
LEARNING STYLES OF PNU FRESHMAN COLLEGE STUDENTS SCHOOL YEAR 2009-2010

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Background

Admittedly, the changing context of today's society brought forth by the scientific and technological revolution, advent of information and communication technology (ICT) and globalization, among others, has redefined and reshaped today's education that poses bigger and tougher challenges to the delivery of QUALITY instruction. The most crucial of these challenges is the diverse preparation of students across disciplines. This need calls for revisiting the current teaching and learning practices especially among instructors in higher education institutions (HEIs), imperative to urgent realignment or for further development of the practices.

Given the diversity and the magnitude of factors affecting the teaching and learning process and practices, Claxton and Murrell (2003) argue that instructors should be sensitive enough to the differences that students bring in the classroom and should thoughtfully and systematically design learning experiences that match students' learning styles to achieve effective learning. The more thoroughly the instructors understand the differences, the better chance they have of meeting the diverse learning needs of all their students (Felder and Brent, 2005).

Sarasin (1999) notes that students have individual learning needs, learn in different ways, and process information differently, thus, postsecondary instructors need to give attention to learning styles. Dunn and Dunn (1993) state that when students are taught through their identified learning style preferences, they statistically increased academic achievement. Thus, Johnson et al. (1996) suggest that through

in-service and staff development, experienced and beginning teachers are equipped to utilize learning styles and preferences in their instruction to meet the learners' needs. After all, they have to be more knowledgeable in identifying reasons for varied achievement of students, in assessing the needs of these students, and in utilizing appropriate strategies for remediation, circumvention, and intervention.

According to Claxton and Murrell (2003), learning style is a concept that is important particularly in informing teaching practices and in bringing to the surface the issues that help instructors think more deeply about roles in which they carry out their responsibilities.

Individualized learning styles started in the 70s and gained popularity in recent years. It started with the idea that most people favor some particular method of interacting with, taking in, and processing stimuli or information (Wikipedia, 2009).

Learning styles are ways in which each learner begins to concentrate on process, absorb and retain new difficult information or ways in which a learner internalizes and studies new challenging material (Dunn and Dunn, 1992; 1993; 1999). They are specified patterns of behavior and/or performance, according to which the individual takes in new information and develops new skills, and the process by which the individual retains new information or new skills (Sarasin, 1999). Furthermore, learning styles are preferences and tendencies students have for certain ways of taking in and processing information and responding to different instructional environments (Felder 2010). Simply put, learning styles are various approaches or ways of learning. They involve educating, particular to an individual that is presumed to allow that individual to learn best (Wikipedia, 2009).

Soon after the introduction of the learning styles, psychologists, scholars, and academicians alike have come up with various models of learning styles based on the different learning theories.

In 1984, David Kolb's styles model was based on Experiential Learning Theory popularized. The ELT model outlines two related approaches toward grasping experience: concrete experience and abstract conceptualization as well as two related approaches toward transforming experience: reflective observation and active experimentation. This model holds that an ideal learning process engages all of these four approaches.

In the mid 70s, Peter Honey and Alan Mumford adapted Kolb's model for use with a population of middle/senior managers in business. Two adaptations were made to Kolb's experiential model. First, the stages in the cycle were renamed to accord with managerial experiences of decision making/problem solving. Thus, the Honey and Mumford stages are: having an experience, reviewing the experience, concluding from the experience, and planning the next steps. Second, the styles were directly aligned to the stages in the cycle and named activist, reflector, theorist and pragmatist. These are assumed to be acquired preferences that are adaptable rather than fixed personality characteristics.

Anthony F. Gregorc and Kathleen A. Butler organized another model—the Anthony Gregorc's Model. The model was based on perceptions, a person's evaluation of the world by means of an approach that makes sense to him/her. These perceptions, in turn, are the foundation of his/her specific learning strengths or learning styles. There are two perceptual qualities in this model: concrete and abstract; and two ordering abilities: random and sequential. Concrete perceptions involve registering information through the five senses, while abstract perceptions involve the understanding of ideas, qualities, and concepts. As regards ordering abilities, sequential involves the organization of information in linear, logical way and random involves the organization of information in chunks and in no specific order.

