Effects of Learning Styles/ Teaching Styles and Effort on Performance in Accounting and Marketing Courses

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It is generally accepted that two factors affecting student performance are the match between instructor teaching styles and student learning styles, and student effort. Both are thought to contribute to student course performance. However, results of academic research examining interrelationships among these variables have been mixed. This paper tests the hypothesis that student effort and the match of student learning styles with instructor teaching styles will significantly influence overall student performance. This research will also investigate other potential factors – such as student aptitude, gender, and major – that may influence student performance. A total of 136 students enrolled in introductory accounting and marketing classes at a branch campus of an urban university were surveyed. Results indicate that learning/teaching styles match and student effort both affect student performance. However, the importance of learning/teaching styles match appears to be contingent on the learning context. Student effort has a significantly greater impact on performance than does learning/teaching style match.

Keywords: Business Education/Student Academic Performance

1. Introduction

Over the last forty years, student learning styles have been a major focus in the teaching profession. The overriding conclusion is that teachers should adjust their teaching styles to accommodate student learning styles in order to enhance student performance (Keri, 2002; Tucker, et al., 2003; Visser, et al., 2006). This conclusion has gained widespread acceptance in almost all educational arenas. At the same time, a separate, related issue that has also been widely accepted is that increased student effort results in higher student performance

Unfortunately, the cumulative results of academic research relating student performance, student learning styles, instructor teaching styles, and student effort have been mixed (Coffield, et al, 2004; Dembo & Howard, 2007). In addition, most research on learning and teaching styles has neglected the concept of student effort.

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The opposite is true of academic studies related to student performance and effort. These studies have concentrated on measures of student effort without considering the potential that the match or mismatch of learning styles and teaching styles may also have an effect on student performance (Johnson, 2002; Rich, 2006).

To date, more than 32 learning styles have been identified (Felder, 1988). Not only has academic research been mixed concerning the effectiveness of learning/teaching style matching but academic scholars have recently begun to question whether accommodating student learning styles is truly beneficial to students in the long run (Coffield, et al, 2004: Graf, et al., 2009).

Moreover, although the link between increased student effort and improved performance is intuitively appealing, business research results have been inconsistent. Some researchers claim *no* relationship between student effort and student performance (Rich, 2006). Academics have criticized early research studies into student effort because of their use of self-reported surrogates to measure student effort. These are viewed as highly subjective and therefore potentially unreliable (Johnson, 2002).

The objective of this study is to integrate the implications of these varied prior academic studies into a comprehensive evaluation of the factors related to student performance. The sample comprises students in both introductory accounting and marketing classes at a small, branch campus of a major urban university. Also, more objective measures of student effort will be included. A regression model has been developed that includes various components that have been identified as potential factors in influencing student performance, with the goal of isolating the most significant factors related to student performance. Simple regression analysis was deemed appropriate for purposes of this analysis, given the total sample size of 136. This falls within the guideline of minimum sample size 120 needed for large population size and required accuracy level.

The following section describes many of the most recent additions to the vast literature in this area.

2. Literature Review

In general, the amount of educational, business and accounting research related to student performance, student effort and student learning styles is extensive. In fact, academic research has investigated a multitude of student demographic, ability and effort factors affecting student performance in almost every learning context and academic discipline. This literature review attempts to focus the vast research in this area to those pieces that includes evaluation of student performance and the effect of matching of student learning styles with instructor teaching styles, student effort, and several demographic factors consistently used in prior research. In particular, this study will focus primarily on the research of student performance in the business and accounting literature.

Learning Styles:
Business and accounting learning/teaching styles research has largely concentrated on the identification of student learning styles and the impact on student performance within certain learning environments, such as distance learning (Battalio, 2009), problem-solving (Jones, et al., 2007), computer technology and multimedia (Karakaya, et al., 2001). A second, related area of research that has received some limited attention is learning styles, academic disciplines and student performance. These academic disciplines include marketing (Karakaya, et aal., 2001, Court, et al., 2003), business statistics (Lockwood, et al., 2007), accounting (Vruwink et al., 1987; Duff, 2001), economics (Terregrossa, et al., 2009) and information systems (Kruck, et al., 2003; Naser, et al. 1998). Much of this research contends that certain student learning styles are more conducive to various learning contexts and academic disciplines. This research has resulted in emphasis being placed on instructors incorporating multiple types of instructional techniques in order to match learning and teaching styles and therefore increase overall student learning and performance (Landrum, et al., 2010; Brown, et al., 2003; Novin, et al., 2003; Morrison, et al., 2006).

