

Learning Styles of Business Students at a Malaysian Polytechnic

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Abstract

This study investigated the learning styles of business students from two academic programs (Diploma in Accountancy and Diploma in Marketing) at a Malaysian polytechnic. The Index of Learning Styles (ILS) Inventory, developed by Felder and Solomon (1991) and consisting of 44 questionnaires was distributed to two student populations (Diploma in Accountancy, $n = 33$ and Diploma in Marketing, $n = 33$). Data from the ILS questionnaire would identify the students' learning styles based on four domains: active/reflective, sensory/intuitive, visual/verbal and sequential/global. Findings showed that the most preferred learning style of students were visual (>90%), followed by sensing and active (>80%). The least preferred learning style was verbal (<10%). Findings also showed that there were no significant differences in the preferred learning styles for Diploma in Marketing students enrolled in two different courses, Integrated Marketing Communication and Principles in Management. The results of this study indicated that the majority of business students were visual, sensing and active learners. By identifying the learning style preferences, lecturers can customize their teaching methods for better academic performance by the students. Suitable teaching strategies, based on the four domains of ILS can be employed to accommodate the diverse learning styles.

Keywords: Learning Styles, Index of Learning Style (ILS) Inventory

1.0 Introduction

Each person differs in the way that he or she learns and learning styles are simply different strategies or ways of learning. A review of literature on learning styles has revealed a multitude of definitions, models and instruments. Stewart and Felicetti (1992) defined learning styles as educational conditions under which a student is most likely to learn. James and Gardner (1995), meanwhile defined learning style as a complex manner in which learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn. Another definition of learning style is by Dunn (1990) who described the latter as the way each learner begins to concentrate, process, and retain new and difficult information. The various definitions of learning styles would lead to different models and inventories based on different psychological theories and variables. According to Felder & Silverman (1988), a learning style model classifies students according to where they fit on a number of scales pertaining to the ways they receive and process information.

An example of a model which is based on personality is the Myers-Briggs Type Indicator (Myers, 1978). Grasha-Reichmann Learning Style Scales model, meanwhile, is based on social interaction (Grasha, 1996). Kolb's Learning Style Model assesses how individuals receive and interpret information, and how they learn through experience (Kolb, 1984). Dunn and Dunn Learning Style Model is based on the theory that each individual student learns best in his own way. This model takes into consideration four major elements (environmental, emotional, sociological, and physical) that could influence the learning process (Dunn, 2000).

The main objective of this study is to identify the learning style preferences of business students enrolled in two academic programs at a Malaysian polytechnic. The information gathered would be helpful not only in determining appropriate teaching approaches to match students' learning styles, but also in enhancing the academic performance of polytechnic students. The Index of Learning Styles (ILS) instrument, developed by Felder and Soloman (1991) was used in investigating the learning styles of Diploma in Accountancy and Diploma in Marketing students with respect to three courses: Commercial Law (CL), Integrated Marketing Communication (IMC) and Principles in Management (POM). Topics in CL include principles of contracts, hire purchase, negotiable instruments and legal aspects of business entities while IMC covers topics such as advertising, direct marketing, interactive and internet marketing and sales promotion. The course content of POM includes planning, organizing, leading, staffing, and decision making. All courses carry three hours of credit and extends over a twenty week period (one semester). Students are assessed through continuous assessments (e.g. tests, quizzes, presentations, projects, case studies) and final semester examinations.

2.0 Literature Review

In identifying the learning styles of individuals, researchers have devised a number of learning style models. A brief review of some of these models and selected studies are given below.

2.1 *The Felder-Silverman Learning Style Model (FSLSM)*

The Felder-Silverman Learning Style Model (FSLSM) was introduced by Richard Felder and Linda Silverman in 1988 and classified learning styles into four dimensions: active-reflective (processing information), sensing-intuitive (perceiving information), visual-verbal (inputting information) and sequential-global (understanding information). The Index of Learning Styles (ILS) instrument, developed by Felder and Soloman in 1991, comprises 44 questions, 11 for each of the four previously described dimensions.

