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Learning Styles of Students and Instructors: An Analysis of Course Performance and Satisfaction

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ABSTRACT

Accounting educators have utilized Kolb's Learning Style Inventory (LSI) in the assessment of accounting students and the accounting curriculum. This study extends these earlier works by examining the effect of student and instructor learning style, as measured by the revised 1985 LSI, on introductory course performance and ratings of satisfaction with both the course and the instructor.

The results indicate no significant effect of student/teacher learning style interaction on final course grade or students' ratings of satisfaction. However, instructors having a convergent learning style were given significantly higher satisfaction ratings regardless of student learning style.

Introduction

Despite concerted efforts to enlighten every student, instructors do not always "reach" everyone who enrolls in their course. Several reasons may exist for this lack of linkage. Differing student and instructor values, differing attitudes toward the course and its perceived usefulness, disparate reasons for enrolling in the course, and various personal differences could cause a chasm between some students and instructors. Another potential reason for this instructor/student divide is the incongruence in individual learning styles. This incongruence would then be expected to affect both student performance and satisfaction during their coursework.

Recent research in accounting education has begun investigation of student learning styles. Most of these studies have employed Kolb's (1976, 1985) Learning Style Inventory (LSI) to assess the way in which new knowledge is acquired by accounting and business students (Baldwin and

Reckers, 1984; Baker, Simon and Bazeli, 1986, 1987; Brown and Burke, 1987; Geiger, 1992; Stout and Ruble, 1991; Togo and Baldwin, 1990). However, no empirical accounting research has explored the effect of an instructor's learning style on student performance, or more specifically, whether students with learning style preferences similar to their instructors outperform their peers or attain higher levels of satisfaction from the course.

Baker, Simon and Bazeli (1986, 1987) have argued that students are more positively influenced by teachers with learning styles similar to themselves, and that students will evaluate these teachers more favorably. They indicate that in previous research,

> Correlations were also found between a student's learning style and his/her rating of the teacher who has influenced the student the most...In many respects, the association is similar to many other relationships in life -- likes attract, opposites repel. Concrete students prefer teachers who have a concrete learning style...(1986, p. 10).

leading to their belief that,

> Some students will become bored and impatient when the instructor is utilizing a teaching strategy other than the one most congruent for their learning stage...these students may give the instructor very low teaching evaluations when the instructor feels he or she taught at an outstanding level (1987, p. 222).

Inherent in these statements is the assumption that an instructor's teaching style is analogous to their preferred learning style. In other words, an instructor's perspective and approach to teaching the course is considered to be substantially influenced by his/her own personal learning style preference. For example, in answering a student's question, an instructor with a preference for concrete experiences may start the response with a numerical example. Conversely, an instructor with a preference for abstract conceptualizations may start the response with a discussion of the underlying concepts, or how other related issues may be affected. In either case, if the student does not appear satisfied with the initial response, the instructor may proceed using an alternate style of presentation. Hence, all types of information presentation may be, and usually are, represented in the classroom by any one accounting instructor. However, emphasis on a preferred style of learning is usually evident, and its impact on teaching is subtly pervasive throughout the course.

Geiger (1992) extended Togo and Baldwin (1990) and has begun to investigate student learning styles and performance using the 1985 LSI. He found that students with the same learning style as the instructor (i.e., assimilator) performed best. However, Geiger (1992) examined

students of only one instructor. The need to analyze multiple instructors with varying learning styles is a logical progression for the examination of student performance in accounting.

In their discussion of future research extensions in this area, Togo and Baldwin (1990) indicate the need for the current study and have argued,

> If the teaching methods of instructors are a reflection of their underlying learning style, then a compatible matching of the instructor and student learning styles should impact academic performance (pp. 198-199).

The purpose of this study is two fold. First, to examine learning styles of introductory accounting students and their instructors using the 1985 LSI. Second, to extend previous work by examining the possible interaction of student and instructor learning style on accounting course performance and satisfaction with multiple instructors at two universities. This multi-site/multi-instructor data will enhance the generalizability of the ensuing results. The next section will briefly discuss Kolb's LSI.

