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FEATURE

**Personality Types, Preferred Learning Modalities,
and College Majors of Students in Luzon**

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Abstract - *This study investigated the relationship of personality types, perceptual learning styles, and the choice of academic major of college students. The subjects were 500 students from six selected academic majors in SDA tertiary schools in North Philippines. Respondents answered the Personal Style Inventory (PSI) and the Perceptual Modality Preference Survey.*

The major findings of the study were as follows: (a) Considering the dominant personality types of college students, there were more extraverts than introverts, more sensors than intuitors, more thinkers than feelers, and more judgers than perceivers; (b) The preferred learning modalities of college students were print and kinesthetic, comprising almost 64% of the total population. The students who preferred aural, interactive, haptic, visual and olfactory modalities comprised only 35% of the total population; (c) There were significant differences in the personality types of college students by gender and ethnicity; (d) There were significant differences in the perceptual learning styles of college students by gender, age, and ethnicity; (e) There was no significant relationship between students' personality types and their choice of academic major; (f) There was a significant relationship between one perceptual learning style and the choice of academic major of college students; (g) There were significant relationships between personality types and perceptual learning styles of college students; (h) As far as the correlates of academic performance are concerned, it was found that personality types, interactive learning style, and ethnicity were significantly related to academic performance; (i) The best predictive model of academic performance, given the variables of the study, include Sensing-Intuition dimension, Region 1, interactive learning style,

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gender of college students, and Thinking-Feeling dimension. The five variables of the study explain 14.2% of the variance in academic performance.

Introduction

What should schools do about individual differences among learners? How can instruction and curriculum be improved in order to meet the needs of different learners? What can we do to contribute to the enhancement of students' unique personality types and preferred learning styles?

According to Silver, Strong, and Hanson (2000), the typical classroom contains many types of personalities and learning styles. They suggest that each student comes to school with unique gifts, needs, skills, attitudes, and preferred ways of learning. Because of this, today's classroom teachers, regardless of their students' ages or the subjects taught, are confronted with this diversity of student needs and potentials and must teach each student equally well.

Kinsella (1995) states that "students have a right within the educational system to have their instructional needs met and to know how to utilize appropriate strategies for approaching teachers" (p. 192). She appeals to educators to work toward promoting and sustaining greater diversity within educational systems by honoring individual differences within their own classes and by setting incremental personal goals for modifying instruction to respond to a wider range of learner characteristics.

This study proposes that understanding and applying personality type and learning style concepts in our educational endeavors can be significant in addressing the learning needs of students and eventually helping them become more successful in their chosen careers. Hanson and Silver (1996) believe that "understanding and accepting our personality types is important for reaching our potential and for having a fulfilling life" (p. 44). Helping students find out who they really are—what they are good at and what they love to do—is the most important way of maintaining natural curiosity and eagerness to learn (Pelullo-Wills & Kindle-Hodson, 1999).

Keefe (1987) explains that "learning style diagnosis opens the door to personalizing education on a rational basis" (p. 42). He believes that it gives the most powerful leverage yet available to educators to analyze, motivate, and assist students in school. He stresses that learning style is the foundation of a truly modern approach to education. Moreover, Siegel and Lester (1994) assert that

understanding how students learn best particularly of their preferred modality is important for beginning and returning college students. They add that this self-awareness can assist students in developing their classroom learning, study skills, and instructional habits throughout their college careers.

It needs to be recognized that individual differences in terms of personality type and learning style are normal and to be viewed as a challenge rather than a liability. By addressing students' personality type and learning style and planning instruction accordingly, teachers will be able to meet more of their educational needs and will be more successful in attaining their educational goals.

Another challenge for educational institutions is to assist students in choosing their appropriate academic major. Harren, Daniels, and Buck (1981) emphasize that the most important challenge for higher education is to respond to the career development needs of an increasingly diverse student population. They add that it is necessary for educators and counselors to be prepared to address the career development needs of an increasingly diverse student population.

It was observed from the review of literature that little effort has been made to integrate all these three important constructs together or to find linkages among them. To date, no study has addressed the relationship of personality types, perceptual learning styles, and the choice of academic major of college students in any Seventh-day Adventist (SDA) tertiary schools in the Philippines. This study sought to bridge this gap in knowledge. This new information can be added to the existing knowledge about personality type and learning style to create a more solid research foundation, expand the general awareness of students' personality type and perceptual learning style differences, and hopefully improve teaching and learning.