However, over the years a growing number of research articles have begun to question the significance of the learning/teaching style match as it relates to student performance (Keri, 2002; Coffield, et al, 2004; Dembo & Howard, 2007; Riener, et al., 2010; Scott, 2010). These authors have emphasized that an overall review of academic learning/teaching style research does not support the contention that matching learning/teaching styles results in improved student performance (Coffield, et al., 2004) and at best, yields mixed results (Coffield, et al., 2004; Scott, 2010).

A concern related to the mixed learning styles research results is the construct validity and reliability of the numerous instruments assumed to measure learning styles (Coffield, 2004; Duff, 2001). One specific, related aspect is that even though studies have demonstrated the important role teaching styles play in the learning process, there is little research done on teaching styles because most researchers do not distinguish between learning and teaching styles, i.e., the teaching style is determined by instructors completing a learning styles instruments, based on the assumption that teachers teach the way they learn. To date, only two teaching style instruments have been developed and few, if any, validity and reliability studies have been conducted on these instruments.

A second issue is that as many as 32 learning styles have been identified. The idea of an instructor trying to accommodate 32 diverse styles in a given class would appear to be a daunting if not impossible task (Felder, 1988). This is particularly true in courses such as business and accounting where class time is already strained due to the extensive course content required.

A third issue is the reluctance of college instructors to adapt their teaching styles. An argument has been put forth that teachers are most effective when they use their own styles (Brown, et al., 2003; Heimlich and Norland 2002) or have a primary teaching style with which they are most comfortable (Felder, 1988; Lacy, et al., 1998).

Finally, researchers have begun to believe that learning styles are not fixed but are flexible and students may be able to adapt their learning styles to fit divergent teaching styles (Coffield, 2004). In addition, the issue has been raised as to who should adapt to whom (Thompson, 1997). Some business education researchers have added that students would benefit from being exposed to different teaching styles since probably little attention will be paid to individual learning styles when they enter the business community (Morrison, Sweeney, and Heffernan 2003). This last concern is not new, as Kinshuk and Graf (2009) stated:

> "As educational theorists such as Messick (1976) and Felder and Spurlin (2005) pointed out, learners should also learn how to cope with courses and learning material that do not match with their preferred ways of learning. Therefore, students should also be trained by using their not-preferred skills and preferences as not all courses and learning environments will adapt to individual preferences. Messick argued that when learners acquire more educational experience, they are required to adapt to a variety of instructional methods and styles. The ability to adapt to different instructional styles will prepare students with important life skills. Therefore, another challenge of adaptive systems is to help students to cope with courses that are not well matched with their learning styles and give them suggestions and assistance in developing appropriate skills (Kinshuk, Liu, T., Graf, S., 2009)."

This very important recommendation seems to have been forgotten by most learning style advocates to the potential detriment of students in the long term.

Effort:
Educators have long believed student effort to be a key determinant of performance (Rich, 2006). Again, this is particularly true in courses such as accounting and business where a significant part of learning is thought to be achieved through student effort on homework assignments and readings outside of class. In the business community, effort is also appealing as a determinant of performance since eliciting effort is the role of managers. In the agency theory literature, researchers propose that owner-managers exert greater effort than do hired managers, resulting in better performance (Charkins, 1985). As noted before, unfortunately the academic business research as to the link between student effort and student performance has been mixed (Rich, 2006; Johnson, et al., 2002).

