

Modification of Classroom Techniques to Fit Student Learning Styles  
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The current generation of students is accustomed to the instant gratification afforded by their long term exposure to computer technology and the Internet. This raises the question whether a traditional lecture style of instruction is the best means of presenting information to our current students. The implementation of course management systems such as BlackBoard have improved our ability to provide instant feedback to students and may, when used in combination with varying methods of course delivery, improve content mastery and increase student interest.

This study was designed to see whether students with different personality types as measured by the Myers-Briggs Type Indicator (MBTI) instrument would perform differently on different types of assessment instruments or on material presented in different manners. The specific objectives of this study were to:

- 1) Determine the mix of personality types present in an Introductory Plant and Soil Science (PLSC 110) class during Fall 2007 and Spring 2008.
- 2) Evaluate student performance on different assessment types relative to their preferred learning styles.
- 3) Determine whether preferred learning style affected student mastery of content presented in different manners.

During the first week of class during Fall 2007 and Spring 2008, students enrolled in PLSC 110 were administered a standard MBTI type preference instrument. A thorough explanation of the planned use of the data collected was provided to the students prior to the administration of the evaluation instrument. Students were also informed of the retention of the data for use in future career counseling through the Student Success Center. All MBTI instruments were scored by the Student Success Center. Results were returned to the students in approximately one week. At that time the results were explained with some discussion of how different personality types approach study and learning. At the conclusion of the period all students were given the opportunity to sign a consent form allowing their scores to be utilized in the study.

A total of 94 students participated in the study over the two semesters. The dataset contained 48 males and 46 females. The overwhelming majority of the group were classified as extraverts (65% vs. 35% introverts). Most of the class considered their preferred method of perception as Sensing (81%), while their decision-making style was primarily Thinking (68%) rather than Feeling (32%). When evaluating how students relate to the outside world the study group was nearly evenly divided between Judging (48%) and Perceiving (52%). When we looked at the combination of gathering and perceiving information, over half of the group (56.8%) fell into the Sensing-Thinking category.

In order to determine the impact of preferred learning style on performance in varying classroom settings we presented content in two different ways and we also administered two different types of assessment over material of similar complexity and content. Our primary comparison of style of delivery compared a standard lecture format to a guided self-study method. In the lecture format, material covering cellular respiration and the enzymes involved was presented using PowerPoint assisted lecture and classroom discussion. For the guided self-study format students were presented a fill-in study guide along with several resource files on BlackBoard to access the necessary information. The resources covering phytohormones included a PowerPoint, a summary table of phytohormone functions, and several websites covering the topic.

Throughout the course of the semester students took weekly quizzes posted on BlackBoard. In order to evaluate the impact of learning preferences on performance on different assessment types two of the weekly quizzes covering topics of similar complexity and content were administered in different format. Mastery of material covering photosynthesis and the associated enzymatic reactions was assessed using a subjective short answer type assessment. Student knowledge of content related to respiration was assessed using an objective-format quiz consisting of multiple choice and true-false questions. Each of these three quizzes was worth 26 points.

To evaluate the impact of preferred learning style on performance test scores of students with differing preferences for perception and judgment types were compared using the GLM procedure of SAS for unbalanced groups. Figure 1 shows the comparison of student scores on quizzes covering the three topics based on their style of perception and judgment.