The central purpose of this study was to determine the relationship of personality types, perceptual learning styles, and students choice of academic major. It also sought to investigate if there are differences in personality types and learning style according to gender, age, and ethnicity. Moreover, the study ascertained the influence of personality types, perceptual learning styles, and selected demographic variables of gender, age, and ethnicity to the academic performance of college students.

The Concept of Personality Type

The most prominent figure in the development of the modern personality type concept based on mental functions is Carl Jung (1875-1961). In his book *Psychological Types*, he presented the concept of personality consisting of two attitudes, *extraversion* and *introversion*, and four functions, *thinking*, *feeling*, *sensation*, and *intuition*, making eight types of personality in all (Hall & Nordby, 1973; Hanson & Silver, 1996).

Myers and Briggs (cited in Myers & Myers, 1989) extended this theory by making the original eight types of personality into sixteen personality types. Jung (1923) postulated two basic bi-polar mental processes (*Sensing-Intuition* and *Thinking-Feeling*) and two fundamental orientations to life (*Extraversion* and *Introversion*). Myers and Briggs add the fourth dimension (*Judgment-Perception*) to identify the dominant mental processes. Figure 1 illustrates the four dimensions of personality types.

Figure 1. The four dimensions of personality types

In Figure 1, the Extraversion-Introversion (E-I) dimension provides information on or about how people tend to focus their attention and get their energy. The Sensing-Intuition (S-N) dimension suggests how people take in information and ways that they become aware of things, people, events, or ideas. The Thinking-Feeling (T-F) dimension explains the ways people evaluate and come to conclusions about information and how they make decisions. The last dimension which is Judging-Perception (J-P), suggests the type of lifestyle and work habits people prefer. The resulting instrument to measure sixteen personality types has become popularly known as *Myers-Briggs Type Indicator (MBTI)* (see Bayne, 1995, Hilliard, 2001; Myers & Myers, 1989).

Based on Carl Jung's theory of psychological types, Champagne and Hogan (1985) classify people into the following personality types:

1. *Extraverted (E) types*—people who tend to focus on the outer world of people, things, and activity and are energized by interaction with others. They love to talk, participate, organize, and socialize.
2. *Introverted (I) types*—people who are energized by the inner world of reflection, thought, and contemplation. They direct their energy and attention inward and receive energy from reflecting on their thoughts, memories and feelings.

3. *Sensing (S) types*—people who rely heavily on their five senses to take in information. They take in information that is real and tangible—what is actually happening. They are observant about the specifics of what is going on around them and are especially attuned to practical realities, and therefore they are practical and realistic.
4. *Intuitive (N) types*— people who seek out patterns and relationships among the facts they have gathered. They trust their hunches and intuition and look for the “big picture.” Their focus is on conceptual information.
5. *Thinking (T) types*—people who look at the logical consequences of a choice or action and decide on the basis of logic, analysis, and reason. They follow their head rather than their heart, value truth over tact, and sometimes appear blunt and uncaring about the feelings of others.
6. *Feeling (F) types*—people who when making decisions, like to consider what is important to them and to others involved. Appreciating and supporting others and looking for qualities to praise energizes them. They strive to create harmony and treat each person as a unique individual.
7. *Judging (J) types*—people who like to live in a planned, orderly way, seeking to regulate and manage their lives. They want to make decisions, come to closure, and move on. They tend to be structured and organized and like to have things settled.
8. *Perceiving (P) types*—people who are spontaneous and don't like to be boxed in by deadlines or plans. They like to postpone action and seek more data, gathering more information before making a decision. Detailed plans and final decisions feel confining to them; they prefer to stay open to new information and last-minute options (pp. 6-8).

One of the aims of education, according to Myers and McCaulley (1985), should be to facilitate the achievement of all types in the classroom. They suggest that the importance of knowledge about student typologies lies in aiding students to plan their learning and in aiding teachers to plan instruction to maximize the aptitude and interest of all types.

Friedman (1995) stresses that instructors need to be aware of the learning needs of students based on their personality types in order to provide the appropriate kinds of reinforcement that are needed for

their learning style. Hilliard (2001) gives the following descriptions of each personality type.

Extraverts thrive when they are allowed time to think things through by talking, such as in classroom discussions, or when working with another student. They excel with learning activities that have visible results and involve interaction with people. On the other hand, *introverts* excel when they can work independently with their own thoughts, through listening, observing, reading, writing, and independent lab work. They need sufficient time to complete their work and to think before answering a question. They need instructors to allow a moment of silence, if necessary, for this thought process and to process their experiences at their own pace. They are more comfortable if they are not required to speak in class but are allowed to voluntarily contribute.

