Analysis of the relationship between college students' learning styles and their academic performance

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ABSTRACT

The purpose of this study was to explore students' learning styles using the Myers-Briggs Type Indicator (MBTI). MBTI is the instrument measuring learning preferences in four dichotomous scales of Jungian theory, which are extraversion vs. introversion, sensing vs. intuition, thinking vs. feeling, and judging vs. perceiving. The combination of four dichotomous scales result in 16 types.

The study sample consisted of 400 students: 123 male students and 277 female students. Of these students, 387 returned a complete questionnaire, yielding a participation rate of 89%. Analyses of data showed that the most common learning style was ISTJ, a combination of introversion, sensing, thinking, and judging. In this study, academic performance measured by grade point average were significantly related to learning style of 16 types (p = .003).

Keywords: learning style, academic performance, college student

Introduction

For centuries, scholars have been interested in knowing how people acquire information and knowledge. Educators and researchers continue to be held accountable for student learning. They have been also interested in discovering ways of using such information in learning processing in school, or in the work places (Reynolds & Gerstein, 1992; Li, Chen, & Tsai, 2008). Researches have pointed out students learn at best in using matched teaching aids with students' learning preferences (Dart, Burnett, Prudie, Boulton-Lewis, Campbell, & Smith, 2000; Lau & Yuen, 2009).

However, teacher-centered and test-oriented teaching methods still remain dominant in Taiwan. The most common teaching phenomenon is that teachers are standing in front of the classroom; meanwhile, students just sit there, listen and take notes. The method of didactic instruction, however, only favors one group of students. Because of one dominant teaching style, others might lack of interests or motivations in learning (Chen, 2004; Chen, 2005).

According to Doolan & Honigsfeld (1999), the more learners know about themselves, the more confident they become in making decisions about their education as well as their future plans. Therefore, the purpose of this study was to explore the relationship between students' performance in the classroom and their learning styles.

Literature Review

Definition of learning styles

The term "learning style" has a broad range of meaning. "Learning style" has been defined, classified, and identified in many different ways according to researchers' instructional needs. The following includes some popular definitions of learning style.

Learning style has identified as “the way each individual begins to concentrate on, process, internalize, and remember new and difficult academic information or skills” (Dunn, Griggs, Olson, and Beasley, p. 353, 1995). Keefe (1979) saw it as “characteristic of cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (p. 17). Kou (1997) defined learning style as the factors that influence individual learning during the learning process.

Definition of Myers-Briggs Type Indicator (MBTI)

The Myers-Briggs Type Indicator (MBTI) is a widely used psychological test that was developed by Katherine Cook Briggs and Isabel Briggs Myers, based on Jung’s theory of psychological types. The combination of MBTI’s sixteen possible preferences derived from Jung’s three dichotomous pairs plus one Myers and Briggs’ bipolar scale. Jung’s three bipolar scales include two mental functions, perceiving and judging, and one dichotomous pair of attitude toward the outside world. Later, Myers and Briggs expanded Jung’s attitudes toward mental function, which create the last dichotomous pair to complete MBTI’s sixteen preferences.

According to *Introduction to Type* by Myers (1998), Jung’s perceiving mental functions describe how learners take in information. Jung’s perceiving mental functions are Sensing (S) and Intuition (N). Sensing learners tend to be interested in direct or objective perceptions made through five senses - sight, sound, touch, taste, and smell. Intuitive learners favor subjective perceptions of the structures, and tend to be insightful and creative.

Thinking (T) and Feeling (F) are two Jung’s judging mental functions, which mainly deal with ways of making decisions and how information is transformed into output. Thinking learners are interested in linking ideas together by making logical connections. Feeling learners,

on the other hand, evaluate relative values to make decisions.

The two dichotomous pairs of attitudes are attitudes toward the world and attitudes toward mental functions, the former was developed by Jung and the latter was expanded by Myers and Briggs. Jung's attitudes toward the world are Extraversion (E) and Introversion (I). Extraverts prefer to get their energy the external world. This type of learner tends to be more friendly and outgoing. Introverts, on the other hand, are more energized by the inner environment of mind and thoughts. This type of learner tends to be more reflective.

Judging (J) and Perceiving (P), attitudes toward the mental function later added by Myers and Briggs, are the last pair of the MBTI which reflect preferences for judging or perceiving mental functions. People with a stronger judging preference are more comfortable with planned and organized lifestyles. As for people score higher in perceiving, they prefer flexible and spontaneous ways of living.