Felder and Silverman (1988) describe active learners as those that improve retention and understanding of information by discussing or explaining it to others. In contrast, they state that reflective learners prefer to think about the material first. Sensing learners prefer learning facts and solving problems using well-established methods. Intuitive learners, on the other hand, like discovering possibilities and relationships. Visual learners differ from verbal learners because the latter prefer written and spoken explanations as opposed to the former who prefer graphics e.g. pictures, diagrams and flow charts. Sequential learners' understanding of information is in linear and logical steps. Global learners however, absorb information randomly until they get the full picture.

2.2.1 Related Studies Using the Index of Learning Styles (ILS) Instrument

Studies on the preferred learning styles of students have been carried out by many researchers for various reasons. Some researchers were interested in looking at the influence of cultural and demographic factors on the choice of learning style (e.g. Holtbrügge & Mohr, 2009; McPherson & Willis, 2009; Yen, 2012). Others investigated the relationship between gender and learning styles (e.g. Zywno, 2007; Ozbas, 2008; Tapsir, Abdul Rahman, Ahmad Saat, Ab Wahab, Awang Boon, Ahmad & Mahmood, 2010). Researchers like Gappi (2013) and Fardon (2013) carried out studies on the relationship between learning styles and academic achievements.

a. Influence of Culture and Gender

Hottbrudge and Mohr (2009) investigated the relationships between cultural values and the learning style preferences of 953 management students from 74 different countries. Findings showed differences in learning style preferences across countries and these differences were influenced by a number of cultural values. Similarly, McPherson and Willis (2009) in a study of American and non-American students found that learning styles were uniquely related to geographic locations. On the influence of gender on type of learning styles, some studies have shown different adoption of learning styles by male and female students. For example, Ozbas (2008) in investigating gender differences in the learning styles of university students found that female students showed stronger preference for visual learning as compared to male students. This finding was in agreement with a study by Tapsir et al. (2010) which showed female students' preferences for visual and sequential learning styles.

b. Influence of Field of Study

It is also common to find researchers focusing on the learning styles of students in specific fields of study. Some of the studies done by Al-Tamimi and Shuib (2009) and Mior Yusop and Balakrishnan (2014) involved investigating the learning styles of students undertaking English language courses. A study of English majors' learning styles at Universiti Sains Malaysia showed that students were more sensing, visual and active learners than intuitive, verbal and reflective ones (Al-Tamimi & Shuib (2009)). Similarly, a study by Mior Yusop and Balakrishnan (2014) of TESL students at Universiti Putra Malaysia indicated strong preferences for visual learning. The study also revealed that the students only had moderate preference for active, sensing and global learning.

Other researchers, for example Wishart (2005), and Kolmos and Holgaard (2008) focused on science and engineering fields. A local study by Husain, Mustaza, Mansor and Nurmahirah (2013) on 31 first year engineering students at Universiti Kebangsaan Malaysia revealed that students were significantly visual learners and balanced in the other three domains (Sequential/Global, Sensing/Intuitive and Active/Reflective). Similarly, Koh and Chua (2012) discovered that more than half (51.23%) of mechanical engineering students from three different institutions in Malaysia preferred the visual learning style.

For business programs, studies on the learning styles of business students was carried out by a number of researchers. Peresamy, Suryana and Govindan (2009) in investigating the relationship between fields of study and learning styles of management undergraduates found that students majoring in marketing were more dominant in sensing learning as compared to students majoring in finance/banking. Similarly, findings by Naik (2003) on 156 business students showed that the majority of the students surveyed preferred sensing, visual, active, and sequential learning styles. Studies have also shown that students in different majors preferred different learning styles (Too, 2009; Alumran, 2008). These findings suggest that the choice of a learning style could not be attributed to a single underlying factor.

c. Influence on Academic Achievement

Studies on the relationship between learning styles and academic achievement have yielded mixed results. Gappi (2013) found no statistical significant correlation between the learning style preferences of Diploma students and their academic achievements. This finding supports Fardon (2013) who found no significant associations between learning styles and exam performance of apprentices at a vocational Further Education College. There are, however studies that showed positive correlations between learning styles and academic achievements. Bhatti and Bart (2013) found that

learning styles influenced the academic achievements of students studying social sciences. Similarly, Jahanbakhsh (2012) discovered significant correlations between learning styles and academic achievements of science students.