Sensing types are best with instruction that allows them to use their senses to hear, touch and see what they are learning. They enjoy hands-on activities, computer-assisted instructions, materials that can be handled, and audio-visual materials, provided they are relevant. *Sensing* types will learn easier if facts and skills presented have relevance to their present lives. They want teachers to make clear exactly what is expected of them. They are best able to create possibilities if a foundation of facts and the concrete is presented first. Conversely, *intuitive* students thrive when they have opportunities to be inventive and original and to find ways to solve problems. They want choices in the ways they work out their assignments. They do well with opportunities for self-instruction, both individually and with a group.

Thinking students will understand best when material is presented in a logical, orderly fashion. When dealing with the abstract, they need to have the logic in the material pointed out. They enjoy instructor and student feedback that shows them their specific, objective achievements. They expect all students to be treated fairly and objectively by instructors, and with respect. On the contrary, *feeling* students will work harder when they have developed personal relationships with their instructors and other students. They need specific, positive feedback with corrective instructions from their instructors, and they want instructors to also show appreciation for

students. They understand best when they can see the relationship of the material to people and/or human values.

Judging students thrive on structure, clear instructions and consistency. A clear, detailed outline with specific grading procedures is desirable. They do best with advanced plans without surprises. They expect their instructors to follow their outlines and return assignments when they say they will. In contrast, *perceiving* students like some choices in aspects of assignments. They work best when they understand the reasons for assignments and when assignments make sense to them. They enjoy variety and spontaneity (adapted from Hilliard, 2001).

The Concept of Learning Styles

The preferred learning modalities of the students fits with the concept of *perceptual learning style*. French (cited in Parry, 2000) theorizes that every individual has a personal learning style. Each person may have one or more ways in which they receive information for processing. These styles are called *perceptual learning styles or perceptual modalities*, which are subcategories of the physiological learning style. The perceptual learning style refers to the means by which an individual gathers information through the physical senses. These styles fit into seven categories: print, visual, aural, haptic, interactive, kinesthetic, and olfactory.

James and Galbraith (1985) support French's theory: "One approach to studying learning styles proposes that a person's learning style is composed of a series of different sensory modalities that together make up each person's unique style" (p. 20). According to Schaiper (1983) and Cherry (1981), all individuals do have dominant perceptual learning styles, and when allowed to operate in these styles, they feel a sense of comfort and control.

According to Cherry (1981), students can be classified as:

1. Print learners—individuals who prefer to learn through reading and writing. Print refers only to printed or written words.
2. Aural learners—individuals who prefer to learn through listening.

3. Interactive learners—individuals who prefer to learn through verbalization.
4. Visual learners—individuals who prefer to learn through visual stimuli and visual representations. Visual refers to visual depictions excluding the printed presentations.
5. Haptic learners—individuals who prefer to learn through the sense of touch and feeling.
6. Kinesthetic learners—individuals who prefer to learn through the sense of movement.
7. Olfactory learners—individuals who prefer to learn through the sense of smell and taste (Cherry, 1981, pp. 56-57).

Learning style can be an extremely important element in the move to improve curricula and teaching in higher education (Claxton & Murrell, 1987). Griggs (1991) affirms that the challenge for schools today is to assess the learning style characteristics of each student and to provide teaching and counseling interventions that are compatible with those characteristics.

Guild and Garger (1998) point out that learning style is essential to any educator's philosophy of education because it touches on classroom practice, administration, and curriculum development. They add that learning style relates to staff development and to students' study habits. It helps teaching professionals to understand themselves and to trust that all students can learn. It calls upon educators to actively recognize that people are different.

Reiff (1992) states that understanding learning style provides several benefits. It leads to: (1) reduction of teacher and student frustration; (2) higher student achievement and an improved self-concept; (3) accommodation of a variety of learners in a classroom; (4) the versatility that is crucial to learning; and (5) improved communication with administrators, parents, counselors, and other staff.

Pettigrew and Buell (1987) point out that when teachers are aware of learning style differences, they can create various types of classroom environments that cater to these preferred styles of learning. In the same way, Hinton (1992) asserts that learning style theory is useful in classroom practice because knowledge of students' learning style can empower the instructor to modify teaching and adapt individual teaching style for the benefit of the individual students.

Research has shown improvement in a child's self-concept and achievement when learning preferences and conditions are matched (Reiff, 1984). Analysis of students learning styles can provide a rational basis for accommodating learning style differences in the classroom.

Lederman and Neiss (1998) suggest two ways educators can address students' learning styles in the classroom. First, teachers can simply choose to adapt all instructional experiences to maximize the match between learning style and instructional approach. Or they could empower their students to extend beyond their learning styles and preferences. This would allow them to adapt to the multitude of situations and educational experience that do not match their preferences and turn what would have been a negative experience into a productive one.