Research about the MBTI

Myers, McCaulley, Quenk, & Hammer (1998) used the MBTI to find a significant relationship among variables such as academic performance, and student persistence. The study stated that students with stronger preferences for Sensing and Judging had a higher overall persistence to graduation rate. Preferences on Introversion, Intuition, and Judging predicted scores on the SAT. Preference of Judging predicted college grade point average. The results supported by Macdaid, McCaulley, and Kainz (1986) indicated that students with learning styles of ISTJ and ISFJ had the highest rate of graduation and students with learning styles of ESTP, ENTP, ISTP significantly more often had not graduated. Stronger preference in Extraversion as opposed to Introversion resulted in an increase in persistence, probably because the students'

outward focus helped them to more easily adjust to the social and environmental demands of college life. Sensing as opposed to Intuition resulted in greater persistence into the sophomore year, probably because successfully getting through the first year of college requires taking in many new facts and information, such as the specific skills necessary to help their academic performance (Myers, McCaulley, Quenk, & Hammer, 1998). Moreover, one might also conclude that our educational system and traditional testing methods tend to favor Judging learners and that college level professors tend to be Intuitive (Wu, 1997).

Methodology

This was a quantitative and exploratory study. The research sample was randomly selected to total 400 students at a university of science and technology in Taiwan. Students were enrolled in the two-year or five-year associate program or the two-year or four-year baccalaureate program. This study used Myers-Briggs Type Indicator (MBTI) self-scoreable questionnaires to examine the students' learning styles. The collected data was transformed into codes for statistical and analytical purposes. The study investigated the relationships between learning style and students' academic performance.

Instrumentation

The MBTI was used as the instrument in this study for measuring students' learning styles.

Reliability. According to Myers, McCaully, Quenk, and Hammer (1998), the reliability of the MBTI's Form G ranged from .82 to .86 (r_{E-I} = .82, r_{S-N} = .84, r_{T-F} = .83, r_{J-P} = .86) using a databank sample of 32,671. The coefficient alpha of Form M ranged from .91 to .92 using a national sample of 2,859. There is little or no difference between Form G and Form M in obtaining the coefficient alpha. Test-retest, an estimate of how stable a characteristic is over time,

is another common method for estimating reliability. Test-retest correlations of Form G ranged from .77 to .84 (r_{E-I} = .84, r_{S-N} = .81, r_{T-F} = .77, r_{J-P} = .82) using a sample of 1,139 with intervals of one to eight weeks. As a result, high internal consistency and consistent test-retest reliability have shown over time.

Validity. The validity of an instrument indicates that the instrument has met its purpose for measurement. The purpose of the MBTI is to measure learners' preferences. A study by Carskadon and Cook (1982) using 118 introductory psychology students found that after receiving a packet of one-page type descriptions eight weeks after taking the MBTI, 50 % of the students chose the correct description of their learning type on their first pick.

Research Procedure

It was a descriptive and exploratory study. Students were required to complete the Traditional Chinese translation of Form G of the MBTI. The entire process required 15-25 minutes to complete and was administered by the qualified researcher. Student participation was anonymous and voluntary. Neither names nor student identification numbers were connected to the data.

Data Analysis

The data were analyzed using functions of the Statistical Package for the Social Sciences (SPSS) such as descriptive statistics, chi-square, and analysis of variance. An alpha level of .05 was set *a priori*.

Results

A total of 400 business students were invited to participate in the study. Of this initial sample, 33 students were in the two-year associate degree (AA) program, 176 in five-year AA program,

30 in two-year baccalaureate (BA) program, and 161 in four-year BA program. Of these students, 387 returned a complete questionnaire, yielding a participation rate of 89%. Table 1 presents the frequency distribution of the students in the academic degree programs.

Table 1

Frequency Distribution in Academic Degree Programs

Program / year	**2-year AA**	**5-year AA**	**2-year BA**	**4-year BA**
1st year		47	30	97
2nd year	33	9		64
3rd year		94		
4th year				
5th year		26		
TOTAL	33	176	30	161

Table 2 and Figure 1 indicate that the most frequent learning style preference for Taiwanese college students was ISTJ (15.3%), a combination of introversion, sensing, thinking, and judging, followed by ESTJ (9.5%), a combination of extroversion, sensing, thinking, and judging.

