# DO STUDENT LEARNING PREFERENCES (VARK) AFFECT THE BENEFIT OF AN ACTIVE-LEARNING PROJECT IN AN INCOME TAX I COURSE?

*Judith A. Sage, A. R. Sanchez, Jr. School of Business, Texas A & M International University, 5201University Blvd., Laredo, TX 78041, 956-326-2493, lloydsage@aol.com*

## ABSTRACT

An Income Tax I active-learning exercise required the students to prepare a report on complex income tax topics. There was a significant difference between the experimental/control groups on Quiz/Exams for Project B and the Final Exam for Project A. Also, the students' change in test scores for the projects was matched with the students' learning preferences to determine benefit of the projects for the students with different learning preferences using the VARK (**V**isual, **A**ural, **R**ead/Write, and **K**inesthetic) instrument [Fleming and Mills (1992)]. A high percentage of the test results improved or remained the same for the Visual, Read/Write, and Kinesthetic students. It appears that this active-learning exercise is a good teaching technique.

## INTRODUCTION

Over the last two decades calls have been made for change in the teaching of accounting. Albrecht and Sack (2000) emphasized that accounting educators need to help students to develop the ability-to-learn skills. Both the Wilkin and Collier (2009) and the Flood and Wilson (2008) studies have recommended that accounting programs should deviate from the traditional practice of conveying large amounts of technical knowledge and, instead, foster students' understanding of the principles and concepts involved with accounting business practices. Our active-learning project (self-generated elaboration) required the students to do some conceptual thinking and writing on complex income tax topics.

Both the Accounting Education Change Commission [AECC] (1990) and the AICPA (1999) in the Framework indicated the need for entry-level accounting professionals to be able to organize and evaluate information. Further, Albrecht and Sack (2000) emphasized the importance of "teaching students how to find answers and how to learn." The active-learning project in this research required the students to locate and organize income tax information in an Income Tax I course.

Albrecht and Sack (2000) indicated that there is a need to change the delivery method of accounting education. In addition, Shanahan and Meyer (2001) recommended that research be conducted to facilitate a better understanding of what, why, and how students learn in order to assist accounting instructors in teaching. One way to change the delivery method and to better understand the student's learning process is to consider the student's learning styles or preferences when teaching.

According to Jackson and Durkee (2008), the instructor's role must shift from being just the presenter of facts to facilitator of active learning. Wessels (2010) suggested that the instructor's fundamental task is to encourage students to utilize learning activities that will most likely result in the students accomplishing the desired learning outcomes for the course. This study presents an elaboration technique that required the students to actively participate in the learning process by obtaining and organizing information on selected technical tax topics [determination of gain or loss and basis determination rules (G/L&B) and special basis determination rules, effect of liabilities on amount

realized and disallowed losses (SB&L&DL)]. This study contributes to the existing accounting literature by investigating the effects of outside of class elaborations on relatively-complex tax topics.

Baltazar *et. al.* (2001) suggested that course designs should include instructional methods that reflect student learning preferences because of their individual learning-style differences. Further, Hawk and Shah (2007) believed that the use of learning-style instruments to assist in the selection of learning activities should enhance the effectiveness and quality of the learning by the students. In our study the students' learning preferences were determined using the VARK learning preference inventory instrument [Fleming and Mills (1992)]. The students' learning preferences were analyzed to ascertain the benefit of the students' preparation of the tax active-learning project.

## THEORY

Levin [1988] found that the learning process might be enhanced by utilizing elaborations. According to Anderson (1983) an elaboration is any information that explains or clarifies some to-be-learned (target) information. Elaborations can be considered as the link that permits the new target information to be incorporated into the learner's existing knowledge. Types of elaborations include self-explanations, summaries, examples, and analogies. Self-generated elaborations are generally superior to externally presented information because they can be better integrated with the learner's existing knowledge (Pressley *et al.* 1987; Jacoby 1978; Slamecka and Graf 1978; McFarland, Jr., *et al.* 1980; Springer and Borthick 2007; Hermanson 1994; Hite and Parry 1994; Cottell and Millis 1993; and Schadewald and Limberg 1990). These research studies involved the encoding of topics that were relatively basic or not very complex. Our research investigated whether the elaboration project (involving relatively complex income tax topics) improved students' quiz and exam scores.