Teachers can incorporate learning styles into their classroom by identifying the learning styles of each of their students, matching teaching style to learning style for difficult tasks, strengthening weaker learning styles through easier tasks and drill, and teaching students, learning-style selection strategies (More, 1993). Moreover, Suleiman, (1996) stresses that it is important for students to have multiple learning opportunities and "learning style-shift" (para. 1) while learning. She suggests that teachers should achieve a match between teaching strategies and the students' unique learning styles.

Choice of Academic Major

The choice of a college major is an important aspect of career decision-making behavior. The completion of a college degree with a given major has a great impact on a student's chances for employment, potential earning power, and the level of occupational prestige that can be obtained as a result of that occupation (Smith, 1981).

Maryland (cited in Isaacson, 1979) emphasizes the importance of career education:

All education is career education, or should be. And all our efforts as educators must be bent on preparing students either to become properly employed immediately upon graduation from high school or to go on to further formal education. (p. 14)

Zunker (1998) agrees that "career education is considered integral to the educational process, from kindergarten through

adulthood” (p. 246). He believes that the integration of career education programs into existing educational curricula has been considered the most feasible method of accomplishing these objectives and goals.

Several research studies have also shown that many Filipino college students lack knowledge and skills in making proper career choices (Saldana, 1969; Torres, 1997; Vivas-Lukban, 1972). For instance, Torres found that many of the college freshmen were not sure of their career choice when they came to college. A great majority had made decisions on what course to pursue at the time of enrollment. Only a small percentage of the respondents desired the career programs they were actually enrolled in.

Saldana also discovered that many students in her study had vague concepts of the job tasks involved in their chosen academic major. Vivas-Lukban confirmed that career guidance programs have not permeated into the course decisions of the senior high school students. In fact, she found that there was no appreciable difference between course choices of seniors and their school’s vocational guidance program.

Healy (1982) observed that almost half of the college students in the US change majors and even change career goals while in college. Along the same line, Valmonte (1979) conducted a study to analyze patterns of change among the University of Philippines college seniors’ career decisions during their undergraduate years. She found that (1) there are significantly more students who changed majors than those who did not through the four years in college and in the different academic majors; (2) three out of every four student changers made at least two changes of academic major over the course of the program; (3) significantly more changes occurred during the first two years than during the last two years of college life.

In relation to the present study, Rigley (1993) explains the probable solution to this disturbing occurrence. He points out that of the attributes that can be evaluated, personality factors are reportedly most predictive of eventual career success. He stresses that there is a potential linkage between student’s personality type and satisfaction with their major, and that student persistence in a certain course is related to personality type.

Brewer (1987) stresses that in order to find satisfaction in their chosen major, students may need information about their learning style and how to use these characteristics to their best advantage. This

idea is supported by Pittman (1983) when he points out that knowledge of learning styles would help to account for the fact that some of them do not succeed and leave the program. He stresses that learning style preferences could be used to tailor programs to these students so that they can succeed in their academic major. Jenkins (1981) adds that retention in school can be strengthened when students are able to find the right major based on knowledge of their learning style.

This study hypothesized that personality type and learning style are significantly related to the students' choice of academic major. If relationships are found, then there will be several implications for academic advising, career orientation, counseling, instructional, and curricular programs of educational institutions. In this way, students can be guided to choose the most appropriate course for them that matches their learning style and personality type which may result in greater achievement, satisfaction, and retention in their chosen academic major. In this way, the career development needs of students will be addressed.

Methodology

The population of this study consisted of 500 college students in the three SDA tertiary education institutions located in the region administered by North Philippine Union Mission in the school year 2002-2003: Adventist University of the Philippines (AUP), Northern Luzon Adventist College (NLAC), and Naga View College (NVC).

The sample in this study consisted of college students from the following academic majors: Bachelor of Theology (BTh), Bachelor in Elementary Education (BEEd), Bachelor of Science in Accountancy (BSA), Bachelor of Science in Computer Science (BSCS), Bachelor of Science in Nursing (BSN), and Bachelor in Secondary Education (BSEd).

This study employed two instruments to collect pertinent data. They were the Personal Style Inventory (*PSI*) and the Perceptual Modality Preferences Survey (*PMPS*). The reliability coefficient for the *PSI* in the present study ranged from .64 to .75 while a previous study of Brockington's (cited in Champagne & Hogan, 2002) ranged from .71 to .90. The results of reliability analysis of the *PMPS* in this work ranged from .60 to .75 while the previous study by Harvey (2002) reported values ranging from .68 to .86. Reliability analysis,

therefore, found that both PSI and PMPS have acceptable reliability (see Nunnally, 1978).