Much of the debate related to student effort has centered on the use of student self-reported or instructor subjective measures as surrogates for effort. Such measurement issues are often cited as a possible reason for many of the mixed results. An instructor's evaluation of student homework and student-reported number of hours studied have been two of the more common surrogates for effort (Charkins, et al., 1985; Johnson, et al., 2002; Rich, 2006). Recently, more objective measures of student effort have been the number of attempts made and the amount of time spent by students on repeatable computerized quizzes; student grades on computerized

quizzes (Johnson, et al., 2002); class attendance; punctuality and the number of times students participated in class (Rich, 2006).

As an outgrowth of this body of research, the present study will explore the following hypotheses: (1) that student effort and the match of student learning styles with instructor teaching styles will significantly increase student performance, and (2) that student effort will have greater salience in predicting performance than will the learning/teaching style match.

3. Research Methodology

Based on the issues raised and the gaps in prior research as previously described, this study was structured as follows:

Subjects included in this study were accounting, management and marketing students from a branch campus of an urban university who were enrolled in introductory accounting and marketing classes. A student profile of participants is included in Exhibit 1.

The first hypothesis is that student effort and the match of student learning styles with instructor teaching styles would significantly influence overall student performance.

3.1 Dependent Variable

The dependent variable used to represent student performance was each student's average grade on in-class exams.

3.2 Independent Variables

1.) In the accounting courses, student effort was operationalized as each student's average grade on computer-graded homework assignments. The use of computer-graded homework assignments was considered an appropriate measure of student effort since the computerized assignments gave students links to the textbook for each problem. Students were given three chances to complete each problem. In addition, after each attempt at solving a problem, students were shown the answers they had that were correct and those that were incorrect. Thus, students used the textbook links to review the pertinent material and by the use of all three attempts, their homework grade should have increased. Also, the average grade on computer-graded homework was considered a more objective measure of student effort than were student-reported number of hours studied or instructor subject evaluations of student effort.

Since marketing is a more qualitative subject than accounting and little, if any, homework is submitted for grading, other surrogates were used for student effort. In the marketing courses, attendance, class participation and extra credit were used as measures of student effort which, as mentioned previously, have been

used in more current research studies and have been concluded to be more objective than student-reported hours studies.

2.) The matching of student learning styles with instructor teaching styles was measured using two different learning styles instruments, the Felder-Solomon (FS) Learning Styles Survey and the Grasha-Reichmann (GR) Learning Styles Questionnaire. Each student completed both surveys and since teachers are thought to teach the way they learn, the instructor also completed both surveys. The absolute differences between the student learning preferences and the instructor's learning preference for each learning style factor detailed by each survey were then totaled. In other words, the total absolute values of the differences between the student and instructor learning styles based on both the FS and GR surveys were calculated. Using this procedure means that the greater the difference between the students's learning styles and the instructor's teaching style, the higher the absolute value. Thus, based on learning style theory, this would yield a lower student performance.

Exhibit 1: Student/Participant Profile

Participants:

Participants in accounting classes	77
Participants in marketing classes	59
Total participants	136

Gender:

Male	67%
Female	33%

Mean SAT scores:

Math	550
Verbal	523

Major:

Accounting	40%
Finance	24%
Marketing	20%
Management	11%
Other	5%

The four dimensions of the FS Learning Styles Questionnaire are: active/reflective, sensing/intuitive, visual/verbal, and sequential/global. Active learners learn by trying things out and prefer to work together with others, whereas reflective learners learn by thinking things through and working alone. Sensing learners like to learn from concrete material like examples, tend to be more practical, and are careful with details, whereas intuitive learners prefer to learn abstract material such as theories and concepts, like challenges, and tend to be more innovative than sensing learners. Visual learners remember best what they have seen, whereas verbal learners get more out of words,

regardless of whether they are spoken or written. Sequential learners learn in linear steps, prefer to follow linear stepwise paths, and be guided through the learning process, whereas global learners learn in large leaps and prefer more freedom in their learning process (Kinshuk, Liu, T., Graf, S., 2009, Platsidoe, et al., 2009).