Table 2

Frequency Distribution of the MBTI sixteen preferences

Type	Frequency	Percent
ESTJ	38	9.5
ESTP	27	6.8
ESFJ	17	4.3
ESFP	13	3.3
ENTJ	24	6.0
ENTP	30	7.5
ENFJ	16	4.0
ENFP	31	7.8
ISTJ	**61**	**15.3**
ISTP	19	4.8
ISFJ	29	7.3
ISFP	27	6.8
INTJ	12	3.0
INTP	16	4.0
INFJ	8	2.0
INFP	19	4.8
Missing	3	0.8
N/A	10	2.5
Total	400	100.0

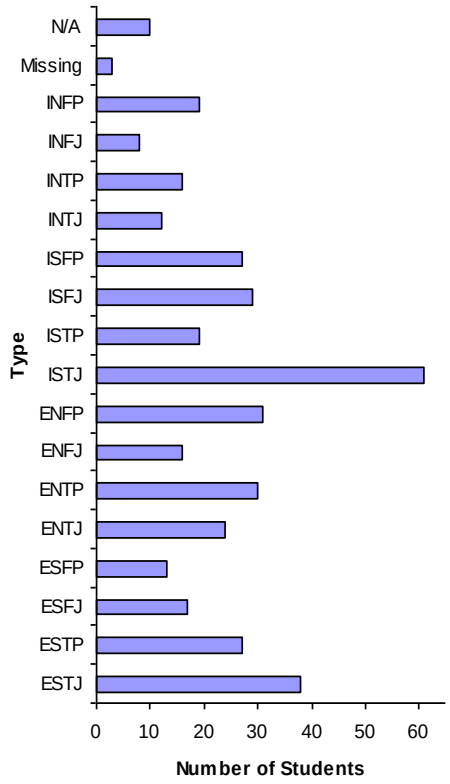

Figure 1. Distribution by Type

Note. N = 400, "N/A" (Not Available) means that the subjects did not finish the MBTI questionnaire. "Missing data" includes three subjects who did not participate in the survey. **Bold** represents the highest percentage among participating students.

The results revealed that there was a significant relationship between grade point average (GPA) and the 16 types of learning preferences ($\chi^2 = 55.437$, $p = .003$). At a .05 level of significance, chi-square was used to examine the differences in the 16 types of preferences according to students' college entrance exam scores and semester GPAs. Table 3 displays the distribution of GPAs among the 16 MBTI Types. The most common type for students who scored

below 70 was ENTP (n = 16). Students with scores between 70 and 79.99 and with scores above 80 shared a preference type of ISTJ (n = 32 and n = 19, respectively), which also registered as the most common learning style.

Table 3

The Ranking of Grade Point Average by MBTI Type

GPA / Ranking	< 70			70 - 79.99			>= 80		
	MBTI	N	%	MBTI	N	%	MBTI	N	%
1	ENTP	16	13.9	ISTJ	32	16.6	ISTJ	19	24.1
2	ESTP	12	10.4	ESTJ	21	10.9	ISFJ	12	15.2
3	ISFP	12	10.4	ENFP	18	9.3	ESTJ	9	11.4
4	ISTJ	10	8.7	ENTJ	15	7.8	ESTP	8	10.1
5	ESTJ	8	7.0	ENTP	14	7.3	ENTJ	6	7.6
6	ENFP	8	7.0	ISFJ	13	6.7	ENFP	5	6.3
7	ISTP	8	7.0	ESFJ	11	5.7	ISFP	5	6.3
8	INFP	8	7.0	ENFJ	10	5.2	INTP	4	5.1
9	INTP	6	5.2	ISFP	10	5.2	ESFP	3	3.8
10	ESFJ	5	4.3	INFP	10	5.2	ENFJ	2	2.5
11	ENFJ	4	3.5	ISTP	9	4.7	ISTP	2	2.5
12	ISFJ	4	3.5	ESTP	7	3.6	INTJ	2	2.5
13	INTJ	4	3.5	ESFP	7	3.6	ESFJ	1	1.3
14	INFJ	4	3.5	INTJ	6	3.1	INFP	1	1.3
15	ESFP	3	2.6	INTP	6	3.1	ENTP	0	0.0
16	ENTJ	3	2.6	INFP	4	2.1	INFJ	0	0.0