Report of Findings

The following discussion presents major findings of this study based on the eleven stated research questions of the study.

Dominant Personality Types

The dominant personality types of college students along the four bi-polar dimensions were Extraverted-Sensing-Thinking-Judging (ESTJ). This indicated that there were more students who were extraverted than introverted, more sensing than intuitive types, more thinking than feeling types, and more judging than perceiving types. See Table 1 for a visual representation of the result.

Preferred Learning Modalities

As far as the preferred learning modalities of students are concerned, it was found that the two most preferred learning modalities were print and kinesthetic. There were only a small number of students who preferred to learn through aural, interactive, haptic, visual, and olfactory modalities.

Differences in Personality Types

There were gender differences ($p < 0.05$, $F = 13.548$; $F = 4.015$). Males were found to be more thinking and judging-oriented, while females were more of the feeling and perceiving-oriented. No age differences were found ($p > 0.05$). There were ethnic differences ($p < 0.05$, $F = 4.27$; $F = 7.63$; $F = 10.42$). Filipinos were found to be more of the intuitive, feeling, and perceiving types while non-Filipinos were more of the sensing, thinking, and judging types.

Table 1
Dominant Personality Types of Colleges Students
(N=500)

Personality Type	Frequency	Percent
E-I Dimension		
Extraverte	306	61.2%

d		
Balanced	31	6.2%
Introverted	163	32.6%
S-N Dimension		
Sensing	324	64.8%
Balanced	31	6.2%
Intuitive	145	29.0%
T-F Dimension		
Thinking	302	60.4%
Balanced	31	6.2%
Feeling	167	33.4%
J-P Dimension		
Judging	338	67.6%
Balanced	19	3.8%
Perceiving	143	28.6%

Differences in Perceptual Learning Styles

There were significant differences in perceptual learning styles by gender ($p < 0.05$, $F=13.757$). Females preferred to learn more through the aural modality than males. There were significant differences in perceptual learning styles by age ($p < 0.05$, $F=2.87$, $F=5.05$, $F=4.33$). There were more younger ones than older ones who preferred to learn through the aural modality and more older ones than younger ones who prefer to learn through the haptic modality. There were significant differences in perceptual learning styles by ethnicity ($p < 0.05$, $F = 2.87$; $F=5.05$, $F=4.33$). Filipino students preferred to learn more through aural, haptic, and olfactory modality than non-Filipino students.

Relationship between Personality Type and Perceptual Learning Styles

Increasing extraversion is related to a higher preference for the interactive modality ($r=.093$, $p<0.05$). More sensing students preferred to learn more through the print modality ($r=.133$, $p<0.05$). More sensing students were less likely to prefer to learn through olfactory modality ($r=-.102$, $p<0.05$). The higher the score on the thinking dimension, the greater the preference for the print modality ($r=.105$, $p<0.05$). Highly judging types showed a stronger preference for the haptic modality ($r=.092$, $p<0.05$).

Personality Type and the Choice of Academic Major

There were no dimensions of personality types that showed significant relationships to the choice of academic major. The result revealed that students' choice of academic major is not influenced by their personality types (see Table 2).

Despite this result, descriptive statistics reveal that there are personality types that gravitate in a certain academic major and that certain academic majors attract particular types of personality. They are as follows: BTh-ESTJ; BEEd-ESFJ; BSEd-ESTJ; BSN-ESTJ; BSA-ESTJ; BSA-ESTJ; BSCS-ESTJ. The PSI manual described ESTJ types as analytical, impersonal, decisive, logical, organized, matter-of-fact, and practical. They solve problems by applying past experience. They want immediate and tangible results from efforts. On the other hand, the ESFJ types are described as people who value harmonious personal relationships. They are warm, friendly, tactful, sympathetic, sensitive. They are persevering, conscientious, idealistic, loyal, practical, conventional, and organized (see Champagne & Hogan, 2002).

Relationship between Students' Perceptual Learning Styles and their Choice of Academic Major

The result revealed that there is a weak negative but significant relationship between olfactory learning style and the choice of academic major of college students. This shows that the choice of academic major is significantly influenced by only one of the students' preferred perceptual learning styles. The negative correlation indicates that the greater the preference for olfactory learning style, the lesser the preference for academic majors that are more scientific and mathematical in nature (see Table 3).