2.2 The Grasha-Riechmann Student Learning Styles Scale (GRSLSS)

GRSLSS consists of six learning styles (Avoidant, Collaborative, Competitive, Dependent, Independent and Participant). Students who are independent prefer to work on their own as compared to students with an avoidant style who avoid taking part in group activities. Collaborative and competitive styles, respectively refer to those that like group work and do not mind competition (Grasha, 1996). Two examples of studies which employed the GRSLSS were carried out by Halili, Naimieb, Sira, Ahmed Abuzaid and Chin (2015) and Amira and Mohd Jelas (2010).

Halili et al. (2015) examined Universiti Sains Malaysia distance learners learning styles preferences across gender. Data analysis from 394 respondents showed that the majority of female students preferred independent, competitive, dependent, participative and collaborative learning styles over male students who were avoidant learners. The model was also used to study the teaching and learning style of lecturers and students at Universiti Kebangsaan Malaysia (Amira & Mohd Jelas, 2010). Findings of the study indicated that students favoured collaborative and competitive learning styles whilst the lecturers were more into expert, facilitator and delegator teaching styles. Both these studies suggest that single methods of teaching would not be effective due to 'gender factor' and disparities between students' learning styles and teaching styles.

2.3 The Dunn and Dunn Learning Styles Model

Learning styles in this model consist of five key dimensions: environmental, emotional support, sociological composition, physiological, and psychological references (Dunn, 2000). An inventory for college students, known as the Productivity Environmental Preference Survey (PEPS) is based on these styles. In examining learning styles across gender, a research done by Subramaniam, Baidin, Melebek and Yong (2014) found similarities (in terms of emotional stimulation, psychological, environmental, and physiological factors) in native students acquiring Malay as a second language. Investigation into the learning styles of low and high achieving students discovered that students did differ in their learning styles according to their level of academic performance (Montemayor, Aplatén, Mendoza & Perey, 2009). The above results on language proficiency and achievement outcomes suggest the need for teachers to incorporate specific teaching methods that accommodate students' learning styles.

2.4 Kolb's Learning Style Inventory (LSI)

Kolb's LSI consists of four dimensions: concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing). From the four dimensions, Kolb determined four learning styles: accommodative, divergent, convergent, and assimilative (Kolb, 1984). Jaju and Kwak (2000) found marketing majors to be accommodators (i.e. preferring concrete experience and active experimentation in their learning). However, findings in another study on online education revealed that students used combinations of Kolb's four learning modes where divergent was the dominant learning style (Barnes, Gooden & Preziosi, 2004).

2.5 Honey and Mumford's Learning style Questionnaire (LSQ)

Honey and Mumford's LSQ is based upon the work of Kolb. The four distinct learning styles in Honey and Mumford's LSQ are: activist, theorist; pragmatist and reflector (Honey & Mumford, 1992). A study of 240 pharmacy students in University of Malaya, Malaysia by Aziz, Tey, Alw and Chong (2013) showed that the most common learning style was reflector learning, followed by theorist, pragmatist and activist. This result was supported by Md Kamaruddin and Abd Wahab (2005) on a sample of 126 electrical engineering students from three Malaysian technical schools. Research findings showed that reflector learning was the preferred choice amongst the students. However, no relationship was found between the learning styles and the academic performances of the students and the researchers postulated that this could be due to other influencing factors such as the teachers' experience.

2.6 The VARK Model of Student Learning

The VARK model was introduced by Neil Fleming in 1987 and has four categories of learners: visual, aural, read/write and kinesthetic (Mlambo, 2011). Arunodaya, Jaafar, Rahim and Abdul (2009) used VARK learning style inventory to investigate the learning styles of 988 undergraduate medical students. The researchers found that a large number of students (72 %) preferred a single style of learning and only thirty percent of respondents were multimodal. The researchers also found that learning styles differed between races. In contrast, investigations into the preferred learning style of medical students at King Saud Bin Abdul Aziz University Saudi Arabia by Nuzhat, Salem, Quadri and Al-Hamdan (2011) found that almost 73 % of students preferred multiple learning styles.