Discussions

Among 387 Taiwanese college student, of the 16 types, the most frequent learning style was ISTJ (15.3%), followed by ESTJ (9.5%). These findings are partially supported by Western studies (Kalsbeek, 1986; Tobacyk and Cieslicka, 2000). Tobacyk and Cieslicka (2000), using 107

Polish students, indicated that greater proportions of students preferred extraversion, sensing, thinking, and judging. Similar findings also found in the studies of Cooper & Miller (1991) and Carland & Carland (1987). However, in this study ISTJ emerged as the most common of the 16 types, which was supported by Li, Chen, & Tsai's (2008) study using Taiwanese nursing college students. In the study, introverted students were more represented than extraverted. Again, using the study of Li, Chen, Yang, & Liu (2011) as a comparison, a similar result showed on both studies. ISTJ is also the most common learning style in the study.

Students with a preference for ISTJ in learning tend to be introverted and depend primarily on sensing to gather and process information and on thinking to draw conclusions. People with such preferences are involved mainly with the inner world of experiences and ideas. They also pay more attention to facts and instructions. They make decisions through impersonal analysis and logic, and seek cause and effect. The common characteristics of people with ISTJ preferences are that they are quiet, serious, successful as a result of their thoroughness; they are practical, realistic, and responsible; they decide logically what should be done and work toward it steadily; and they take pleasure in making everything orderly and organized (Myers, McCaulley, Quenk, & Hammer, 1998).

A significant relationship between the 16 types and grade point averages emerged when they were analyzed using chi-square. The most common learning type among those with scores below 70 was ENTP. The common characteristics of ENTPs are that they are quick and outspoken; creative in solving new and challenging problems; adept at generating abstract possibilities and then analyzing them strategically; bored by routine and not inclined to do the same thing the same way twice (Myers, McCaulley, Quenk, & Hammer, 1998). Scores between 70 and 79.99

and scores above 80 shared the same preference type of ISTJ. The learning style of ISTJ was also found significantly in Li's (2003) study under the same grade categories of the scores between 70 and 79.99 and with scores above 80. An explanation might be using lectures is the main teaching method in Taiwan which is best suited for ISTJ learners. The preferences for sensing and judging learn best through a method of teacher-led question and answer with repetition and drill exercises which are the main teaching style in Taiwan. Teachers in Taiwan usually use drills, workbooks, lectures, and memorization in class. These types of students usually receive a higher score on quizzes or exams. Higher scores in the GPA were received by students who prefer sensing or judging modes of learning. ISTJ learners preferred a structured learning environment. This type of students usually gets rewarded with a higher grade point average. These findings were also partially supported by Tharp (1992), who demonstrated that ISFJs have a higher GPA than those of the lowest four types (i.e., the ISFPs, ESTPs. ESFJs, and ESFPs). The common characteristics of ISFJ types are that they are quiet, friendly, and accountable; committed and steady in meeting their responsibilities; understanding, and attuned to specifics about people important to them; and likely to create an orderly and harmonious environment at work and at home (Myers, McCaulley, Quenk, & Hammer, 1998).

Conclusion

The goal of this study was to explore Taiwanese college students' learning styles determined by MBTI scores and to understand the relationships with their academic performance.

There was a wide variety of learning styles in the classroom. In planning an efficient and effective curriculum educators must consider the individual differences of their students. Therefore, if teachers wish to reach these students and provide effective learning environments,

they need to vary their teaching approaches. Otherwise, according to the study, they are only reaching, at most, 15% of the sample, which is the largest group doing best with the main teaching style in Taiwan – lectures. It is also the group with the highest grades. If teachers began adapting a variety of teaching strategies, the remaining 85% of the students might learn more effectively with the matched styles. As a part of the future research, an analysis of the effectiveness of the various teaching styles along with the students' learning style might be considered.

A better understanding of learning preferences can be advantageous to teachers, students, schools, and even society. Teachers must be aware of individual differences to provide academic support accordingly. In addition, teachers, like students, can benefit from knowing their own strengths and weaknesses to better design lesson plans that promote critical thinking and stimulation. Students can benefit by being able to build on their own strengths and to work on their weaknesses in learning. Schools that provide adequate support gain from making teachers and students assets of the institution and by generating revenue from retaining more efficient teachers and producing more effective students. Society in turn benefits from having effective and efficient people working in various fields, who contribute to the creation of a wealthy public and a harmonious society.

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