Fleming's VARK model in 2001 is one of the most common and widely used categorizations of the various types of learning styles. Such model was expanded upon earlier Neuro-linguistic programming (VAK) models: visual learners, auditory learners, reading/writing preference

learners and kinesthetic and tactile learners. Fleming claims that visual learners have a preference for seeing (think in pictures or visual aids such as overhead slides, diagrams, handouts, etc.). Auditory learners on the other hand, learn best through listening (lectures, discussions, tapes, etc.). Tactile kinesthetic learners prefer to learn via experience—moving, touching, and doing (active exploration of the world; science projects; experiments, etc.).

In 1988, Felder and Silverman formulated the Learning Styles Model which classifies learners as having preferences for one category or the other in each of the four dimensions: perception dimension (sensing/intuitive), processing dimension (active, reflective), input dimension (visual/verbal) and understanding dimension (sequential/global).

Each of the dimensions in the Learning Styles Model has parallels in other learning styles models. The active/reflective dimension is analogous to the same dimension on the learning style model of Kolb, and the active learner and the reflective learner are respectively related to the extrovert and introvert of Myers-Briggs Type Indicator (MBTI). The sensing/intuitive dimension is taken directly from the MBTI and may have a counterpart in the concrete/abstract dimension of the Kolb Model. The active/reflective and the visual/verbal dimensions have some analogs in the visual-auditory-kinesthetic formulation of the modality theory and neurolinguistic programming and the visual/verbal distinction is also rooted in cognitive studies of information processing. By contrast, the sequential/global dimension has numerous analogs. Students who have the characteristics of sequential learners have been referred to as left brain dominant, automatic, analytic, serialist and auditory—sequential, and students with global learning traits have been termed right-brain dominant, holistic, hierarchical and visual spatial (Felder and Spurlin, 2005).

Felder (1993) summarizes the Learning Styles Model as follows:

Sensing and Intuitive Perception

People are constantly being bombarded with information, both through their senses and from their subconscious minds. The volume of this information is much greater than they consciously attend to; they, therefore, select a minute fraction of it to admit to their “working memory” and the rest of it is effectively lost. In making this selection, sensing learners (sensors) favor information that comes in through their senses intuitive learners (intuitors) favor information that arises internally through memory, reflection and imagination.

Sensors tend to be practical; intuitors tend to be imaginative. Sensors like facts and observations; intuitors prefer concepts and interpretations. A student who complains about courses having nothing to do with the real world is almost certainly a sensor. Sensors like to solve problems using well-established procedures, do not mind detail work, and do not like unexpected twists or complications; intuitors like variety in their work, do mind complexity, and get bored with too much detail and repetition. Sensors are careful, but may be slow; intuitors are quick, but may be careless.

Visual and Verbal Input

Visual learners get more information from visual images (pictures, diagrams, graphs, schematics, demonstrations) than from verbal materials (written and spoken words and mathematical formulas), and vice versa for verbal learners. If something is simply said and not shown to visual learners (e.g. in a lecture), there is a good chance that they will not retain it.

Inductive and Deductive

Inductive learners prefer to learn a body of material by seeing specific cases first (observations, experimental results, numerical examples) and working up to governing principles and theories by inference; deductive learners prefer to begin with general principles and to deduce consequences and applications. Since deduction tends to be

more concise and orderly than induction, students who prefer a highly structured presentation are likely to prefer a deductive approach, while those who prefer less structured tend to favor induction.

Active and Reflective Processing

Active learners tend to learn while doing something active—trying things out, bouncing ideas off others; reflective learners do much more of their processing introspectively, thinking things through before trying them out. Active learners work well in groups; reflective learners prefer to work alone or in pairs.

Sequential and Global Understanding

Sequential learners absorb information and acquire understanding of material in small connected chunk; global learners take in information in seemingly unconnected fragments and achieve understanding of the material and their solutions are generally orderly and easy to follow, but they may lack a grasp of the big picture—the broad context of a body of knowledge and its interrelationships with other subjects and disciplines. Global learners work in a more all-or-nothing fashion or may appear slow and do poorly on homework and tests until they grasp the total picture, but once they have it they can often see connections to other subjects that escape sequential learners.

