

Learning Styles and Admission Criteria as Predictors of Academic Performance of College Freshmen

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Abstract

This study was an investigation of college freshmen to determine the effectiveness of student learning style and university admission criteria as a means of predicting student performance and retention. High school class rank, high school GPA, ACT score, and learning styles were analyzed. Freshmen enrolled in a First Year Seminar (FYS) course were the subjects of the study.

Introduction

Admission Criteria

Universities across the nation continue to study admission criteria in order to improve their selection processes and support the guidance of students toward academic success (Steunkel, 2006). This is especially important today because of the monetary values placed on student retention. Academic indicators used since the 1940s include a variety of standardized assessment tools that measure students' math, reading, and critical thinking skills. Tinto (1975) defined grade performance and intellectual development as academic measures. Student success in prior learning activities, which can include high school courses, college preparatory courses, and general education courses taken prior to matriculation, are also used as predictors of future academic success to inform admission decisions (Yoho, Young, Adamson, & Britt, 2007).

Today, academic predictors are routinely used in the college admissions process for all degree programs and majors. Various academic screening criteria include essays, references, high school grade point average (GPA), last acquired science grade, and standardized assessment exams. Standardized assessment exams used as criteria for entrance to undergraduate programs include the Scholastic Aptitude Test (SAT), used since 1926, and American College Test (ACT) for an assessment of skills in math and English. In addition, Accuplacer Computerized Placement Tests (CPT) may be used to determine student placement into freshman college math and English courses.

Standardized assessment exams are also used for specific undergraduate majors as pre requisites for admission. Although many standardized exams may be used as admission predictors of student success it could be argued that a student's high school course grades are the most relevant academic predictor of undergraduate student

success. This finding has caused a number of colleges to re-evaluate the use of traditional college exams in the admissions process. Currently, some colleges, such as Worcester Polytechnic Institute (Lamb, 2008) in Massachusetts, Bates College in Maine, and Mount Holyoke in Massachusetts, no longer require the SAT or ACT as a condition of entrance due to their lack of specific relevance as predictors ("The SAT is Losing Favor among College Admissions Officers," 2000). One possible suggestion for an improvement in retention and academic performance through admission criteria is an examination of student learning styles.

Literature Review

Learning Styles

Research on learning styles now spans four decades and occurs across a wide spectrum of disciplines. Cassidy (2004) states, "there is general acceptance that the manner in which individuals choose to or are inclined to approach a learning situation has impact on performance and achievement of learning outcomes." (p. 420) Cassidy describes an onion metaphor as a way of organizing how the various measures arrive the different constructs considered part of learning and cognitive style. At the outer level, meaning they are most observable, at the same time they are most susceptible to influence, therefore making them the least stable measures are instruments that rate student's "instructional preference" or their "preferred choice of learning environment." (p. 423) Next are instruments that measure how much social interaction students prefer during learning. The third and most stable layer of instruments seek to measure "information processing style." The well-known Kolb instrument falls into this category. And finally are innermost measures of "cognitive personality style" like the Myers Briggs Type Indicator.

Kolb's Experiential Learning Theory

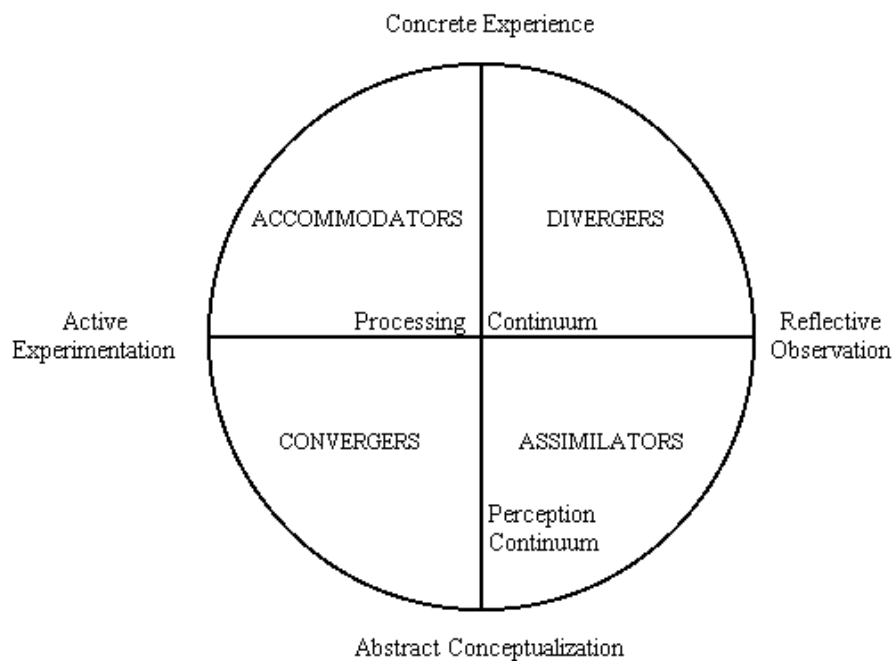
David Kolb's experiential learning theory is one of the best known educational theories in higher education (Kolb and Fry 1975, Kolb 1984) and is frequently cited in the literature involving higher education. Fielding (1984) and Robotham (1995) report that since the publication of his seminal *Experiential Learning* in 1984, Kolb's ideas have had an increasing impact on the work of teachers and trainers, particularly those involved with students of 16 years and upwards. The salient question for this study is, "How does Kolb's experiential learning theory enhance student achievement?"

