information: Undergraduate Year
2. Departmental Major: _____
3. How familiar are you with the subject of Abnormal Psychology?
not at all familiar 0 1 2 3 4 5 6 7 8 9 very familiar
4. How familiar are you with the subject of Organizational Behaviour?
not at all familiar 0 1 2 3 4 5 6 7 8 9 very familiar

APPENDIX G: Quiz for Abnormal Psychology

(An asterisk will be included beside the correct response in the Appendix only).

This quiz consists of 12 multiple choice questions related to the text material that was presented to you. Please circle the letter associated with the best answer to each question.

After each of the 12 questions please complete a scale rating how confident you are that you answered the preceding question correctly. There are 12 rating scales in total. Each one specifically refers to the question that precedes it.

- 1) "I have legs made out of carrots. They will run because the thorn is prickly."
Which symptom of schizophrenia is this an example of?

- a) thought insertion
- b) somatic passivity
- * c) disorganized speech
- d) loose associations

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

- 2) A psychologist has trouble understanding a schizophrenic patient because he is jumping from topic to topic. Which of the following symptoms of schizophrenia is the patient displaying?

- a) thought withdrawal
- b) loose association
- * c) thought broadcast
- d) disorganized speech

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

- 3) An individual with schizophrenia wants to watch TV with a friend but rather than tell the friend this, she says, "The TV is too loud. Loud noises hurt my mother's ears..."

Which symptom of schizophrenia is this an example of?

- * a) somatic passivity
b) loose association
c) thought insertion
d) disorganized speech

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

- 4) A schizophrenic patient is convinced that his phone is tapped and the neighbours are listening in on his phone calls.

Which symptom of schizophrenia does this represent?

- * a) delusions
b) disorganized thoughts
c) loose associations
d) persecutory deviations

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

- 5) Which of the following is a characteristic of loose association?

- * a) a negative schizophrenic symptom
b) train of associations with topics previously mentioned
c) a type of delusion
d) associating oneself with fictional characters

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

6) Which of the following is a characteristic of delusions?

- a) speaking in several different tones during the same sentence
- b) jumbled thoughts that are incomprehensible
- * c) having thoughts that others question
- d) none of the above

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

7) A patient complains of feeling sharp pins entering his skull and sending electric shock sensations through his body to his toes.
Which schizophrenic symptom does this represent?

- * a) somatic passivity
- b) thought broadcast
- c) derailment
- d) none of the above

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

8) "I see the world of a musical legend through Michael Jackson's eyes."
Which schizophrenic symptom does this represent?

- a) thought broadcast
- b) role playing
- * c) thought insertion
- d) both b and c

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

- 9) Which of the following is most likely a statement from a schizophrenic patient displaying somatic passivity symptoms?
- a) "I try to tell my mother what I need but I get sidetracked on several different tangents and can't get to the point."
 - b) "I try to think of what groceries I need to buy but someone scoops the ideas from my mind, leaving it empty."
 - c) "I keep pinching my arm but it doesn't hurt."
 - * d) "I feel cold tingles in my knees that move into my feet and make my toes numb."

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

- 10) Which of the following is the best example of thought insertion?

- a) "I am the Queen of England."
- b) "The FBI can read my thoughts by tapping into my mind."
- * c) "My mind is filled with the creative ideas of William Shakespeare."
- d) "If I jump off this building, I can fly."

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

- 11) An individual sitting in a doctor's waiting room feels her thoughts are being recited aloud on the intercom system.
Which schizophrenic symptom does this represent?

- a) persecutory delusions
- * b) thought broadcast
- c) derailment
- d) thought transference

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

12) Which of the following examples is correctly matched with the symptom it describes?

- a) "I think that the characters on the TV screen came into my living room this morning." - describes thought insertion
- b) "I tell everyone what I think of them whether they like it or not." - describes thought broadcast
- c) "I can't concentrate on a task because the radio broadcasts send a ringing sound through my ears." - describes thought insertion
- * d) "It's like my thoughts leave my mind and get written on a chalkboard over my head for everyone to see." - describes thought broadcast

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

APPENDIX H: Quiz for Organizational Behaviour

(An asterisk will be included beside the correct response in the Appendix only).