Schools should attempt to improve the quality of their teaching which, in turn, requires understanding the learning needs of today's students and designing instructions to meet those needs. How much a given student learns in a class is governed in part by his/her attributes as a learner and the instructor's teaching styles (Felder and Brent, 2005) and in 2009, Cranton argues that the level of success students achieve in school is often dependent on teaching that meets their learning styles; thus she suggests that education professionals assess, manage and understand differences among students and their unique learning styles and work toward this move. Cranton further argues that the importance of learning styles cannot be overlooked.

An area in the Research Agenda of the Philippine Normal University focuses on a research that should find out whether there is match or mismatch between the learning styles of PNU students and the teaching styles of PNU faculty (URA, 2008-2010). Ochave and Suatengo (2005), in their study on approximation of the PNU students' preferred teaching methodologies, recommend a particular study on PNU students' learning styles. It is thus imperative to determine the learning styles of PNU students; hence, this study.

Research Problem

Generally, this study aimed at determining the learning styles of PNU freshman students in SY 2009-2010.

Specifically, this study sought to assess preferences of PNU freshman college students on the following learning styles dimensions:

1. active/reflective
2. sensing/intuitive
3. visual/verbal
4. sequential/global

Methodology

Respondents

Based on the basic demographics of the respondents (Part I of the questionnaire), of the 306 respondents, 237 or 77.45% are female and 245 or 80.33% belong to 15-17 age bracket.

The results include the intended courses and majorship of the respondents. The top five intended courses and majorship are BSE English (72) or 23.53%, BS Psychology (54) or 17.64%, BSE Mathematics (53) or 17.32%, BSE Biology (24) or 7.84% and BEED (18) or 5.88%.

Sample and Sampling Technique

This study involved freshman college students at the Philippine Normal University in SY 2009-2010. Following Slovin's sampling formula,

out of 1,311 freshman students enrolled in that semester, only 315 were involved in the study. However, due to incomplete responses, some questionnaires were rejected by the researcher, reducing the total of number of respondents to only 306.

The researcher administered the research instrument to classes or sections. Of the 31 first year classes or sections, only eight (8) sections were needed to complete the needed number of respondents picked at random.

Research Instrument

This study employed the *Index of Learning Styles (ILS)*, a 44-item question instrument designed to assess preferences on four dimensions of the Felder-Silverman learning styles model. It was created in 1991 by Richard M. Felder, a chemical engineering professor at North Carolina State University, and Barbara A. Soloman, then the coordinator of advising for the North Carolina State First-Year College. The four learning style dimensions of the instrument were adapted from the model developed in 1987 by Dr. Richard M. Felder and Linda K. Silverman, then educational Psychologist at the University of Denver.

The first version of the instrument was administered to several hundreds of students and the data were subjected to factor analyses. Items that did not load on one were replaced with new items to obtain the current 44-item version of the instrument. The ILS was installed in the World Wide Web in 1996.

The ILS gets close to a million hits per year and has been translated into Spanish, Portuguese, Italian, German, and several other languages. Three studies have examined the independence, reliability, and construct validity of the four instrument scales. The authors conclude that the instrument meets standard acceptability criteria for instrument of its type.

To obtain other desired data like the basic demographics of the respondents, the researcher included preliminaries in the instrument

and labeled it *Part I*, so that the second part (labeled *Part II*) would be entirely the ILS.

As stated in the website (<http://www4.ncsu.edu/unity/lockers/users/f/felder/public/ILSdir/ILS-faq.htm>), the ILS is available at no cost to students and faculty at educational institutions to use for non-commercial purposes and also to individuals who wish to determine their own learning styles. The commercial rights are held by the Carolina State University. Since the ILS would be used for research purposes in an educational institution, the researcher assumed that the use of the instrument was for free. Nevertheless, for formality, he asked permission from the authors and from the owner of the copyright to use the instrument through a letter addressed to Dr. Richard M. Felder. Following the terms and conditions in the use of the instrument, the researcher indicated in the instrument through a footnote the authors and the owner of the copyright.