Researchers [Anderson (1995), Driscoll (1994), Gagné and Medsker (1996), Gredler (1997), and Schunk (1996)] have suggested that instructors need to establish different learning opportunities to accomplish different types of learning objectives. Boh *et al*. (2001) indicated that lecture-based training/education may not be an adequate transfer technique when complexity of knowledge is high. Bonner (1999, p. 11) suggested that "learning objectives involving complex skills require teaching methods that promote active learning on the part of students, while learning objectives involving simpler skills can be achieved with more passive teaching methods." In this study the students were required to organize complex tax topics using an active-learning elaboration technique.

In summary, prior literature suggested that self-generated elaborations can enhance the learning process. As Hite and Parry (1994) suggested the benefit of elaboration techniques may have a greater short-term effect and middle-term effect than a long-term effect. The following hypothesis is used to test these effects (using the chi-square test):

$H_1$: The distribution of Quiz (Exam I) [Final Exam] scores on the G/L&B (SB&L&DL) questions are the same for the students who prepared an outside of class project on these topics as the students who did not prepare an outside project for these topics.

### VARK Learning Preference Inventory

A short learning preference inventory instrument (VARK), which was developed by Fleming and Mills (1992) to determine sensory modality preferences when processing information [i.e., instructional prefer-ence(s)], was used in this research. VARK is an acronym for **V**isual, **A**ural, **R**ead/Write, and

**K**inesthetic sensory modalities that are utilized for learning information. According to Fleming and Mills, the "Visual Preference" modal includes depiction in the form of charts, graphs, flowcharts, symbolic arrows, circles, hierarchies, and other methods that can be used to represent what could be presented in words. The "Aural Preference" modal involves learning from lectures, tutorial and talking to other students. Students with the "Read/Write Preference" modal learn when the information is displayed as words. The "Kinesthetic Preference" modal involves learning through experience, examples, practice, or simulation. It should be noted that students can have more than one learning preference.

## RESEARCH METHODS

An Income Tax I class taught by one of the researchers was used in the experiment. There were no significant differences between the two experimental groups (G/L&B rules and SB&L&DL rules) on the reported demographic information. The instructor required the students to complete the VARK inventory instrument (VARK) during the first day of class. The Income Tax I class was divided into two groups. The students in Group A were asked to prepare a project (Project G/L&B) to assist them in learning about determination of gain or loss and basis determination rules. The other students in the class (Group B) were asked to prepare a project (Project SB&L&DL) to assist them in learning about special basis determination rules, effect of liabilities on amount realized, and disallowed losses rules. The students in both groups A and B were told they could use a checklist, chart, graph, grid, flowchart, mapping, outline, tree, or other approach that would help them understand the topics.

In the class period following the discussion of the homework problems on these topics a Quiz was given. On this Quiz there were 11 points related to G/L&B rules and 11 points pertaining to SB&L&DL rules. The results of the Quiz were used to measure the short-term effect of this teaching technique. About two weeks after the active-learning elaboration project was completed, Exam I was given. On Exam I there were two multiple choice questions and a short calculation problem for each of these topics. The results of Exam I were used to measure the middle-term effect of this active-learning elaboration technique. In order to examine the long-term effect of this teaching technique, there were three multiple-choice questions and a short calculation problem for each of these tax topics on the Final Exam.

### VARK Learning Preference Inventory

The active-learning elaboration project may not be as equally helpful for all learning style preferences. As previously mentioned, Baltazar *et. al.* (2001) recommended that course designs should include instructional methods that reflect student learning preferences. On each quiz/exam only a portion of the testing instrument involved the elaboration project topics. A portion of each quiz/exam involved a very similar set of rules for which the student did not prepare an elaboration project. Therefore, it was possible to compare the students' test scores related to the project to the test scores of the similar set of rules for each quiz/exam. As a result, student learning preferences were compared to the students' change in test scores for the similar topic rules (project vs. non-project) for each quiz/exam.