Kolb's Learning Style Inventory

Kolb's Learning Style Inventory (1976, 1985) was developed to assess individuals according to the Experimental Learning Model derived, in part, from Piaget's (1970) work on cognitive development.[1] Kolb posits a four-stage learning cycle consisting of four distinct types of learning ability: (1) concrete experience (CE), (2) reflective observations (RO), (3) abstract conceptualizations (AC), and (4) active experimentation (AE). Learning is conceptualized as a circular process in which the learner employs different abilities at different stages. In particular, the learning process is thought to be initiated through concrete experience which induces reflective observation of the event. This reflection subsequently leads the individual to formulate abstract conceptualizations of the experience. In the final stage, a period of active experimentation attempts to test the abstract conceptualizations across new experiences, which returns the individual back to concrete experience. Over time, people develop individual learning style preferences that emphasize some of these learning abilities over others.

Kolb has depicted the individual learning styles two-dimensionally to illustrate the opposite nature of the four learning abilities. The two-dimensional plane is defined by abstract conceptualization versus

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[1]   For a more detailed discussion of Kolb's LSI, experiential learning theory and their application in accounting education, see Baldwin and Reckers (1984) or Geiger (1992).

concrete experience (AC-CE), and active experimentation versus reflective observation (AE-RO). As a result, the plane also allows for the classification of four types of learning style: divergers, accommodators, convergers and assimilators. Briefly, divergers are noted for their idea generating and imaginative abilities. Accommodators tend to be adaptive and risk-taking, solving problems through intuitive trial and error methods. The convergers' strength lies in their conventional problem solving and decision making abilities. Finally, assimilators show evidence of inductive reasoning skills and the ability to integrate disparate observations.

Kolb (1976, 1984, 1985) states that experiences, personality differences and environmental factors help individuals develop strengths and weaknesses which emphasize some learning stages over others. An individual must select a learning style that balances the conflict between being active or reflective, and being concrete or abstract. The closer an individual is to the intersection of the two opposing abilities, the more "balanced" the person's learning style. In contrast, individuals with more extreme scores reflect a learning style dominated by one ability in terms of preference for acquiring new knowledge. These individuals will undoubtedly encounter some situations in which new knowledge is presented in a manner inconsistent with their preferred style. Accordingly, individuals who rely heavily on one learning stage may have more difficulty than individuals with more balanced learning styles in acquiring new knowledge in a variety of learning environments.

Research Questions

Little research has investigated the possible effect of student learning style on course performance and satisfaction, and no study in accounting has empirically examined the interaction of student learning style and instructor learning style. Moreover, only recently has empirical investigation looked to the effect of student learning style on accounting course performance. Togo and Baldwin (1990) used Kolb's 1976 LSI in assessing introductory student multiple-choice exam performance. They concluded that students with a convergent learning style outperform other types of learners. Geiger (1992) used Kolb's revised 1985 LSI and concluded that students with an assimilator learning style outperform other types of learners on introductory multiple-choice and problem accounting exams. Both studies, however, found that students with an accommodator learning style received the lowest grades. Yet, while both of these studies assessed student learning styles and exam performance, neither investigate the potential effect of

teacher learning style or the interaction of student and teacher learning styles.

In addition to the work of Geiger and Pinto (1991), Pinto and Geiger (1991), Ruble and Stout (1990, 1991), who used accounting students to examine learning style changes and the psychometric properties of the LSI, two other studies have examined introductory accounting students with the 1985 inventory with similar overall results. Baker, Simon and Bazeli (1987) found assimilator (44%) to be the predominant learning style followed by converger (31%) for their sample, and Geiger (1992) found assimilator (43%) to be the predominant learning style followed by converger (27%), accommodator (18%) and diverger (12%). Geiger (1992) also found that assimilators performed best on exams while accommodators performed worst, even after controlling for overall grade point average of the student.