Administration of the Research Instrument

The ILS is a web-based instrument. Anyone who desires to determine his/her learning style can take the test online. Once the ILS questionnaire is completed and submitted online, a profile is immediately returned with scores on all four dimensions and brief explanations of scores' interpretations. Links to references that provide more details about the interpretations of the results are also provided.

Two scoring systems may be employed to obtain results: the automated and the manual. Automated is done automatically online, while the manual is done using the scoring formula provided by the authors of the instrument.

Considering this setup, the researcher could have asked the respondents to take the test online. However, with the big number of the respondents and with the time constraints, he opted to come up with hard copies (with same format as the instrument online) of the instrument. As stated above, the researcher administered the instrument to the respondents by class or section. After administering

the instrument, he encoded all the responses online for faster and more efficient scoring. Automated scoring system does not process incomplete responses so the researcher rejected questionnaires with item/s left unanswered.

He also used the Statistical Package for Social Sciences (SPSS) program to obtain the frequency of responses in the first part of the instrument and the frequency of scores in the four dimensions identified in the instrument.

Significance of the Study

The results of this study hold utmost significance basically to instruction, instructors and students.

Learners, especially the college students largely differ in terms of learning styles. Often, the diversity of learning poses a crucial challenge not only in the delivery of quality but also in the design of effective instruction. Determining the students' learning styles provides valuable input and support in coming up with an effective instructional design.

On the other hand, knowledge of the different types of learners helps instructors formulate a teaching approach or create more relevant teaching methodologies that address the needs of students. Specifically, the findings of this study may help instructors become more effective in teaching for creative and critical thinking, problem solving and decision making. The understanding of the students' styles dimension may help instructors identify, structure, and work on complex tasks more effectively and efficiently. Through a clear understanding of the students' styles dimensions, instructors may enable individuals or groups to customize or personalize methods and tools, through style-based modifications, for greater effectiveness and impact, and groups may be helped to function effectively by being aware of varying styles within the group, and by guiding groups to accommodate diversity of styles and thus work together better (Tenedero, 2001).

The results of the learning styles test provide students with valuable clues about their possible strengths and weaknesses and indications of things they might work on to improve their academic performance (Felder and Spurlin, 2005). As a powerful set of tools, learning styles help individuals understand their strengths and interests and then use them as enablers for creative productivity and meaningful accomplishments (Tenedero, 2001).

Scope and Delimitation of the Study

This study limited itself to determine the learning styles preferences in the four (4) learning styles dimensions identified by Felder and Silverman (1988) of the freshman college students at the Philippine Normal University in the first semester of SY 2009-2010. Only samples were used in this study. Using the Slovin's sampling formula, some 315 respondents were included in the study.

To ascertain the learning styles preferences of the respondents, an instrument (ILS) developed by Richard M. Felder and colleague in 1991 was used. Just like any other instruments, the ILS had its limitations, too. Felder identified two (2) major limitations in the use of the ILS. First, the learning styles profiles of the respondents identified through the instrument only suggest behavioral tendencies and not infallible predictors of behavior. Second, the learning style preferences identified through the instrument are not reliable indicators of the respondents's learning strengths and weaknesses.

Results and Discussions

Table 1 shows the learning styles preference of the respondents in the active-reflective dimension. The data reveal that the scales from 1 to 3 under the reflective category have the highest frequency (119) or 38.89% interpreted as fairly well-balanced. It means that the respondents that fall under this category, though inclined toward reflective category, manifest characteristics of both the reflective and the active learners. Simply put, these respondents, in processing ideas or information, are sometimes reflective but at other times, active.

Table 1. Learning Styles Preference of Freshman College Students at PNU in the Processing Dimension (Active-Reflective)

Dimension	ACTIVE			REFLECTIVE			Total
	Frequency	149			Frequency	157	
Percent	48.69			Percent	51.31		
Scale	9-11 (strong preference)	5-7 (moderate preference)	1-3 (fairly well-balanced)	1-3 (fairly well-balanced)	5-7 (moderate preference)	9-11 (strong preference)	
Frequency	3	38	108	119	32	6	306
Percent	.98	12.42	35.29	38.89	10.46	1.96	100

The data in Table 1 clearly show that of the total number of respondents (306), more than half (157) or 51.31% belong to the reflective category. The small difference (16 or 2.62%) supports the above finding that a number of respondents have fairly well-balanced learning styles preference in the active-reflective dimension.