According to Fleming and Mills (1992), the "Visual Preference" modal involves depiction in the form of charts, graphs, flowcharts, symbolic arrows, circles, hierarchies, and other methods that can be used to represent what could be presented in words. Since the elaboration project encouraged the students to use a chart, graph, grid, flowchart, mapping, and/or tree, it was expected that the students with the "Visual Preference" should improve their quiz/exam scores.

"Read/Write Preference" students learn more efficiently when the information is displayed as words. The elaboration project required the students to read the appropriate tax topic rules. In addition, the students were required to concisely organize the rules into a written report. Also, the students were instructed to read/review their elaboration project before each quiz/exam. As a result, the elaboration project should be beneficial to the students with the "Read/Write Preference" learning style.

The "Kinesthetic Preference" modal involves learning through experience, examples, practice or simulation. While organizing the tax topic rules involved in the project, the students could use examples or develop simulations for their project. Therefore, it was expected that the elaboration project may be moderately beneficial to students with the "Kinesthetic Preference" learning style.

As previously mentioned the "Aural Preference" modal involves learning from lectures, tutorial and talking to other students. Since the elaboration project did not entail any of these learning methods, it was expected that the project may not result in much higher quiz/exam scores for the project rules than the non-project rules by the "Aural Preference" students. Remember that students can have more than one learning preference.

## RESULTS

The purpose of this elaboration project was to encourage the students to participate in an active learning process. They were required to obtain and organize information on relatively complex tax topics (G/L&B rules and SB&L&DL rules). A Quiz was used to evaluate the short-term effect of the project. The middle-term effect was measured using Exam I and the Final Exam was utilized to measure the long-term effect.

For both the G/L&B Project and the SB&L&DL Project, the experimental group Quiz scores (11 points for each project topic) were higher than the control group scores. Even though the G/L&B Project experimental group scored higher, the chi-square test indicated that there was no significant difference. For the SB&L&DL Project the chi-square test indicated that the experimental group scored significantly higher ($p = .10$) than the control group.

For both the G/L&B Project and the SB&L&DL Project, the experimental group Exam I scores were generally higher than the control group scores. Even though the G/L&B Project experimental group scored higher, the chi-square test indicated that there was no significant difference. For the SB&L&DL Project the chi-square test indicated that the experimental group scored significantly higher ($p = .05$) than the control group.

For both the G/L&B Project and the SB&L&DL Project, the experimental group Final Exam scores were generally higher than the control group scores. The chi-square test for the G/L&B Project indicated that the experimental group scored significantly higher ($p = .05$) than the control group. For the SB&L&DL Project the chi-square test indicated that the experimental group scored significantly higher ($p = .01$) than the control group.

On the Final Exam the elaboration project appears to be beneficial for both of the experimental groups. Also, the elaboration project appears to be beneficial for the SB&L&DL Project experimental group on both the Quiz and Exam I. Since the G/L&B Project experimental group scored higher, even though not significant, than the control group, there appears to be some positive benefit to preparing this elaboration

project. As previously discussed, the active-learning elaboration project may not be as equally helpful for all learning style preferences. It is possible that the students in the G/L&B Project experimental group had different learning style preferences than the SB&L&DL Project experimental group.

**VARK Learning Preferences**

The students' test scores related to the project were compared to the test scores of the similar set of rules (with no project) for each quiz/exam. As a result, it was possible to examine student learning preferences in relation to the students' change in test scores for the similar topic rules (with and without project) for each quiz/exam.

For the "Visual Preference," the students' (SB&L&DL Project group) scores were equal to or higher as related to these rules than the scores for similar rules (without the elaboration project) for both the Quiz and Exam I but not for the Final Exam. However, there were no students with the "Visual Preference" in the G/L&B Project group. Since it was expected that the students with the "Visual Preference" would strongly benefit from this elaboration project, the lack of students with this learning preference in the G/L&B Project group could help explain why there were no significant differences on the Quiz and Exam I scores for this group.