The GR Learning Styles Questionnaire (GRLSQ, 1974) can be used to differentiate several types of learning styles. One classification scheme of the GRLSQ is used to identify three types of learning styles and their opposites: Dependent/Independent, Collaborative/Competitive, and Participative/Avoidant. A person who scores high as a dependent learner generally prefers a teacher-directed, highly-structured course with explicit reading assignments, explicit class assignments, and a predetermined number of tests. A person who is a dependent learner would most likely prefer a straightforward lecture without term papers, but if a term paper is to be assigned, the dependent learner would want the topic to be assigned by the teacher, with fairly detailed instructions. A student who scores high as an independent learner likes to have some influence on the content and structure of the course. This type of student would like some role in the determination of the material to be covered, the number of tests given, and so forth. Independent learners would prefer that the teacher serve as a resource person rather than as a formal lecturer. If a paper is to be assigned, independent learners would prefer to choose their own topic instead of having the teacher assign a specific topic. A person who scores high as a collaborative learner prefers a discussion class with as much student interaction as possible. A person who is predominantly a collaborative learner would prefer group projects and collective assignments, such as case studies. A competitive learner prefers to work alone, dislikes group assignments, and is highly grade-conscious as well as highly interested in his performance in relation to the class. Participative students prefer interactive class discussions with the instructor, ask frequent questions and usually sit in the front of the class. An avoidant student prefers straight lecture with few instructor questions, and rarely asks any questions or participates in class discussions (Charkins, et al., 1985; Graf, et al., 2007; Platsidoe, et al., 2009).

3.3 Control Variables

Since the objective of this study was to determine the incremental effect of student effort and matching of learning/teaching styles, several control variables that were used in previous studies were also included. These control variables were math and verbal SAT scores and gender.

The second hypothesis relates to the salience of both student effort and learning/teaching style match on student performance. Even though previous research for *both* of these variables has been mixed, the importance of matching learning and teaching styles has generated greater inconsistency. The dominating intuitive appeal of student effort on student performance suggests that student effort will have a greater influence on student performance than will the matching of learning/teaching styles.

4. Results

Although anecdotal in nature, an interesting/puzzling observation is the differentiation in faculty teaching styles apparent using the FS scale (Exhibit # 2) and the lack of teaching style differentiation using the GR scale (Exhibit #3). Based on learning/teaching styles theory, two possible explanations can be surmised. The first is that the two learning/teaching style instruments are measuring the same learning/teaching style factors and the FS instrument is more effective at culling out those differences. The second possible explanation is that the two instruments are measuring different components of learning/teaching styles. This explanation is somewhat disturbing given the previously-noted abundance of identified learning styles and the near-impossibility of classroom accommodation.

Examining the statistical results can be done in two ways. The first is comparing the results within each discipline (accounting and marketing) based on the two learning/teaching style instruments used. The second results comparison is between the two disciplines. To present a comprehensive examination of these results -- and since all the variable regression coefficients are in the direction predicted -- all variables will be considered with a significance approximating .010 or less.

When the accounting results are compared across the two learning style instruments, consistent results are observed. The adjusted R-squares are approximately equal to 0.43 and the FS and GR standardized beta interaction coefficients approximate 0.18 (Exhibit #4 and #5). Also, in both cases, the significant variables related to student performance are the learning/teaching style interaction, SAT – Math, Major-Marketing, attendance and homework. These results provide support that at least when considering the introductory accounting course, the learning styles appear to be measuring the same learning style factors. In addition, due to the consistency of significant independent variables across the two learning styles, some limited support could be assigned to their importance as well as to the consistent lack of importance for the remaining independent variables.

Exhibit 2: Felder Solomon teaching styles – Faculty

Scale: -11 (first) - +11 (second)

Felder Solomon Teaching styles components	Accounting	Marketing
Active/Reflective	7.0	-3.0
Sensing/Intuitive	-5.0	-9.0
Visual/Verbal	-5.0	9.0
Sequential/Global	-1.0	-9.0

Exhibit 3: Grasha Reichmann teaching styles – Faculty

Scale: 1 (low) - 5 (high)

Grasha Reichmann Teaching styles components	Accounting	Marketing
Independent	3.5	4.2
Dependent	4.1	3.8
Avoidant	2.1	2.0
Participative	3.8	4.4
Collaborative	2.8	3.5
Competitive	3.7	3.3