Also the data show that of the respondents classified under the reflective category, 32 or 10.46% have a moderate preference and only six (6) of them have a strong preference. By contrast, of the respondents classified under the active category, 38 or 12.42% have moderate preference, while only three (3) or 0.98% has a strong preference.

The learning styles preference of the respondents in the sensing-intuitive dimension is shown in Table 2. Notably, more than a third (120) or 39.22% of the respondents have a fairly well-balanced learning styles preference. This means that, though the preference is inclined toward the sensing category, these respondents are both sensors and intuitors, that is, they possess or manifest characteristics of both kinds of learners. Taking the FS model (1988), this suggests that these respondents perceive ideas or information sensibly and intuitively. They favor information that come in through their senses and information that arise internally through their memory, reflection and imagination.

Table 2. Learning Styles Preference of Freshman College Students at PNU in the Perception Dimension (Sensing-Intuitive)

Dimension	SENSING			INTUITIVE			Total
	Frequency	256		Frequency	50		
	Percent	83.66		Percent	16.34		100
Scale	9-11 (strong preference)	5-7 (moderate preference)	1-3 (fairly well-balanced)	1-3 (fairly well-balanced)	5-7 (moderate preference)	9-11 (strong preference)	
Frequency	32	104	120	44	5	1	306
Percent	10.46	33.98	39.22	14.38	1.63	.33	100

As presented in Table 2, the majority (256) 83.66% of the respondents are classified under the sensing category. This means that most of them are sensors. Felder (1993) typifies these kinds of learners as practical, careful but slow and that they like facts and observations, solving problems using well established procedures, but dislike unexpected twists or complications.

Scrutinizing the data, one can notice a stark contrast between the number of sensors and intuitors. Intuitors are only a sixth (50) or 16.34% of the total number of the respondents. Of these intuitors, only five (5) or 1.63% have moderate preference and only one (1) or 0.33% has a strong preference.

Table 3 presents the learning styles preference of the respondents in the input dimension (visual-verbal). The data show that more than a half (171) or 55.88% of the total number of respondents are visual learners, and barely a half (135) or 44.12% verbal learners.

Table 3. Learning Styles Preference of Freshman College Students at PNU in the Input Dimension (Visual-Verbal)

Dimension	VISUAL			VERBAL			Total
	Frequency	171		Frequency	135		306
	Percent	55.88		Percent	44.12		100
Scale	9-11 (strong preference)	5-7 (moderate preference)	1-3 (fairly well-balanced)	1-3 (fairly well-balanced)	5-7 (moderate preference)	9-11 (strong preference)	
Frequency	16	62	93	95	32	8	306
Percent	5.23	20.26	30.39	31.05	10.46	2.61	100

Though more than a half of the total number of respondents are visual learners, more than a third (95) or 31.05% of the respondents have a fairly well-balanced learning styles preference between the visual and the verbal categories. This means that these respondents approach or process inputs (ideas or information) visually or verbally. Felder (1993) argues that these kinds of learners get information from visual images like pictures, diagrams, graphs, schematics, demonstrations, etc. and from verbal materials like written and spoken words, mathematical formulas, etc.

The data further show that of the total numbers of respondents, 62 or 20.26% are moderately visual learners and 16 or 5.23% are strongly visual learners. Contrastingly, of the total number of respondents, 32 or 10.46% are moderately verbal, and only 8 or 2.61% strongly verbal.

The learning styles preference of the respondents in the understanding dimension (sequential-global) is shown in Table 4.