Although, these studies have utilized the 1985 LSI, none have adequately investigated the possible effect of teachers' learning styles on students. Accordingly, the following hypotheses (stated in null form) are tested in this study:

H1: There is no effect of student learning style and instructor learning style on students' final course grade.

H2: There is no effect of student learning style and instructor learning style on students' overall rating of the course.

H3: There is no effect of student learning style and instructor learning style on students' overall rating of the instructor.

Research Methods

Sample

Seven hundred and eighteen introductory accounting students completed Kolb's 1985 twelve-item LSI along with a cover-sheet requesting demographic information (e.g., gender, grade point average and major). The instrument was administered half-way through the semester to students taking the first introductory accounting principles course at two large northeastern universities (N=302 and 416, respectively). Both courses were attended primarily by sophomores and were required by all business administration majors, but enrollments were also open to students of other colleges. Consequently, 188 non-business students were enrolled and completed the LSI. The final usable number of student LSI measures was 694, after eliminating students with missing data used in the analysis.

In addition, all of the course instructors from both universities completed the 1985 LSI. In total, 12 individuals instructed the 25 sections

of introductory accounting for which data were collected. The data analyzed represent all students and faculty involved with introductory accounting at the two universities for the fall 1989 semester. Of the 12 instructors, six were convergers, five were assimilators and one was a diverger. Hence, only three types of teacher learning styles were examined in this study.

The bias of convergers among the accounting instructors in this study is not surprising. Collins and Milliron (1987) measured the learning styles of 334 professional accountants across four "Big 8" CPA firms, four local CPA firms and one industrial firm. Their results revealed a marked preference to the converger style, with 49% of the staff accountants and 61% of the management level scoring as convergers. Togo and Baldwin (1990) found that students with the converger style performed significantly better on accounting exams, and suggest that,

> It would not be surprising to find a predominance of the convergent learning style among accounting instructors because they are very often subsets of both accounting professionals and students who majored in accounting (p. 199).

Learning Style Classifications

Responses to the LSI were used to categorize students and instructors into one of Kolb's four learning style categories: accommodators, convergers, assimilators and divergers. Cut-off points of 5.5 and 4.3 for the AE-RO and AC-CE dimensions, respectively, were obtained from LSI adult norms developed by Smith and Kolb (1986).

Performance Measures

Students' final course grades, based on a 4.0 scale, served as the course performance measure. All grades were determined on a plus/minus system. This allowed for twelve possible grade measures (i.e. F, D-, D, D+ ... A-, A), corresponding to the zero to 4.0 scale. Course examinations and the determination of final grades were not centralized at either university. This typical "academic freedom" gave the instructors full control over their respective sections, and also allowed for maximum utilization of their individual learning/teaching style.

Satisfaction Measures

Along with demographic variables, students were asked to respond to the statements: "I am satisfied with this course" and "I am satisfied with the instructor." A 5-point Likert-type response was obtained for each

statement with the endpoint of "A Lot" given a score of 5 and "Not at all" given a score of 1. Hence, the higher the satisfaction score the more the student felt satisfied with the course or with the instructor. All data were collected by the researchers (only one section was taught by one of the researchers), and students were assured that their responses to these questions would be kept confidential and in no way would effect their final course grade.

Results

Table 1 presents some descriptive statistics for the sample by declared major. Additionally, to test whether learning style scores differed across majors, separate one-way analyses of variance (ANOVAs) for unbalanced data were run for the AC-CE and the AE-RO dimension scores. The ANOVA results presented in Table 1 indicate that there was no significant difference on the two learning dimensions due to declared major. Additionally, a similar ANOVA using learning style classification (i.e. 1,2,3,4) and declared major produced similar results (F-value = .15, P-value = .9296), indicating the absence of differences in learning styles across declared majors. [2]

$\underline{H_1}$

In order to assess whether student and teacher learning styles had any effect on final course grades, a two-way analysis of covariance (ANCOVA) was run with final grade (GRADES) the dependent variable, and student learning style classification (LSI), teacher learning style classification (TLSI) and an LSI * TLSI interaction term designated as the independent variables. The student's overall grade point average (GPA) was included in the analysis as a covariate. Student's overall grade point average has been found by Dockweiler and Willis (1984), Eskew and Faley (1988) and Geiger (1992) to be significantly associated with performance in introductory accounting courses.