Table 2
Relationship Between Personality Type and the Choice of Academic Major

Personality Type Dimension	r_s	p
Extraversion-Introversion	-.034	.454
Sensing-Intuition	.047	.290
Thinking-Feeling	.029	.521
Judging-Perceiving	.021	.633

Table 3
Relationship Between Perceptual Learning Styles and the Choice of Academic Major

Perceptual Learning Style	r_s	p
Print	-.001	.989
Aural	-.027	.551
Interactive	-.054	.224
Visual	.024	.597
Haptic	-.031	.495
Kinesthetic	.066	.141
Olfactory	-.103	.021*

*p < .05

Relationship between Academic Performance and Demographic Variables

The analysis revealed that there was no significant relationship between the college students' academic performance and the background variables of gender and age. On the other hand, there was a statistically significant relationship between students' academic

performance and ethnicity, being Filipino or non-Filipino, and by region ($r = .105$, $p < 0.05$ and $r = .112$, $p < 0.05$ respectively). See Table 4 for the complete result.

Ethnicity being Filipino or non-Filipino, and by region, accounted for only 1 percent of the shared variance in the academic performance, with non-Filipinos achieving higher academic performance.

Relationship between Personality Type and Academic Performance

The result revealed that there were significant relationships between the college students' personality types and their academic performance in all of the four bi-polar dimensions of personality type namely: Extraversion-Introversion ($r=.121$, $p<0.05$); Sensing-Intuition ($r=.259$, $p < 0.05$), Thinking-Feeling ($r=.249$, $p < 0.05$), and Judging-Perceiving ($r=.241$, $p < 0.05$). The positive correlation indicates that personalities with higher levels of extraversion, sensing, thinking, and judging had higher GPAs compared to the more introverted, intuitive, feeling, and perceiving. Table 5 presents the complete result on the relationship between personality types and academic performance.

Table 4
Correlations Between Academic Performance and Demographic Variables

Demographic Variable	r	r²	p
Gender	.073	.01	.105
Age	.048	.00	.286
Ethnicity (Filipino and Non-Filipino)	.105	.01	.019*
Ethnicity (by Religion)	.112	.01	.013*

* $p < .05$

The four dimensions of personality accounted for the following variance in the academic performance of college students: E-I (1%); S-N (7%); T-F (6%); and J-P (6%). While the magnitude of correlation coefficients indicates weak relationships, it does show that

all personality type dimensions slightly influence the academic performance of college students. Extraverted, sensing, thinking, and judging personality types are more strongly related to academic performance than introverted, intuitive, feeling, and perceiving personality types.

Table 5
Correlations Between Personality Types and Academic Performance

Personality Type Dimensions	r	r²	p
Extraversion-Introversion	.121	.01	.007**
Sensing-Intuition	.259	.07	.000**
Thinking-Feeling	.249	.06	.000**
Judging-Perceiving	.241	.06	.000**

**p < .01

Perceptual Learning Styles and Academic Performance

Data from the sample revealed a statistically significant ($r=.111$, $p=.013$) but weak relationship between academic performance and interactive learning style (see Table 6). The percentage of variance is low (1%) however, indicating that other variables may be more important to the academic performance of a student than preferred interactive learning style. No other statistically significant associations were found between other perceptual learning styles and academic performance.

Table 6
Correlations Between Perceptual Learning Styles and Academic Performance

Perceptual Learning Style	r	r_s	p
Print	-.023	.00	.605
Aural	-.066	.00	.140

Interactive	.111	.01	.013*
Visual	.062	.00	.169
Haptic	.034	.00	.448
Kinesthetic	-.051	.00	.255
Olfactory	-.083	.00	.064

*p < .05,

Predictive Model for Academic Performance

Table 7 presents the predictive model of academic performance. There were five variables that entered the regression equation model of academic performance. The first variable that entered was the Sensing-Intuition dimension ($\beta=0.134$, $p=.019$). The second variable that entered was Region 1 ($\beta=-2.01$, $p=.000$). The next variable that entered was interactive learning style ($\beta=0.114$, $p=.006$). The fourth variable that entered was gender ($\beta=0.128$, $p=.003$). The last variable that entered was the Thinking-Feeling dimension ($\beta=0.168$, $p=.004$). These five variables that entered the regression equation accounted for 14.2% of the variance in the academic performance of college students.

Table 7
Predictive Model of Academic Performance

Step	Variable Entered	Cumulative R ²	Parameter Estimate B	Standardized Beta	p
1	Sensing-Intuition	.067	5.386	.134	.019*
2	Region 1	.105	-.286	-.201	.000*
3	Interactive learning style	.116	5.795	.114	.006*
4	Gender	.127	.128	.128	.003*
5	Thinking-Feeling	.142	6.158	.168	.004*

Personality Types, Preferred Learning Modalities. . .