This quiz consists of 12 multiple choice questions related to the text material that was presented to you. Please circle the letter associated with the best answer to each question.

After each of the 12 questions please complete a scale rating how confident you are that you answered the preceding question correctly. There are 12 rating scales in total. Each one specifically refers to the question that precedes it.

1) Three years ago, it took *Miller's Furniture* 4 weeks to assemble their cherry oak dining sets. Pieces of furniture were made separately, such that extra chairs were stored until they could be matched with tables that took longer to make.

Now workers are instructed to work on tables rather than build as many chairs so now tables are stored until there are enough chairs to accompany them. A dining set still takes about four weeks to assemble. There is 15% less floor space used by storing tables rather than chairs.

This is an example of:

- a) work of a value-added manager
- * b) work of a manager who does NOT fit the description of a value-added manager
- c) a move towards a global economy
- d) a transition towards increased productivity

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

2) Which of the following is an example of a value-added manager?

- a) a manger who increases labour cost per unit, increases productivity and decreases the amount of scrap left over
- b) a manager who decreases labour cost per unit, increases productivity, and increases the amount of scrap left over
- * c) a manager who organizes morale boosting exercises for staff and decreases labour cost per unit
- d) a and b are both examples of a value-added manager

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

3) A manager wishes to effectively enhance her business in a global economy. Which of the following would be a bad decision for her to make in bringing her business into a global economy?

- a) develop products in other countries
- * b) move the company from one country into another country where cost of running it is cheaper
- c) distribute the company's products to other countries
- d) send employees to receive training in other countries

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

4) Which of the following countries appears most concerned with being part of the global economy?

- a) The *Bath and Body* company operating out of Vancouver, Canada incorporates plants typically found in warm climates like in South America in its products.
- b) *Kluck Kluck Chicken* expanded its franchise from Newfoundland throughout Canadian provinces to British Colombia with at least 2 locations in every province.
- * c) *Vista Jeans*, developed in Orlando, U.S.A., opens up a second jeans factory in London, England.
- d) *ABC Computer* manufacturers hired their entire staff from Toronto, Canada, to come and work in their headquarters in Ottawa, Canada.

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

5) As a result of economic decline, a company finds its costs much exceed its profits. As a result, the company is increasing its debt on the verge of facing bankruptcy.

New management is hired. It downsizes the company and creates new structure.

As a result, the company begins to earn a profit again.

This demonstrates:

- a) value added management
- * b) effective organizational transition
- c) increasing work force diversity
- d) value added management and increasing work force diversity

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

6) According to the text, which of the following represents organizational transition because of current economic decline?

- a) As a result of the decline in zipper sales because since the invention of velcro, *Zip Up Zippers* is facing bankruptcy and is forced to downsize.
- b) *Perk Up Coffee's* business in the U.S. is doing well but their business in Canada is doing very poorly. As a result, they decide to move their headquarters to the U.S. and transfer some of their funds from Canada to the U.S.
- c) *Fashion Furs* finds sales have dropped dramatically since the anti fur campaigns began. They find themselves in a significant amount of debt. As a result, they lay off some of their staff and consider using materials other than fur.
- * d) a, b and c all represent organizational transition because of current economic decline.

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

7) Which of the following best demonstrates a manager's move towards the technological revolution?

- a) A manager recruits staff directly from a computer college to ensure they will be efficient workers.
- b) A manager buys 20 new computers because with a recent increase in staff, employees must share computers.
- c) A manager hires an individual to repair 25 of the company's computers that are not functioning properly.
- * d) A manager buys a new statistical software package that allows staff to perform calculations more quickly than by hand.

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

8) Which of the following is a potential consequence of a manager incorporating developments of information technologies into her/his company?

- a) A computer company will increase its sale of Personal Computers (PCs) to single individuals as well as families.
- b) Individuals may loose jobs that can now be performed using technology.
- c) The number of defective products may decrease if technology is developed that can perform complex tasks.
- * d) b and c are both potential consequences of a manager incorporating developments of information technologies into her/his company.

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

9) Which of the following represents effective organization of the workplace?

- * a) Worker's record their own hours and keep a personal log of duties performed.
during the day rather than having a supervisor do it.
- b) Employees work shift work rather than full time hours.
- c) In order to ensure they perform a task well, each staff member is assigned to one task on an assembly line in a factory for the time they are with the company.
- d) Managers assign a months duties for their employees at the beginning of each month.