Accordingly, GPA was incorporated as a covariate to more directly assess the relationship between student and teacher learning styles and course grades.

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[2]   An analysis of learning style classification and declared major, excluding the 188 non-business students, was also performed. Results also indicate no significant relationship (F-value = .20; p-value = .8985).

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TABLE 1
LSI Scores by Major

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	CE	RO	AC	AE	AC-CE	AE-RO
Accounting	22.40	32.52	31.86	33.82	9.45	1.30
(N=99)	(6.82)	(6.94)	(7.02)	(6.17)	(11.88)	(10.88)
Finance	23.28	30.55	33.14	35.47	9.72	4.96
(N=69)	(7.29)	(7.28)	(7.23)	(6.51)	(11.64)	(11.14)
Marketing	24.15	30.93	31.86	35.03	7.71	4.10
(N=59)	(7.85)	(6.21)	(6.96)	(7.44)	(11.83)	(10.92)
Management	23.01	32.51	31.15	33.92	8.14	1.40
(N=84)	(7.27)	(6.37)	(5.94)	(6.23)	(10.33)	(9.88)
Management Info	24.60	32.20	33.20	30.00	8.60	-2.20
Systems	(10.26)	(5.18)	(7.73)	(9.56)	(16.19)	(12.97)
(N=10)						
Undecided Business	23.17	31.86	31.86	34.75	8.68	2.87
(N=185)	(6.31)	(5.95)	(6.93)	(6.28)	(10.55)	(9.72)
Non-Business	23.23	31.33	32.15	34.21	8.92	2.87
(N=188)	(6.48)	(7.04)	(6.73)	(6.75)	(10.72)	(11.05)
Alpha Coefficients	.812	.789	.818	.780		
Adult Norms*	26.0	29.9	30.3	35.4	4.3	5.5
(N=1,446)						
ANOVA Statistics						
F-ratio					.29	1.57
p-value					.9422	.1528

( ) Standard Deviation
*Smith and Kolb (1986)

Table 2 presents the Type III sums of squares in assessing the ANCOVA model. This evaluation considers the incremental effect of the independent variable if it is added to the model last. Using this assessment, the only significant variable was TLSI (p = .0689). This suggests that the learning style of the teacher is more closely associated with differences in final

grades than the individual student's learning style. Although Duncan's and Scheffe's multiple range tests indicate instructors with the three learning types did not differ on the average level of grades given to students (p > .10), there does appear to be some teacher learning style effect.

TABLE 2
ANCOVA Results - Course Grades

Source	dF	MS	F-Value	PR < F
Model	12	8.0494	8.59	.0001
Error	681	.9373		
Model Source	dF	Type III SS	F-Value	PR < F
LSI	3	4.0336	1.43	.2315
TLSI	2	5.0352	2.69	.0689
LSI * TLSI	6	5.1552	.92	.4822
Covariate				
GPA	1	66.526	70.98	.0001

However, there was no significant interaction effect between teacher and student learning style for the LSI * TLSI variable on final grades (p-value = .4822). [3]

To further analyze whether students maintaining the same learning style as their instructors receive higher grades, a separate ANCOVA was run on student's grades with the independent variable being whether or not there was a learning style match between student and instructor (MATCH). This ANCOVA reveals no significant difference (p = .7019) between students with the same learning style as their instructor (n = 209, mean grade = 2.54) and those

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[3] Additionally, four separate ANOVAs were run with course grade the dependent variable, student LSI score the independent variable and prior GPA the covariate for each of the three learning style classifications of instructors (i.e. converger, assimilator and diverger) and for the combined data set. Each of these analyses produced similar results. Convergers and assimilators outperformed accommodators (p-values were .099, .076, .904 and .028, respectively). Only in the case of the diverger instructor did the accommodator students not perform significantly below their peers. In sum, these results confirm those of Togo and Baldwin

(1990) and Geiger (1992) that converger and assimilator introductory accounting students outperformed students with an accommodator learning style in terms of course performance.

not having the same learning style (n = 485, mean grade = 2.66). These results indicate, contrary to expectations, that students do not benefit significantly in terms of final grade by taking introductory accounting from an instructor with the same learning style as themselves.