Table 4. Learning Styles Preference of Freshman College Students at PNU in the Understanding Dimension (Sequential-Global)

Dimension	SEQUENTIAL			GLOBAL			Total
	Frequency	203			Frequency	103	
Percent	66.34			Percent	33.66		100
Scale	9-11 (strong preference)	5-7 (moderate preference)	1-3 (fairly well-balanced)	1-3 (fairly well-balanced)	5-7 (moderate preference)	9-11 (strong preference)	
Frequency	4	66	133	90	13	0	306
Percent	1.31	21.57	43.46	29.41	4.25	0	100

The data clearly reveal that almost two-thirds (203) or 66.34% of the total number of the respondents are sequential learners and more than a third (103) or 33.66% global learners. From these data, it can be noted that almost two (2) out of three (3) first year college students at PNU are sequential learners. According to Felder (2003), sequential learners are the kinds of learners that absorb information and acquire an understanding of a material in small connected chunk.

Notably too, of the total number of respondents, almost half (133) or 43.46% have a fairly well-balanced learning styles preference in the understanding dimension, that is, they take in information either sequentially or globally. This is supported by a number of respondents (90) or 29.41% (second to the highest frequency under the global category) who have a fairly well-balanced learning styles preference between the sequential and the global categories. When the numbers of respondents with fairly well-balanced learning styles preference under the two categories are combined, it would total 229. This means that more than three-fourths of the total number of respondents have a fairly well-balanced preference between the sequential and the global categories.

Of the total number of respondents, only 66 or 21.57% are moderately sequential learners, and only four (4) or 1.31% strongly sequential. On the other hand, only 13 or 4.25% are moderately global, and none is strongly global.

Table 5 presents the summary of the learning styles preferences of PNU freshman college students in the four learning styles dimensions. In the sensing/intuitive dimension (perception dimension), a majority (256) or 83.66% of the respondents are sensing learners; in the sequential/global dimension (understanding dimension), almost two-thirds (203) or 66.34% of the respondents are sequential learners; in the visual/verbal dimension (input dimension), more than half (171) or 55.88% of the respondents are visual learners; and in the active/reflective dimension (perception dimension), more than a half (157) or 51.31% of the respondents reflective learners.

Table 5. Learning Style Preferences of PNU Freshman College Students in the Four Learning Styles Dimensions

DIMENSION		Frequency	Percent
Sensing/Intuitive	Sensing	256	83.66
	Intuitive	50	16.34
Total		306	100
Sequential/Global	Sequential	203	66.34
	Global	103	33.66
Total		306	100
Visual/Verbal	Visual	171	55.88
	Verbal	135	44.12
Total		306	100
Active/Reflective	Reflective	157	51.31
	Active	149	48.69
Total		306	100

Conclusion

In light of the findings aforesaid, it can be concluded that PNU freshman students learn in various ways, that is, they have various learning styles preferences. Although a number of them manifest fairly well-balanced learning styles preferences in the four learning styles

dimensions, it seems that PNU freshman college students are SENSING, SEQUENTIAL, VISUAL and, REFLECTIVE learners.

Recommendations

Based on the above conclusion, the research study recommends that:

1. Various teaching strategies that may address the learning needs of all students with different learning styles preferences be employed by the PNU instructors;
2. The determination of students learning styles preferences be made a requisite practice especially among PNU or other TEI instructors since learning styles preferences of students provide relevant inputs in formulating effective teaching approaches;
3. Learning styles dimensions and specific learning styles categories—their characteristics, the teaching and learning theories upon which they are based or anchored, their pedagogical implications, among others, be clearly or fully understood by the PNU or other TEI instructors;
4. Knowledge or awareness of learning styles preferences provides students with an idea on how they can capitalize on their possible learning strengths or highlight their learning potentials and work on how they can overcome their possible weaknesses in learning. Their awareness of their learning styles preferences enables them to work on achieving balance in different categories under the different learning styles dimensions. Thus, students be informed of their learning styles preferences;
5. Studies that would determine the factors that influence or shape a learner's learning styles preference and factors responsible for its shift or change be conducted; and, that

6. Since, the respondents in this study are the freshman college students of the University and that they still have a long way off before graduating, the same study, using the same methodology, instrument and respondents, be conducted three years from now when the respondents shall have been in their senior year to find out any changes. If there would be any, how much would have taken place and the factors that may be responsible for such changes or shift in the respondents' learning styles preferences.

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