3.0 Statement of Problem

Academic achievement of polytechnic students are assessed through continuous assessment and final semester examinations. Recent examination results have shown that more than seventy percent of students enrolled for three courses (Commercial Law, Principles in Management and Integrated Marketing Communication) obtained grades B and C (equivalent to 47 to 69 marks). The literature search failed to find any studies done on Malaysian polytechnic business students (enrolled in these courses) with regards to their preferred learning styles. Thus a study was carried out to understand how these particular group of students learn and use the findings to improve the students' academic performance by employing suitable teaching strategies.

Objective of the Study

In general, the objective of this study was to investigate the learning styles of business students and to recommend appropriate teaching strategies. Specifically, this study was conducted to: 1) identify the learning style preferences of business students enrolled in two academic programs i.e. Diploma in Accountancy and Diploma in Marketing, and 2) compare the preferred learning styles of Diploma in Marketing students with respect to two different academic courses.

5.0 Methodology

5.1 Sample and Data Collection Procedure

The Index of Learning Styles (ILS) Inventory, consisting of 44 questionnaire items was distributed to two student populations. Malaysian polytechnics offer various three year (six semesters) programs at diploma levels. The respondents for this study were second semester students (Diploma in Accountancy (DAT), $n = 33$ and Diploma in Marketing (DPR), $n = 33$). The courses selected for this study were Commercial Law (CL), Integrated Marketing Communication (IMC) and Principles in Management (POM). Data from the ILS questionnaire would identify the students' learning styles based on four dimensions: active-reflective, sensory-intuitive, visual-verbal and sequential-global. All the questionnaires were administered and returned in-situ.

5.2 Instrumentation

The survey instrument consisted of two main parts. Part A was on the demography of respondents (sex, course and cumulative grade point average (CGPA)). Part B consisted of 44 discrete-choice questions which represented the four dimensions (active-reflective, visual-verbal, sensing-intuitive, and sequential-global) in the ILS inventory. Each dimension had eleven questions and the difference between two scores for each question would indicate the type of learning style preferred by the students.

Scores on the four dimensions were coded on a scale from 11 to -11 (in decrements of 2). For example, a score between 9 and 11 on the sensing-intuitive dimension would indicate a strong preference for sensing learning style whilst a score between 5 and 7 would suggest a moderate preference for sensing learning style. A score between 1 and 3 would indicate a slight preference for sensing learning style but would be comfortable with both sensing and intuitive learning styles. Similar scores in the negative range would indicate a preference for intuitive style of learning. An analysis of the Cronbach's alpha reliability coefficients for all four dimensions of ILS was carried out and yielded results between 0.64 and 0.72, indicating moderate to high levels of internal reliability.

5.3 Data Analysis

The Statistical Package for the Social Sciences (SPSS) program version 20 was used to analysis the data. Descriptive analysis was used in determining the distribution (in percentage) of the learning style of the respondents according to programs of study and courses enrolled. A paired sample t-test was also conducted to compare the scores of the 4 dimensions of ILS for POM and IMC courses.

6.0 Results

6.1 Demographic Analysis

The total number of respondents involved in this study was 66. Half of the respondents was enrolled in the Diploma in Accountancy (DAT) program whilst the remainder was in the Diploma in Marketing program. There were eight male students ($n = 33$) in the DAT program compared to six male students in the DPR program. More than 50 % of the respondents from each program had cumulative grade point average (CGPA) of between 2.5 and 3.5.

6.2 Descriptive Statistics

6.2.1 Learning Style Preferences Related to Program and Course

From table 1, DAT and DPR students preferred the visual, sensing, active and sequential learning styles. The most preferred learning style is ‘visual’ based on the overall percentage recorded by the students. The data in Table 1 are illustrated in Figure 1 in the form of a histogram.