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

10) Which of the following is incorporated into a high-performance system?

- * a) increased performance-based incentives for employees
- b) increased external supervision over employees
- c) increased task-based incentives for employees
- d) individual based tasks rather than group based tasks for employees

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

11) Which of the following represents a potential problem with the workplace in the coming years according to the text?

- a) a decrease in skill requirements for jobs
- b) overflow of skilled individual to fill jobs
- c) increase in the number of managers in a company
- * d) shortage of skilled labourers

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

12) Which of the following was forecast to be an area where jobs would be found in the 1990s?

- a) business services
- b) professional services
- c) national services
- * d) both a and b

How confident are you that you answered the question above correctly?

not at all confident 0 1 2 3 4 5 6 7 8 very confident

APPENDIX I: Follow Up Questionnaire

Please rate the text you have just read.

I. The following six questions relate to the text about: Schizophrenia - Abnormal Psychology (or Management - Organizational Behaviour)

1. Did you find the material interesting?

not at all 0 1 2 3 4 5 6 7 8 very interesting

2. Did you find the material clear?

not at all 0 1 2 3 4 5 6 7 8 very much

3. Could you relate the material to real life?

not at all 0 1 2 3 4 5 6 7 8 very much

4. How much of the material do you understand?

none 0 1 2 3 4 5 6 7 8 all

5. What score do you think you received on the quiz? _____ %

APPENDIX J: Introduction to Experiment

Thank you for volunteering to participate in the experiment. The purpose of this study is to examine how the style of text writing affects learning.

You will be asked to answer a couple of questions regarding background information about yourself. You will then be given an excerpt of a few pages from a text book presented in hypertext on a computer and asked to read them. The subject of the material is Abnormal Psychology (or Organizational Behaviour, depending on what condition subjects are in). You will have half an hour to go through the material.

You will then move away from the computer and the text material and you will be given a quiz of 12 multiple choice questions on the material you have just read. After each question there will be a rating scale assessing how confident you are that you answered the preceding question correctly. You will have 15 minutes to complete the quiz. Once you are finished with the quiz you will be asked to complete a final questionnaire examining your reactions towards the text presented to you. Then you will repeat this with text from Organizational Behaviour (or Abnormal Psychology depending on the condition participants are in).

The entire process should not take more than 2 hours. I will give you an informed consent form to look over and sign if you would like to continue with the experimental session. Please note, you can cease to participate at any time if you wish. After you complete the experiment, you will be given a debriefing form which will give you more information about the study.

Do you have any questions?

APPENDIX K: Informed Consent Form

Guideline

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present Study: The Evaluation of Educational Textual Material:

Research Personnel. The following people are involved in this research project and may be contacted at any time. Fariya Syed (Principal Investigator, 520-2600, ext. 8204), Dr. W. Thorngate (Faculty Sponsor, 520-2600, ext. 2706). Should you have any ethical concerns about this study, please contact Dr. M. Gick (Chair, Dept. of Psychology Ethics Committee 520-2600, ext.2664) or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

Purpose. The purpose of this study is to examine how the style of text writing affects learning. The purpose of this study is to examine whether certain features of text material enhance learning or the reader's impression of the material (i.e. interest and meaning).

Task Requirements. You will be required to read excerpts of educational text on a computer. All material provided to you (on the computer) will then be taken away and you will be required to complete a quiz and questionnaire regarding the material presented. You will then repeat the procedure with text from another discipline.

Duration and Locale. The experimental session will last approximately 2 hours. Testing will take place in room A428 of the Loeb Building, Carleton University.

Potential Risk/Discomfort. There are no potential physical and no psychological risks in this experiment.

Anonymity/Confidentiality. The data collected in this experiment is confidential. All data is coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to Withdraw. You have the right to withdraw from the experiment at any time without academic penalty.

Signatures

I have read the above description of **The Evaluation of Educational Textual Material** and understand the conditions of my participation. My signature indicates that I agree to participate in the experiment.