Constant	=	
		2.637
Total Variance		.142
Explained		

* Significant at .05 level

Figure 2 presents this model of academic performance given the variables of the study.

Figure 2. Predictive model of academic performance

Recommendations for Educational Practice

The following are the specific recommendations based from the findings of the study:

1. Teachers should be made aware that students in the classroom have dominant traits of Extraversion-Sensing-Thinking-Judging (ESTJ) and consequently most students will enjoy curriculum and activities directed to those traits. Alternative curriculum and activities should be provided to meet the needs of the minorities. Furthermore, students possessing a dominant personality type should be encouraged to see the value of, and adapt properly to the other personality traits.

2. Since the primary learning modalities of students were print and kinesthetic, teaching needs to show bias towards these modalities. But teachers should seek to develop alternative learning modalities that while less preferred, may be more effective in contributing to a higher academic performance such as an interactive learning modality.

3. In responding to individual differences in personality types, teachers should be made aware that males were more thinking and judging-oriented while females were more feeling and perceiving-oriented and consequently, traits of these personality types will surface in their daily encounters with others. Teachers should assist their students in preventing a potential clash in personality that may lead to isolation, prejudice, misunderstanding, and disconnection with each other.

4. In responding to individual differences in personality types, teachers should be made aware that females learn more through the auditory modes compared to males, and they appreciate a quiet and serene environment because they are easily distracted by noise. They also appreciate listening to lively lectures and discussions. However, male students should be provided learning activities that are appealing so that their interest for learning will be sustained. In classrooms where there are younger and older groups of students, aural learning activities could be provided to the younger ones while haptic learning activities could be provided to the older ones.

5. Since most of the students display Extraverted-Sensing-Thinking-Judging (ESTJ) personality types, learning modalities could be provided that are appealing to them. Extraverted students enjoy interactive learning activities. Sensing students like to learn through reading and writing. Thinking types prefer to learn through a print modality. And lastly, judging students favor learning through touching and manipulation.

6. Since descriptive analysis of personality profiles indicates association between personality types and academic major, there will be an advantage to counselors' of determine students' personality

types and advise them how personality types may influence their success in their future jobs. While a majority of students in a particular academic major exhibit the same type of personality, other types of personality may still be able to be successful as long as they will endeavor to adapt to whatever challenging situations may appear. Thus, college admission should not bar students from enrolling in any academic major they desire to pursue in college, since it could become their future career.

7. Since the only significant relationship was found between a small group of students who preferred olfactory modality, choosing non-scientific and non-mathematical courses, it would also be wise to help this group find suitable academic majors for them. They could be advised to take up courses which are 'artistic' and 'cultural' in nature.

8. Since it was found that males, Filipino students, and students from Region 1 achieved significantly lower than their counterparts, college academic cultures should be made more appealing to them by focusing assignments and activities that are more relevant to their interest e.g. problem solving, tangible rewards, shorter-term goals, and better peer socialization. Supportive tutorials, mentoring, and supplementary materials could be provided for them. They should also be advised not to feel inferior but be encouraged to strive some more and find alternative ways of improving their academic performance.

9. Since of all learning styles, only interactive learning styles are directly related to higher GPA, teachers need to engage students in enjoyable interactive learning processes so as to develop their appreciation and acceptance of the effectiveness of this form of learning. Timid types of personalities or 'uncreative' students need to be protected and supported with concepts and ideas within the structure of the activity so that they are not discriminated against. Suggested activities that can be implemented are as follows: role-plays, small group discussions, social activities, debates, and question and answer methods.

10. Since the personality types of intuition and feeling showed a lower academic performance, they need to be assisted by exploring cognitive processes that lead to a more successful academic experience. They could be provided learning activities that seek to develop thinking processes and problem solving skills.

The following are the broader recommendations gleaned from the study:

1. Since the research literature recognizes the importance of diagnosing students' personality types and learning styles, it is recommended that teachers and guidance personnel need to do likewise in their respective schools. The result of personality type and learning style assessments should be given and explained to the students so that they may become aware of their learning preferences and strengths. In this way students may learn how to learn, by capitalizing on their strengths, at the same time developing other cognitive skills which prove to be significantly related to, and predict academic performance such as an interactive learning style.