Exhibit 4: Regression Results Accounting - Felder Solomon

	R-Square	Adjusted R-Square		
	0.507	**0.433**		

	Standardized Coefficients Beta	t	Sig.	VIF
Constant		5.045	0.000	
Felder Interaction	**-0.187**	**-2.043**	**0.045**	**1.125**
Gender (Male = 1)	-0.081	-0.922	0.360	1.031
SAT - Math	**0.223**	**2.074**	**0.042**	**1.549**
SAT - Verbal	0.026	0.266	0.791	1.286
Major - Finance	-0.091	-0.917	0.363	1.331
Major - Management	-0.132	-1.419	0.161	1.152
Major - Marketing	**-0.252**	**-2.434**	**0.018**	**1.441**
Major - Undecided	-0.049	-0.543	0.589	1.110
Attendance	**0.161**	**1.626**	**0.109**	**1.311**
Homework	**0.307**	**2.578**	**0.012**	**1.895**

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Exhibit 5: Regression Results Accounting - Grasha Reichmann

	R-Square	Adjusted R-Square		
	0.504	**0.428**		
	Standardized Coefficients			
	Beta	t	Sig.	VIF
Constant		5.011	0.000	
Grasha Interaction	**-0.177**	**-1.909**	**0.061**	**1.140**
Gender (Male = 1)	-0.111	-1.247	0.217	1.054
SAT - Math	**0.252**	**2.343**	**0.022**	**1.537**
SAT - Verbal	0.063	0.639	0.525	1.277
Major - Finance	-0.094	-0.937	0.352	1.329
Major - Management	-0.105	-1.122	0.266	1.175
Major - Marketing	**-0.247**	**2.373**	**0.021**	**1.440**
Major - Undecided	-0.032	-0.355	0.724	1.097
Attendance	**0.176**	**1.796**	**0.077**	**1.275**
Homework	**0.277**	**2.326**	**0.023**	**1.885**

Exhibit 6: Regression Results Marketing - Felder Solomon

	R-Square	Adjusted R-Square		
	0.365	**0.213**		
	Standardized Coefficients			
	Beta	t	Sig.	VIF
Constant		2.529	0.015	
Felder Interaction	**-0.149**	**-0.957**	**0.344**	**1.760**
Gender (Male = 1)	-0.064	-0.418	0.678	1.692
SAT - Math	**0.400**	2.552	**0.014**	1.777
SAT - Verbal	0.163	1.203	0.235	1.336
Major - Accounting	0.052	0.306	0.761	2.098
Major - Management	**-0.236**	**-1.679**	**0.100**	**1.431**
Major - Marketing	0.079	0.464	0.645	2.095
Major - Undecided	-0.218	-1.645	0.107	1.272
Attendance	**0.260**	**2.110**	**0.040**	**1.098**
Extra Credit	-0.820	-0.544	0.589	1.632
Participation	**0.354**	**1.978**	**0.054**	**2.320**

Exhibit 7: Regression Results Marketing - Grasha Reichmann

Marketing	R-Square	Adjusted R-Square		
	0.417	**0.278**		
	Standardized Coefficients			
	Beta	t	Sig.	VIF
Constant		2.921	0.005	
GR Interaction	**-0.275**	**-2.258**	**0.029**	**1.169**
Gender (Male = 1)	-0.116	-0.849	0.400	1.485
SAT - Math	**0.310**	**2.245**	**0.030**	**1.507**
SAT - Verbal	0.164	1.262	0.213	1.329
Major - Accounting	0.137	0.838	0.406	2.115
Major - Management	-0.157	-1.143	0.259	1.492
Major - Marketing	0.089	0.555	0.581	2.019
Major - Undecided	-0.198	-1.563	0.125	1.270
Attendance	**0.271**	**2.299**	**0.026**	**1.093**
Extra Credit	-0.062	-0.434	0.666	1.595
Participation	**0.300**	**1.734**	**0.090**	**2.366**