Table 1. Learning Style Preferences Related to Program and Course

Program	Course	Active (%)	Reflective (%)	Sensing (%)	Intuitive (%)	Visual (%)	Verbal (%)	Sequential (%)	Global (%)
DAT	CL	84.8	15.2	87.9	12.1	91.0	9.0	78.7	21.3
DPR	IMC	84.9	15.1	84.9	15.1	90.9	9.1	78.7	21.3
DPR	POM	81.8	18.2	81.8	18.2	97.0	3.0	72.7	27.3

DAT : Diploma in Accountancy, DPR : Diploma in Marketing, CL : Commercial Law, IMC : Integrated Marketing Communication, POM : Principles in Management

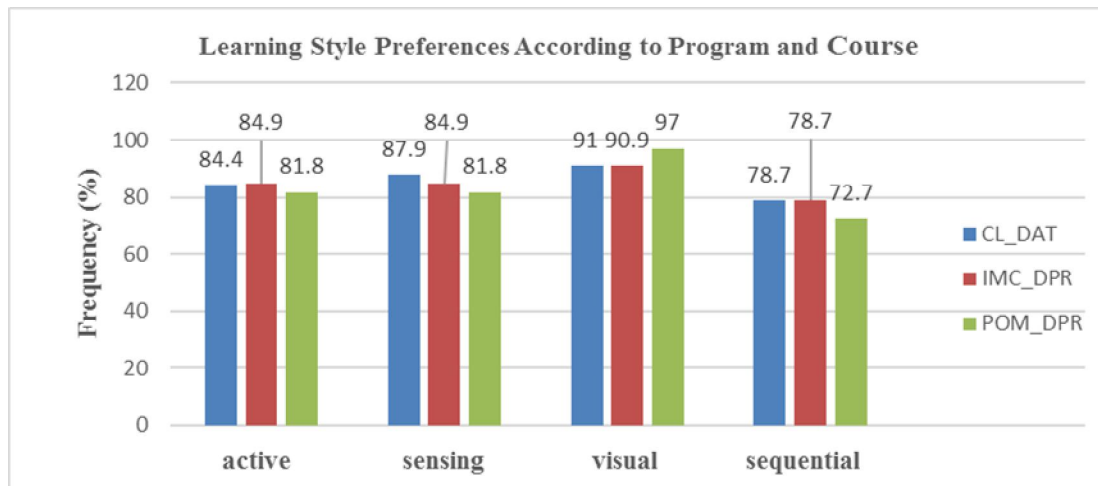


Figure 1. Learning Style Preferences According to Program and Course

Based on Table 2, 84.8 % of DAT students taking CL were active learners and 15.2 % were reflective learners. On closer inspection of the active-reflective dimension, the percentage of strong and moderate preferences was thirteen times higher for active learners than for reflective learners. In the sensing-intuitive dimension, 87.9 % of students were sensing learners. Balanced learners consisted of more than half of the students (63.6 %). In the visual-verbal dimension, 24.3 % of the students were strong visual learners. For the sequential-global dimension, 78.7 % of students indicated a preference for sequential learning. Almost seventy percent (69.7 %) were balanced learners. In sum, DAT students taking CL were characterized by a majority of visual, sensing, active and sequential learners.

Table 2. Distribution and Strength of Learning Styles Preferences (DAT program & CL course)

Preference	Active (%)	Reflective (%)	Sensing (%)	Intuitive (%)	Visual (%)	Verbal (%)	Sequential (%)	Global (%)
Strong	6.1	0	3.0	0	24.3	0	3.0	0
Moderate	33.3	3.0	33.4	0	30.4	3.0	21.2	6.1
Balanced	45.4	12.2	51.5	12.1	36.3	6.0	54.5	15.2
Total	84.8	15.2	87.9	12.1	91.0	9.0	78.7	21.3

For DPR students taking IMC, 84.9 % exhibited a preference for active learning and 15.1 % for reflective learning (Table 3). Thirty percent of the students were balanced learners in the active-reflective dimension. In the sensing-intuitive dimension, a similar figure of 84.9 % preferred to be sensing learners. However, slightly more than forty percent (42.4%) considered themselves as balanced learners. A high percentage of students (90.9%) were visual learners in the visual-verbal dimension and only 18.1 % were balanced learners. More than half (60.6 %) of the students were moderate learners. In the sequential-global dimension, 78.7 % were sequential learners. The same percentage of students (48.5 %) considered themselves as balanced and moderate learners. In sum, DPR students taking IMC were characterized by a majority of visual, active, sensing and sequential learners.