H_2

To test the effect of LSI and TLSI on student's ratings of course satisfaction (SATC), another ANCOVA was run with SATC the dependent variable, LSI, TLSI and the interaction term LSI * TLSI the independent variables.

TABLE 3
ANCOVA Results - Satisfaction with Course

Source	dF	MS	F-Value	PR < F
Model	12	11.3753	16.26	.0001
Error	681	.69940		

Model Source	dF	Type III SS	F-Value	PR < F
LSI	3	1.5329	.73	.5340
TLSI	2	4.8771	3.49	.0312
LSI * TLSI	6	4.4315	1.06	.3878

Covariate				
Grades	1	114.2011	163.28	.0001

In this test, student's final course grade (GRADES) served as the covariate.[4] Since the students completed the LSI and responded to the satisfaction questions halfway through the course, they had already received feedback on their grades, which was believed to influence their satisfaction ratings. Accordingly, the variable GRADES was included as a covariate in the two satisfaction analyses. The results of the ANCOVA for course satisfaction are included in Table 3.

Similar results were found for course satisfaction as for final grades. The only significant independent variable was TLSI (p=.0312), indicating that teacher learning styles were associated with student's ratings of course satisfaction. Separate Duncan's and Scheffe's multiple range tests indicate that instructors with a

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[4] Some concern could be raised over the use of the 12-category variable GRADES as a covariate. Additional ANOVAs were run on SATC and SATI without the covariate GRADES. These analyses produced similar results to the ANCOVA models reported.

convergent learning style received significantly higher (p < .05) ratings of satisfaction (mean of 4.10) for their course than instructors with assimilator (mean of 3.83) or diverger (mean of 3.84) learning styles.

In order to assess the effect of a learning style match between student and instructor, a separate ANCOVA was run with SATC the dependent variable, MATCH the independent variable, and GRADES the covariate. Results indicate no significant difference (p = .9799) in course satisfaction ratings between those students with a learning style match

(mean of 3.90) and those that did not match (mean of 3.96). These results indicate that accounting instructors with a convergent learning style received course satisfaction ratings higher than their peers, regardless of the learning styles of their students, and that student learning styles of themselves, and as an interaction, had no significant effect on ratings.

H₃

To test the effect of LSI and TLSI on student's ratings of satisfaction with the instructor (SATI), another two-way ANCOVA was run. Results of the ANCOVA are presented in Table 4.

TABLE 4
ANCOVA Results - Satisfaction with Instructor

Source	dF	MS	F-Value	PR < F
Model	12	3.73099	4.39	.0001
Error	681	.8506		

Model Source	dF	Type III SS	F-Value	PR < F
LSI	3	.5343	.21	.8899
TLSI	2	5.5716	3.28	.0384
LSI * TLSI	6	8.2297	1.61	.1409

Covariate				
Grades	1	29.3305	34.48	.0001

Again, Table 4 indicates that the only significant independent variable is TLSI (p = .0384), once all other variables have been included in the model. Further analysis using Duncan's and Scheffe's multiple range tests indicate that instructors with a

convergent learning style (mean of 4.30) were rated significantly higher (p < .05) than those having a divergent learning style (mean of 4.00); with the assimilator group rated in-between (mean of 4.15). These results also indicate that instructors

with convergent learning styles received the highest ratings, regardless of the learning styles of their students.

An additional ANCOVA was also run with SATI the dependent variable, MATCH the independent variable and GRADES the covariate. This analysis also produced insignificant results (p = .1976). These findings, coupled with the earlier findings, reveal that the accounting students did not have higher levels of satisfaction with instructors or their courses because they had similar learning styles as measured by the LSI.