Professors in higher education should engage in reflective practice as it enables us to learn from our experiences of teaching and facilitating student learning. Developing reflective practice means developing ways of reviewing our own teaching so that it becomes a routine and a process by which we might continuously develop. Kolb developed a theory of experiential learning that can give us a useful model by which to develop our practice. This is called The Kolb Cycle, The Learning Cycle or The Experiential Learning Cycle. The cycle comprises four different stages of learning from

experience and can be entered at any point but all stages must be followed in sequence for successful learning to take place. The Learning Cycle suggests that it is not sufficient to have an experience in order to learn. It is necessary to reflect on the experience to make generalizations and formulate concepts which can then be applied to new situations. This learning must then be tested out in new situations. The learner must make the link between the theory and action by planning, acting out, reflecting and relating it back to the theory.

While some learning style categories focus only on the environmental aspects of learning (auditory, visual, kinesthetic, and tactile), Kolb's learning styles include perception and processing. According to Kolb, learners perceive and process information in a continuum from concrete experience, reflective observation, abstract conceptualization, and active experimentation:

1. Concrete experience: being involved in a new experience
2. Reflective observation: watching others or developing observations about one's own experience
3. Abstract conceptualization: creating theories to explain observations
4. Active experimentation: using theories to solve problems, make decisions



Kolb's Learning Styles

Concrete/Reflective/Abstract/Active

From this continuum, Kolb developed four learning styles: Diverger, Assimilator, Converger, and Accommodator. Learners generally prefer one of the four styles above the others. Although Kolb thought of these learning styles as a continuum that one moves through over time, usually people come to prefer, and rely on, one style above the others. And it is these main styles that instructors need to be aware of when creating instructional materials.

Accommodators - (Concrete experience/Active experimenter)

These students are motivated by the question, "What would happen if I did this?" They look for significance in the learning experience and consider what they can do, as well as what others have done previously. These learners are good with complexity and are able to see relationships among aspects of a system. These teaching methods would work well for an Accommodator:

1. Anything that encourages independent discovery is probably the most desirable.
2. Accommodators prefer to be active participants in their learning.
3. The instructors working with this type of student might expect devil's advocate type questions, such as "What if?" and "Why not?"

Assimilator - (Abstract conceptualization/Reflective observer)

These students are motivated to answer the question, "What is there to know?" They like accurate, organized delivery of information and they tend to respect the knowledge of the expert. They aren't that comfortable randomly exploring a system and they like to get the right answer to the problem. Instructional methods that suit Assimilators include:

1. Lecture method (or video/audio presentation)--followed by a demonstration.
2. Exploration of a subject in a lab, following a prepared tutorial (which they will probably stick to quite closely) and for which answers should be provided.
3. These learners are perhaps less instructor intensive than some other learning styles. They will carefully follow prepared exercises.

Convergers - (Abstract conceptualization/Active experimenter)

These students are motivated to discover the relevancy or the "how" of a situation. Application and usefulness of information is increased by understanding detailed information about the system's operation. Instructional methods that suit Convergers include:

1. Instruction should be interactive, not passive.
2. Computer-assisted instruction is a possibility.
3. Problem sets or workbooks can be provided for students to explore.