Table 3. Distribution and Strength of Learning Styles Preferences (DPR program & IMC course)

Preference	Active (%)	Reflective (%)	Sensing (%)	Intuitive (%)	Visual (%)	Verbal (%)	Sequential (%)	Global (%)
Strong	18.2	0	9.1	0	21.1	0	3.0	0
Moderate	48.5	3.0	45.5	3.0	57.6	3.0	39.4	9.1
Balanced	18.2	12.1	30.3	12.1	12.1	6.0	36.3	12.2
Total	84.9	15.1	84.9	15.1	90.9	9.1	78.7	21.3

Referring to Table 4, 81.8 % of DPR students taking POM revealed themselves as active learners and 18.2 % as reflective learners. These figures were similar to those that preferred to be sensing and intuitive learners in the sensing-intuitive dimension. However the percentage of balanced learners in the active-reflective dimension was slightly higher (51.5 %) than the percentage of balanced learners (45.4 %) in the sensing-intuitive dimension. A very high figure (97.0 %) of students showed preferences for visual learning (in the visual-verbal dimension) and almost half of the students (48.4 %) considered themselves as moderate learners. In the sequential-global dimension, 72.7 % were sequential learners as compared to 27.3 % who were global learners. Sixty six percent of the students were balanced learners. In sum, DPR students taking IMC were characterized by a majority of visual, active, sensing and sequential learners.

Table 4. Distribution and Strength of Learning Styles Preferences (DPR program & POM course)

Preference	Active (%)	Reflective (%)	Sensing (%)	Intuitive (%)	Visual (%)	Verbal (%)	Sequential (%)	Global (%)
Strong	9.1	0	0	3.0	18.2	0	6.1	3.0
Moderate	39.4	0	45.5	6.1	48.4	0	21.3	3.0
Balanced	33.3	18.2	36.3	9.1	30.4	3.0	45.3	21.3
Total	81.8	18.2	81.8	18.2	97.0	3.0	72.7	27.3

Figure 2a compares the learning style preferences (active-reflective dimension) of DPR students with respect to two different courses. It could be seen that students taking both POM and IMC courses were predominantly active learners where only 6 POM and 5 IMC students were reflective learners. Almost an equal number of students who preferred an active style of learning considered themselves as balanced and moderate learners.

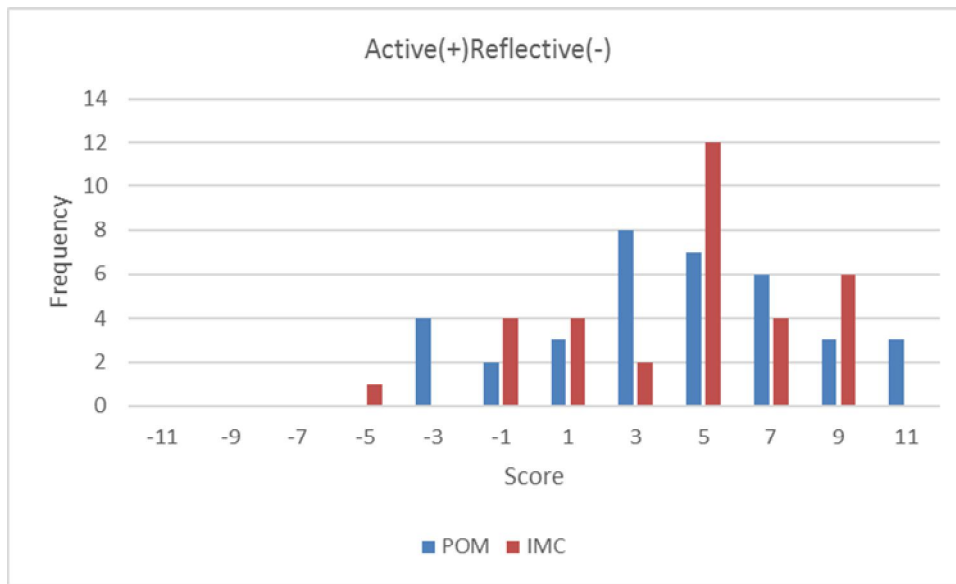


Figure 2a. Scores on the Active/Reflective Scale

For the sensing-intuitive dimension, Figure 2b showed that the majority of students for both POM and IMC courses had balanced and moderate inclinations toward the sensing dimension. Only 1 student from the POM course had a strong preference for the intuitive dimension whilst only 3 from the IMC course exhibited a strong preference for the intuitive dimension.