2. Since this study found that there were significant differences in personality types and learning styles of college students by gender, age, and ethnicity, it is recommended that teachers and other school personnel value and respect individual differences displayed by these students. Teachers should become more mindful of their learning needs as determined by their personality types and learning styles. In particular, it is recommended that: (a) Teachers should see themselves as organizers of learning opportunities by allowing students to learn through their preferred ways. (b) Teachers should not follow a 'one size fits all' type of instruction but need to differentiate instruction by providing multiple options for taking in new and difficult information, and by offering choices in class activities and evaluation procedures. (c) They should develop a repertoire of teaching strategies and varied methods of evaluating student progress based on their students' learning preferences. (d) Teachers can apply modality-based instruction and they need to create multi-sensory learning experiences in their classes in order to reach all types of learners. (e) Teachers can engage actively in institutional research on implementing differentiated instruction, and publish the results of their study in order to benefit other faculty members who may wish to apply the same methods.

3. School administrators should support teachers by encouraging and allowing them to implement a variety of learning style strategies in their classroom. They can actively participate in discussions, workshops, observations, and experimentation geared towards addressing the learning needs of the students. They can allocate funds for resources such as audiovisual materials, instruments to be manipulated, books/journals to read and facilities for kinesthetic activities. They can implement staff development procedures like conducting seminars and workshops, demonstrating or viewing videotapes in which teachers can see what a different learning style program looks like, and inviting resource persons, or outside consultants who can show how to implement multi-learning style

instruction. They can promote institution-wide research on the best possible method of implementing differentiated instruction in their school.

4. Curriculum developers should be challenged to develop lesson plans, study guides, curriculum frameworks and course outlines that incorporate learning preferences of college students, taking into account their personality types and learning styles so as to support teacher initiatives. Claxton and Murrell (1987) recommend the establishment of curricular experiences that focus on helping students learn how to learn. They emphasize the relevance of assisting students to develop strategies for succeeding in courses taught in ways that are incongruent with their primary learning abilities. They also suggest that orientation activities can be geared toward helping students gain a greater understanding of how learning occurs and their responsibility in the process.

5. In their counseling sessions with the students, school guidance personnel can incorporate insights relating to their personality types and how to learn more about their personality type and learning style. They can guide and facilitate the students' understanding of their successes, failures, problems and potential, using ideas related to their learning preferences. Though this study did not find a strong influence of learning styles, or of personality types of students to their choice of academic major, yet guidance personnel can still assist them in choosing their academic major. This is because other research studies previously conducted found a stronger influence of personality types and learning styles to student choice of academic major.

6. Pre-service education for college teachers might include training on how personality type and learning style can be catered to in curriculum design and classroom instruction which seeks to serve a greater diversity of the student population. Tomlinson (1999) recommends that teacher-education programs should set clear expectations for the novice's growth in student-centered and responsive instruction. She also recommends that pre-service education provide clear models for differentiated curriculum and differentiated instruction in action. It should provide mentoring that helps teachers reflect on student needs and appropriate responses. Pre-service education should ensure teachers' comfort in implementing a growing range of instructional strategies that invite differentiation and facilitate its management.

7. In hiring new faculty members, administrators should take into account candidates' understanding of teaching-learning practices

that recognize individual differences, including learning style (Claxton & Murrell, 1987). School leaders need to realize that prospective faculty's competence for preparing differentiated curriculum and conducting differentiated instruction is important to serve an increasingly diverse student body.

Recommendations for Future Research

1. This study can be replicated within an Asian, but not Filipino sample, to determine whether the results are similar to other populations previously studied.

2. Future research could involve high school students in order to find out whether there are differences in personality types and learning styles when compared with college students.

3. Other demographic variables that can be included in future studies would be type of institution, religion, socio-economic status, and order of birth. Future research could endeavor to determine whether personality types and learning styles are related to these variables. It can also determine whether there are significant differences in personality types and learning styles across these demographic variables.

4. This study can be extended to all Philippine regions in order to determine especially the personality types and learning styles of Filipino and non-Filipino students. Thus, results would be more conclusive as far as the whole country is concerned.

5. Investigation of the possible connection of personality types and learning styles with student motivation for learning, discipline, and satisfaction in school life could be carried out. This study could determine whether addressing the learning needs of students based on their personality types and learning styles, contributes to a greater motivation, better discipline, and more satisfaction in school life.

6. Further research could investigate factors that may contribute to the lower performance of students from Region 1 and male students, to verify whether this has something to do with the academic community, or peer socialization.

7. Investigation could be made on the possible effect of matching teaching styles with the learning styles of students to their academic performance. If a relationship is found and that matching contributes to a higher academic performance, important recommendations could be made.

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