Divergers (Reflective observer/Concrete experience)

These students are motivated to discover the relevancy or "why" of a situation. They like to reason from concrete, specific information and to explore what a system has to offer, and they prefer to have information presented to them in a detailed, systematic, reasoned manner. Instructional methods that suit Divergers include:

1. Lecture method--focusing on specifics such as the strengths, weaknesses and uses of a system.
2. Hands-on exploration of a system.

The instructor would be best to mingle with the students, answering questions and making suggestions. Ready reference guides provide handy, organized summaries for this kind of learner.

There is a bounty of research that has reported associations between learning style academic performance. Albeit at the same time, there has been little studied recently about the relationship between university admission criteria and learning styles to academic achievement and student retention.

Purpose and Research Question

The purpose of this study was to determine predictors of academic achievement of freshmen students in a small rural university branch campus. The specific objectives of the study were to:

1. Describe the relationship between students' learning styles according to first semester college GPA.
2. Determine the best predictors of academic performance as measured by grade point average after the first semester of college.

Methods

Participants

The target population for this ex post facto correlational study was freshmen entering the university during the fall of 2011 (N=181). The sample consisted of a group of freshmen enrolled in 3 sections of a First Year Experience Course (n=88). Of the participants, 51 (58%) were females, 37(42%) were males; 66 (21%) were freshmen, and 22 (20%) were sophomores. The mean age was 21.47 (SD=1.61; Minimum: 17; Maximum= 26).

Instruments

David Kolb's (1985) Learning Style Inventory (LSI) was administered to assess the preferred learning style of each student as Diverger, Assimilator, Converger and Accommodator. The Learning Style Inventory (LSI) is a simple self-description test, based on experiential learning theory that is designed to measure your strengths and weaknesses as a learner. Experiential learning is conceived as a four stage cycle:

1. Immediate concrete experience is the basis for
2. Observation and reflection;
3. These observations are assimilated into a "theory" from which new implications for action can be deduced
4. These implications or hypotheses then serve as guides in acting to create new experiences.

The effective learner relies on four different learning modes: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). That is, he must be able to involve himself fully, openly, and without bias in new experiences (CE), he must be able to reflect on and observe these experiences from many perspectives (RO), he must be able to create concepts that integrate his observations into logically sound theories (AC), and he must be able to use these theories to make decisions and solve problems (AE).

A high score on Concrete Experience represents a receptive, experience-based approach to learning that relies heavily on feeling-based judgments. High CE individuals tend to be empathetic and "people-oriented." They generally find theoretical approaches to be unhelpful and prefer to treat each situation as a unique case. They learn best from specific examples in which they can become involved. Individuals who emphasize Concrete Experience tend to be oriented more towards peers and less toward authority in their approach to learning, and benefit most from feedback and discussion with fellow CE learners.

A high score on Abstract Conceptualization indicates an analytical, conceptual approach to learning that relies heavily on logical thinking and rational evaluation. High AC individuals tend to be oriented more towards things and symbols and less towards other people. They learn best in authority-directed, impersonal learning situations that emphasize theory and systematic analysis. They are frustrated by and benefit little from unstructured "discovery" learning approaches like exercises and simulations.

A high score on Active Experimentation indicates an active, "doing" orientation to learning that relies heavily on experimentation. High AE individuals learn best when they can engage in such things as projects, homework, or small group

discussions. They dislike passive learning situation such as lectures. These individuals tend to be extroverts.

A high score on Reflective Observation indicates a tentative, impartial and reflective approach to learning. High RO individuals rely heavily on careful observation in making judgments, and prefer learning situations such as lectures that allow them to take the role of impartial objective observers. These individuals tend to be introverts.

Data Collection and Analysis

The LSI was administered to three sections of freshmen in a college success course during the 1st week of the fall semester. Academic performance was measured by cumulative grade point average at the completion of the fall semester. University admission variables included ACT score, high school class rank, and high school grade point average. Retention was based on enrollment status at the beginning of the spring semester of the freshmen year.

Descriptive statistics were generated on LSI results and academic admission variables (ACT, high school GPA, and high school rank). Pearson product correlation coefficients were calculated between learning style preference and academic admission variables. Regression analysis was used to explain variance in students' cumulative GPA at the completion of the fall semester. An alpha level of .05 ($\alpha = .05$) was established *apriori*.