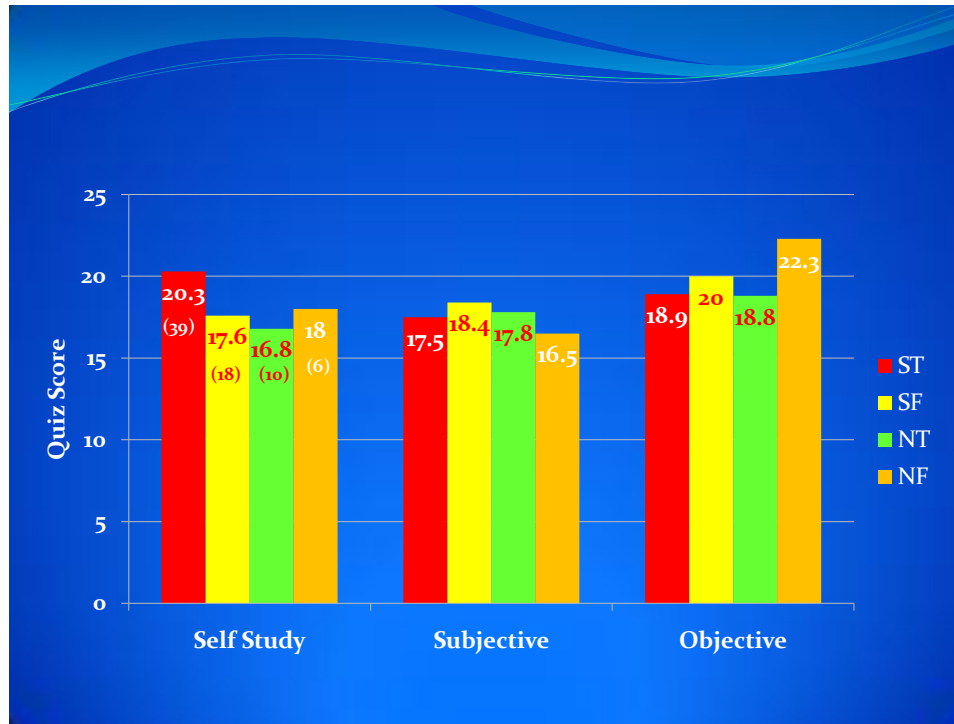


Figure 1. Test scores of students on material presented by a self-study approach and standard lecture format (subjective and objective) based on preferred learning style. Subjective refers to essay style questions covering photosynthesis, while objective refers to multiple choice and true-false questions covering respiration. The self-study material covered phytohormones and was evaluated using a objective format.

There were no significant differences among the four information gathering/decision-making types. Sensing-Thinkers scored numerically higher than the other groups on the self-study material and this group was the largest (39 students); however, Intuitive-Feelers performed better when assessed objectively over material that was presented in standard lecture format.

Overall average scores were lower on the subjective style assessment, regardless of preferred learning style. It appears that students were less comfortable with this style of assessment, although females did perform significantly better ( $p > F = 0.10$ ) on the subjective style assessment than did males (Fig. 2).

Differences were greater among learning preference types when information gathering method (Sensing vs. Intuition) was separated from decision-making style (Thinking vs. Feeling). Figure 3 indicates that Thinkers performed significantly better ( $p > F = 0.10$ ) than Feelers or those that preferred to gather information by intuition on material presented through self-study. It is quite possible that this resulted from the preference of Thinkers to logically analyze data to make decisions which may drive them to seek the necessary information through self-study. There were no other significant differences among the learning preference types, although it was again evident that all groups performed less well on the subjective style assessment.