Participant's Name: _____

Participant's Signature: _____

Researcher's Name: _____

Researcher's Signature: _____

Date: _____

APPENDIX L: Debriefing form

There is more to the study than I have told you about so far. But before I tell you exactly what it is, I would like to explain why it is necessary in some kinds of psychological studies not to tell people all about the purpose of the study at the very beginning. In some kinds of studies, if we tell people what the purpose of the experiment is and what we predict about how they will react under particular conditions, then they might deliberately do whatever it is they think that we want them to do, just to help us out and give us the results that they think we want. If that happened, their reactions would not be a good indication of how they might react in a situation in everyday life, where they didn't think they were being studied or that a psychologist was predicting that they would react in a certain way. What would be influencing them is what they thought the purpose of our study was rather than the specific conditions that we are trying to investigate. It is also possible that the opposite might occur and that people might think that if we predicted that they would do a certain thing, they might deliberately not do that to show us that we can't figure them out. That would also make the results invalid, because again what people would be responding to is what they thought we were looking for rather than responding naturally as they would in everyday situations. This is not a problem in all studies. For example, in a study where researchers wanted you to specifically focus on an item to be recalled, they would do their best to make sure you focus on this item. Now I would like to explain exactly what we are trying to get at in this study, and why we couldn't tell you everything from the beginning.

You were told that the purpose of this study was to examine how the style of text writing affects learning. This is true. What was not specified was that the specific feature of educational material that will be focused on in this study is the effectiveness of examples in learning textual material. Our concern was that if you had been told that this study focused on examples in the text, you may have been influenced to either attend to them or not attend to them instead of reading the material as you normally would.

Examples are found throughout qualitative text material. Despite this, little past research has investigated the effects of examples on learning educational material. Some past findings provide insight into how examples may effect learning.

Concrete material is encoded differently and recalled more quickly, easily and with greater confidence than abstract material. Examples are concrete representations which illustrate more abstract concepts. Confidence in answering questions related to material increases with increasing amounts of material presented.

Examples also provide instructional support. General examples as well as those which relate material to a context which is familiar to the reader facilitate learning when compared to abstract contexts or unfamiliar contexts.

Material with examples is sometimes rated more positively than abstract information, while in other cases it is not.

The present study attempts to examine whether examples facilitate learning by increasing the amount learned. This study also examines whether the inclusion of examples in text makes the text more helpful, interesting, meaningful and understandable for learners. Also of interest is whether participants of the study read examples in the text or skip over them. The computer program on which the text is presented keeps a record

of the amount of time each participant spends reading each page of text. Examples are presented on separate pages of text. In order to investigate whether participants of this study read examples in the text, the amount of time they spend reading pages of text which contain examples will be noted.

In the present study, subjects will read material related to two disciplines, Abnormal Psychology (AP) and Organizational Behaviour (OB). Half the participants in this study will be presented with text about OB with examples while the other half will be presented the same text with examples deleted from the text. If participants read OB text with examples, they will receive AP text without examples. If participants read OB text without examples they will receive AP text with examples. Therefore, some of the text material presented to subjects in this study contains examples and some of the text material does not. One of the two quizzes participants complete, on AP or OB, will test their learning of text with examples while the other quiz will test their learning of text without examples. It is expected that individuals will receive significantly higher scores on material with accompanying examples regardless of the subject matter of the text they receive. This will indicate that examples facilitate learning by increasing the amount learned. It is also expected that subjects will rate text with examples as more interesting, meaningful, helpful and understandable than text without examples on the questionnaire presented after the quiz.

It is expected that including examples in text will make learners more confident about answering questions related to the material. The relationship between confidence in correctly answering questions related to text material presented and the following two measures will also be explored: self rated knowledge in the topic of material presented, accuracy in answering questions related to material presented.

We would like to thank you for participating in this study. Your time and efforts are much appreciated. Due to the nature of this research we ask you not to discuss the subject matter with potential participants until testing is complete (approximately Dec. 1998).

If you have any questions or comments about this research, then please feel free to contact Fariya Syed (Principal Investigator, 520-2600, ext. 8204), Dr. W. Thorngate (Faculty Sponsor, 520-2600, ext. 2706). Should you have any ethical concerns about this study, please contact Dr. M. Gick (Chair, Dept. of Psychology Ethics Committee 520-2600, ext. 2664) or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).