Results

The first objective sought to describe the relationship between students' learning styles and academic performance at the completion of their first semester of their freshman year. The majority of the students (69.2%) identified as Accommodators and Divergers on the LSI. Thirty-six percent of the students rated as accommodators in their learning style. Thirty-two percent of the students were rated as divergers in their learning style. Convergers (14.9 %) and Assimilators (15.9%) were ranked lowest with a 1% difference between the two groups.

Eighty-two percent of the students who are Divergers received a GPA of 2.5 or higher during their first semester (Table1). Assimilators (78.57 %) achieved a GPA of 2.5 or higher, likewise accommodators (78.10%) and convergers (69.20%) scored a GOA of 2.5 or higher.

Table 1

Relationship Between Learning Style and Academic Performance

Cumulative GPA	Learning Style							
	Accommodator		Diverger		Converger		Assimilator	
	n	%	n	%	n	%	n	%
3.50 - 4.00	6	6.8	5	5.6	3	3.4	2	2.2
3.00 - 3.49	7	7.9	8	9	4	4.5	5	5.6
2.50 - 2.99	12	13.6	11	12.5	2	2.2	4	4.5
Total	25	78.10%	24	82.75%	9	69.20%	11	78.57%
2.00 - 2.49	4	4.5	4	4.5	2	2.2	3	3.4
1.50 - 1.99	2	2.2	1	1.1	1	1.1	0	0
Below 1.49	1	1.1	0	0	1	1.1	0	0
Subtotal	7	22.90%	5	17.25%	4	30.80%	3	21.43%
Total	32	36.3	29	32.9	13	14.9	14	15.9

So, to answer the first research question, overall, there was a low positive relationship (.311) between students' learning style and their GPA at the end of their fall semester.

The second research objective sought to determine the best predictors of students' academic performance at the completion of their first semester as freshmen. Not surprisingly, substantial positive intercorrelations were found between the predictor variables of ACT and high school GPA ($r=.662$). Also, a very strong positive relationship was found between high school GPA and Class rank ($r=.770$). Low positive relationships were found between learning style and the predictor variables of high school GPA (.202), and high school class rank (.223). A moderate positive relationship was found between learning style and ACT scores (Table 2).

Conclusion

Learners who are "divergers" performed at a higher level respectively in terms of their GPA at the end of their first semester. "Assimilators" and "accommodators" respectively scored very similarly and "convergers", while still performing above 2.5 or higher in GPA, ranked 8.9% lower than the other three learning style groups. More research is needed into the dynamic. While this study showed that divergers were higher in terms of academic performance, it does not tell us why. Divergers are motivated to discover the relevancy or "why" of a situation. They like to reason from concrete, specific information and to explore what a system has to offer, and they prefer to have information presented to them in a detailed, systematic, reasoned manner. Perhaps this is the result of 12 years of teacher-centered education. Perhaps students at

this developmental stage lack the life experience that would give them an affinity for preferring another style of learning, such as the dynamics of abstract conceptualization.

Table 2

Intercorrelations of Regression of Variables Predicting Academic Achievement

	LSI	ACT	HS GPA	HS Rank	Semester GPA
LSI	1.00	.366	.202	.223	.311
ACT		1.00	.662	.592	.277
HS GPA			1.00	.770	.308
HS Rank				1.00	.425
Semester GPA					1.00

The best predictor of academic performance during the first semester of college was high school GPA and ACT score. This is not surprising; however more research must be conducted to determine why learning style was not as much of a predictor of academic performance. Perhaps the instruction provided at the university was sufficiently diverse to negate the impact learning style preference would have on student achievement. This is not likely. What is likely is the notion that instruction at the university did not differ substantially from the skill level of the instruction in their previous K-12 experience. This would be another area of future research.

This study is a reminder that the college admission criteria currently used is a good predictor of achievement. For this group, however' learning styles does not seem to be an obvious predictor of success. This might prove to be different if the students were tracked again after the entire first year, or even the sophomore year. However, not enough is written about how to help students engage and how to retain students in that first semester. Since it can be agreed that high school GPA and ACT score are good predictors of success in college, and this study confirms that position, then why, for these students, does learning style only factor in at a low correlation? The answer is probably found in the asking of further questions. Variables other than high school GPA and ACT must influence some students more than others, and learning style must influence some students' achievement more than others. The statement is ambiguous at best, but the underlying charge behind this would suggest that classroom teachers and others at universities keep in mind the need to conduct research into factors that influence academic performance and shift their emphasis as needed to promote opportunities for student success.

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