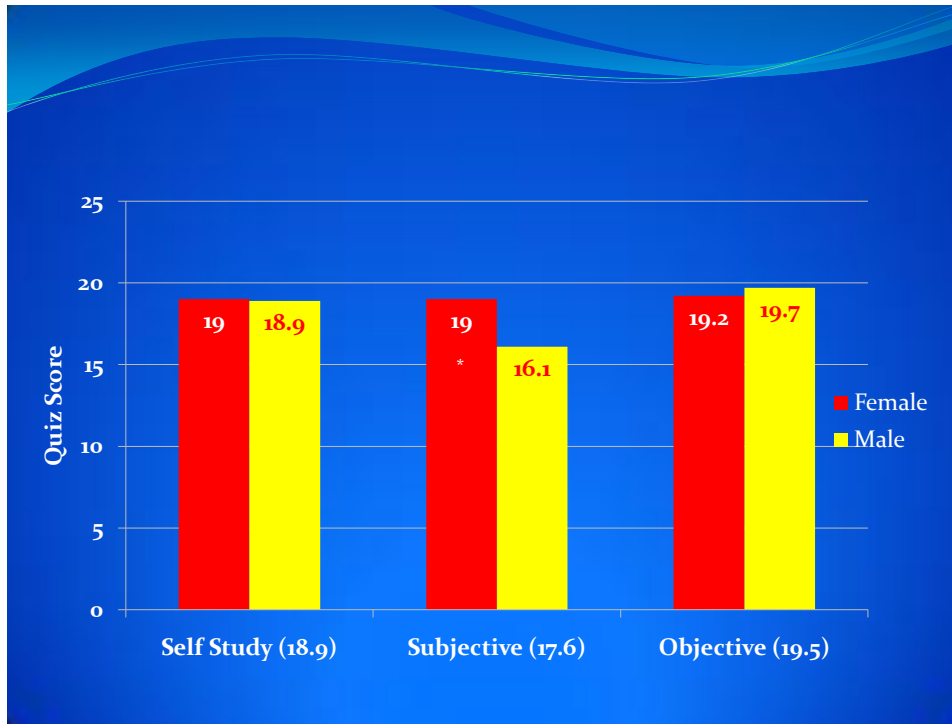


Figure 2. Test scores of students on material presented by a self-study approach and standard lecture format (subjective and objective) based on sex. Subjective refers to essay style questions covering photosynthesis, while objective refers to multiple choice and true-false questions covering respiration. The self-study material covered phytohormones and was evaluated using a objective format.

From our study, we believe that even though there were limited significant differences among learning preference groups in the present study, that MBTI offers a good method for discerning student learning preferences. It appears that students who make decisions by Thinking do better in a self-study format than do students who make decisions Intuitively. We do believe that in order to make better use of MBTI to modify teaching and learning to benefit students it may be necessary to develop more diverse delivery and assessment methods. We did learn that regardless of learning style preferences, students preferred an objective style of assessment based on their performance.

In order to better understand the influence of preferred learning style on student preferences for different styles of material presentation and performance on different assessment instruments we believe that we need to continue this study to increase sample size. We may also diversify our methods of delivery and assessment to provide a better separation of learners.

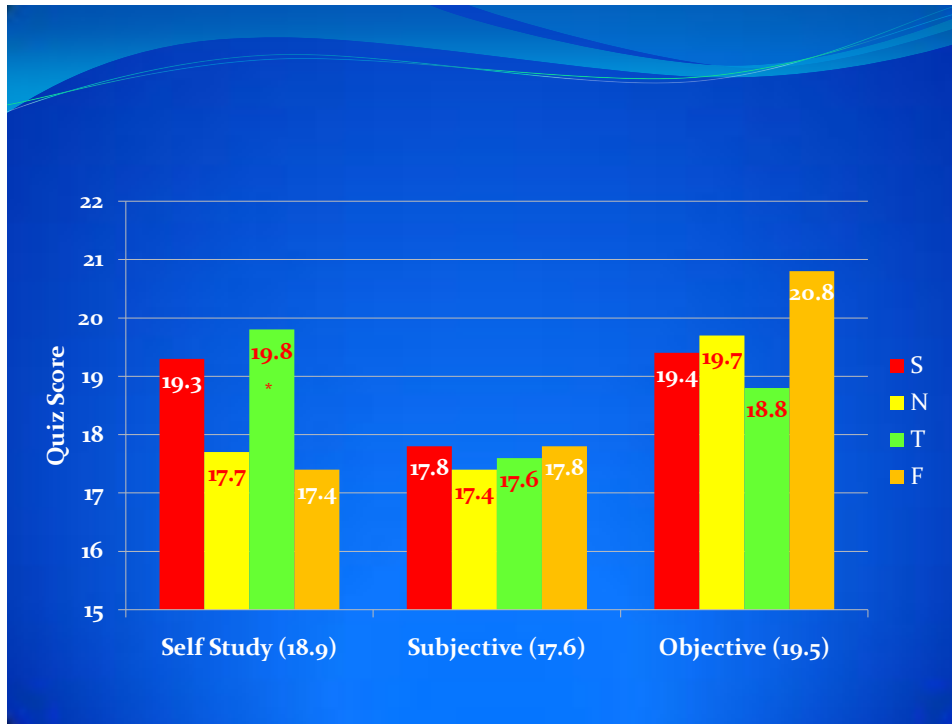


Figure 3. Test scores of students on material presented by a self-study approach and standard lecture format (subjective and objective) based on preferred method of acquiring material (Sensing vs. Intuition) or making decisions (Thinking vs. Feeling). Subjective refers to essay style questions covering photosynthesis, while objective refers to multiple choice and true-false questions covering respiration. The self-study material covered phytohormones and was evaluated using a objective format.