Somewhat different and less consistent results are observed when comparing the marketing results (Exhibit #6 and #7). First, the adjusted R-square for both FS and GR regression results are somewhat consistent (FS Adjusted R-square = 0.213 and GR adjusted R-square = 0.278). However both of these R-squares are considerably lower than the adjusted R-squares obtained in the accounting course results (FS Adjusted R-square = 0.433 and GR Adjusted R-Square = 0.428). Second, the FS learning/teaching style interaction is insignificant (0.344) and yet the GR interaction is significant (0.029). In addition, mixed results are evident regarding the independent variable - Major – Management which is significant using FS (0.100), yet not significant using GR (0.259). Consistent results do exist in regard to SAT – Math, attendance, and participation, with all being significant using either learning/teaching style interaction.

Finally, it should be noted that the variance inflation factors (VIF), a measure of multicollinearity among the independent variables, are well below the widely-accepted significance threshold of 10. This is particularly important in social science research, since many times independent variables can be closely related, resulting in unreliable beta coefficients. This issue appears not to be a concern in this study except for the independent variable – Major-Accounting in the accounting classes.   Major – Accounting was so highly correlated with the other major types that the statistical software (SPSS) automatically excluded it from the accounting results. The same issue did not arise in the marketing class results.

5. Conclusions/Inferences

Although at first glance it appears that these results generate as many questions as they do answers, some significant inferences can be derived. First, the importance of the learning/teaching style interaction may be content-specific. For courses such as accounting, with its emphasis on mathematical problem-solving and technical orientation, a better match may be required than in the less mathematical content-oriented marketing courses. As an aside, it should be noted that in the accounting classes, the instructor has relied heavily on structuring the class in accordance with his own learning style. Lecture, homework and exams are highly integrated and little emphasis is placed on the textbook. In the marketing classes, the course structure is more traditional, with a more even emphasis on lecture and the textbook content.

Consistent across all the results, math aptitude operationalized as SAT – Math seems to be not only a significant factor in student performance, but also a positive performance contributor (standardized beta coefficients are positive). A contention could be presented that business in general is somewhat of a mathematical/problem-solving area so a math aptitude would be favorable. The same is not true of SAT – Verbal, which was not significant in any of the results.

Finally, the clearest and most unbiased measure of effort may be the computer-graded homework with multiple chances to obtain the correct answers, as measured in the accounting classes. Homework grade was significantly correlated with student accounting exam grades. In fact, a comparison of the magnitude of the homework standardized coefficient with the learning/teaching style interaction indicates that effort provides an average 57 percent higher contribution to overall student performance than does the learning/teaching style match.

In regard to the marketing classes and effort, attendance and participation were significant across both learning styles instruments. In the GR analysis where the learning/teaching style match was significant, the magnitude of the combined standardized beta coefficients for attendance and participation (effort) was 100 percent higher than the contribution of the styles interaction.

In conclusion, it can be proposed that aptitude and effort are all consistent significant contributors to student performance in business courses. In addition, the learning/teaching style match may be a positive contributing factor in some learning contexts. However, with all the current controversy surrounding learning styles and their impact on student performance as well as teacher time limitations, it could be recommended that teacher efforts would be more effective if focused on developing student aptitudes, motivating students and rewarding student effort, all of which have considerably more research support than do learning styles.

6. Limitations of Study

As with all previous studies of the learning/teaching style interaction, this study assumes that teachers "teach the way they learn," hence teaching styles are

measured using learning styles instruments. This is a major assumption with little academic support. Unfortunately, to date only two teaching style instruments have been developed and there are no studies evaluating the validity and reliability of these instruments. Second, even though this study does use more objective measures than do previous studies and includes more than one business discipline, more comprehensive measures could be used and other business disciplines could have been included.

7. Future Research

The most significant area for future research is continuing the investigation into the validity and reliability of learning and teaching style instruments and continued appropriate and objective research into the importance of learning/teaching style matching in diverse learning contexts. Most importantly, longitudinal studies should be conducted that investigate whether promoting learning style flexibility is possible. Also important to investigate is whether the lack of learning flexibility is detrimental to students in the long run, given that accommodating student learning styles may contribute to an increasing lack of learning flexibility on the student's part.

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