Research Limitations

While presenting evidence on an interesting, and thus far neglected topic, the study failed to find significant results for the main research questions addressed. One potential reason may be the lack of a substantive relationship between student and teacher learning styles resulting in no effect on overall student performance and satisfaction. Another could be that Kolb's (1985) LSI was not sensitive enough to adequately capture teaching styles or learning styles of the study's participants. An emerging body of literature has debated the merits and shortcomings of the LSI (for example see Geiger, 1992 or Stout and Ruble, 1991 for further discussion). Although there appears no clear consensus, it is fair to state that the LSI has its detractors, and that

the limitations of the LSI need to be acknowledged when using the instrument. Additionally, recent research has demonstrated that a scrambled version of the LSI appears to improve its psychometeric properties--particularly its classification stability over time (Veres et al., 1991). However, the standard version was utilized in this study, and identification or quantification of any potential bias in the findings from not using a scrambled version is problematic.

In addition, the findings of this study are limited in their generalizability because of the use of only introductory accounting students. Students in higher level accounting courses may evidence different patterns due to increased student/teacher interaction. Analysis of higher level students would help to generalize the results beyond this study.

Also, this study assessed instructors with only three of the four learning-style types. As addressed in the next section, a more replete analysis would assess instructors of all learning-style types and their students.

Summary And Discussion

This was the first study in accounting education to empirically address instructor learning styles and the potential effect of a compatible

match of learning style between students and instructors on final course grades and satisfaction ratings. The findings indicate no significant effect on final grades or ratings of satisfaction with the instructor or of the course for a compatible learning style match. Overall, however, students rated courses and instructors with a convergent learning style significantly higher than those of other instructors.

Implications of these findings are that students with all types of learning styles appear more satisfied with courses (H2) and instructors (H3) with a convergent learning style. Perhaps the convergent accounting instructor is better suited to teach accounting, or, more specifically, introductory accounting. According to Kolb (1985), convergent learners' strength lies in problem solving and the practical application of ideas. They perform well in situations where there is a single correct solution and prefer dealing with technical tasks. These learning strengths may enable the instructor with a convergent learning style to better present introductory accounting material that is often viewed as a technical task that involves application of new ideas.

Future accounting education research should attempt to isolate specifically why convergent instructors are perceived more favorably. Do they offer clearer, more easily understood explanations of accounting material? Do they cover material more slowly or quickly? Do they demonstrate different overall personality traits (e.g., perceived concern for students)? Also, do convergent instructors in other disciplines receive similarly high recognition?

The predominance of accounting instructors in this study having converger and assimilator learning styles could also be further investigated. Are these two learning styles peculiar to accounting professors, or all college professors; or is it the manifestation of an accounting self-selection process? Most research using the LSI in accounting has found large portions of converger and assimilator learning styles present in the accounting student groups. It may be that students self-select out of, or into accounting education as a career choice based on their learning style. A longitudinal study of accounting and business students would start to address this issue.

Additionally, this and earlier research has reached consensus that students with accommodator learning styles perform below their peers in introductory accounting (Geiger, 1992; Togo and Baldwin, 1990). The lack of accounting instructors with that learning style may pose a factor. Further analyses could attempt to identify reasons for this disparity on

the part of students with an accommodator learning style.

To confirm and extend this research, other measures of cognitive style and learning styles could be utilized to examine the possible synergistic effect of matches between teachers and students on grades and course satisfaction. For instance, the Canfield (1976) Learning Styles Inventory and Canfield and Canfield (1978) Instructional Styles Inventory could be used to provide evidence on the fit between learners and instructors. These instruments were developed specifically for secondary and college students and provide measures on multiple scales that cross three basic learning domains (e.g. conditions for learning, area of interest and, mode of learning). Also, Cooper and Miller (1991) have recently investigated business students and instructors using the Myers-Briggs Type Indicator. They also found that congruent classifications between students and teachers in their study were not related to final course grades, but were, however, related to students' evaluations of the course and of the instructor. Additional studies using these, or other cognitive assessment instruments, would extend our knowledge of the learner/instructor interaction.

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