All of the students with the "Read/Write Preference" in the G/L&B Project group had test scores that were higher or equal to the scores for the non-project rules on the Quiz, Exam I, and the Final Exam. For the SB&L&DL Project group, 100% of the Quiz scores were higher or equal to the scores for the similar rules, but the number of students with higher or equal scores declined for Exam I (to 40%) and the Final Exam (to 20%). Overall, for both groups the results were as expected because the project requirements reinforced both reading and writing. Specifically, the elaboration project required the students to read the appropriate tax topic rules. In addition, the students were required to concisely organize the rules into a written report. As a result, it appears as if this project is a satisfactory teaching method for students with the Read/Write Preference.

All of the students with the "Kinesthetic Preference" in the G/L&B Project group had test scores that were higher or equal to the scores for the non-project rules for the Quiz, Exam I, and the Final Exam. For the SB&L&DL Project group, 66.67% of the Quiz scores were higher or equal to the scores for the similar rules, but the number of students with higher or equal scores declined for Exam I (to 33.33%) and the Final exam (to 33.33%). In general, for both groups the results were as expected. The project was somewhat beneficial to the "Kinesthetic Preference" students. Therefore, it looks as if the project is a moderately satisfactory teaching method for the students with the Kinesthetic Preference.

But, the "Aural Preference" student results were opposite of what was expected. The researchers expected that very few quiz/exam scores for the project rules would be higher or equal to the scores for the non-project rules. A high percentage of the Aural Preference students' scores were higher or equal to the quiz/exam scores for the project rules as compared to the non-project rules scores. However, the Aural Preference students were relatively few in number; only 36.36% of all of the students as compared to 72.73% of the students with the Read/Write Preference.

Also, as stated earlier, students can have more than one learning preference. In fact, all of the Aural students were multi-modal. Since all of the Aural Preference students were multi-modal, it could explain why the test score results were not as expected. It could be that the other learning preferences of these multi-modal students had a stronger influence on the test score results than the Aural Preference modal.

## SUMMARY AND CONCLUSIONS

The Quiz mean scores were used to measure the short-term effect of the active-learning elaboration project. The middle-term effect of this project assignment was assessed using the mean scores on Exam I. The Final Exam mean scores were used to measure the long-term effect of this project. The chi-square test indicated that the SB&L&DL Project experimental group scored significantly higher ($p = .10$) on the Quiz than did the control group, but this was not the case for the G/L&B Project group. For Exam I, the chi-square test indicated that the SB&L&DL Project experimental group scored significantly higher ($p = .05$) than the control group, but the G/L&B Project group scores were not significantly higher. On the Final Exam the chi-square test indicated that both experimental groups scored significantly higher than the control group with the G/L&B Project at $p = .05$ and the SB&L&DL Project at $p = .01$. Overall, the active-learning elaboration project appears to be beneficial for both of the project experimental groups.

The students' test scores related to the project were compared to the test scores of a similar set of rules (with no project) for each quiz/exam. The students' change in test scores for the similar topic rules (with and without project) for each quiz/exam was matched with the students' learning preferences.

There were no students in the G/L&B Project group with only a "Visual Preference." Generally, for the "Visual Preference" students in the SB&L&DL Project, the results were as expected. Therefore, it appears that this project is a good teaching method for the students with the Visual Preference learning style. Overall, the results were as expected for the students with the "Read/Write Preference." Therefore, it looks as if the project is a satisfactory teaching method for students with the Read/Write Preference.

For the "Kinesthetic Preference" students, the results were as expected (somewhat beneficial). Therefore, it seems that the project is a moderately satisfactory teaching method for these students. Unexpectedly, a high percentage of the Aural Preference students' test scores were higher or equal to the quiz/exam scores for the project rules as compared to the non-project rules scores. This could have resulted because all of the Aural Preference students were multi-modal and the other modal preferences of these students dominated the test results. Therefore, it appears that generally the active-learning elaboration project is a good alternative method for teaching these relatively complex tax topics.

## REFERENCES

References are available upon request from Judith A. Sage, A. R. Sanchez, Jr. School of Business, Texas A & M International University, 5201 University Blvd., Laredo, TX 78041, 956-727-1999, lloydsage@aol.com