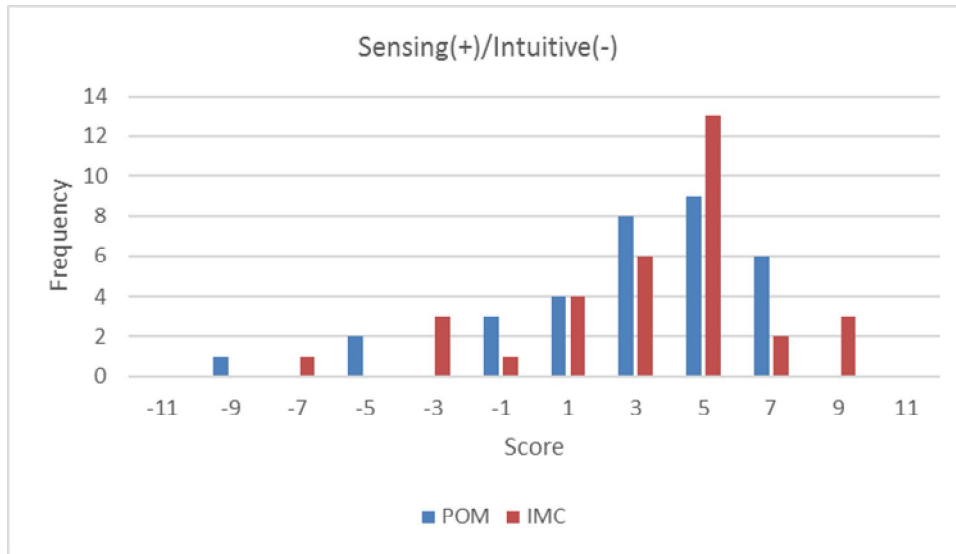


Figure 2b. Scores on the Sensing/Intuitive Scale

For the visual-verbal dimension (Figure 2c), the results showed that the majority of students for both courses were inclined toward the visual style of learning. Almost an equal number of students had moderate and strong preferences for the visual dimension. Only 3 IMC students and 1 POM student showed balanced and moderate preferences for the verbal dimension.

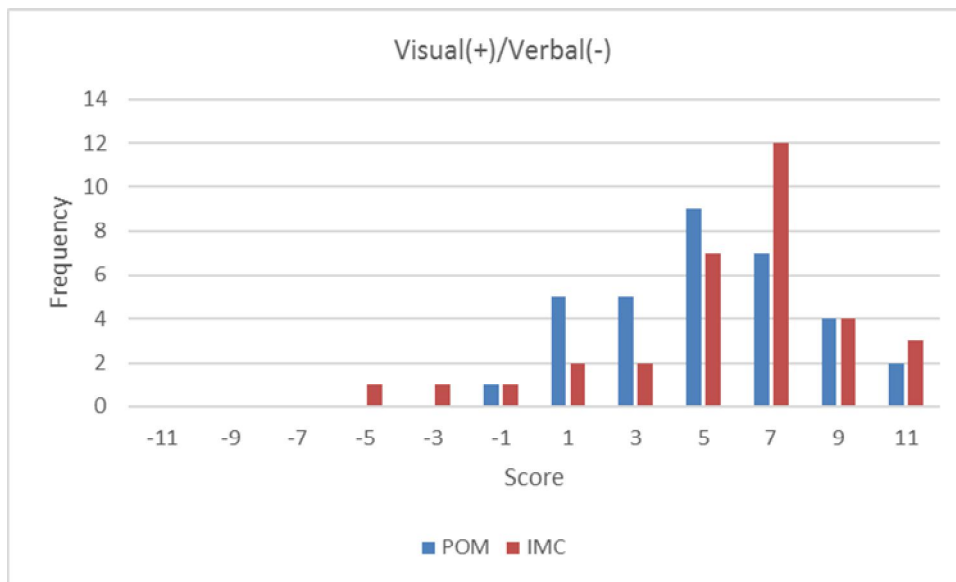


Figure 2c. Scores on the Visual/Verbal Scale

As illustrated in Figure 2d, the students were predominantly sequential learners. Almost an equal number of students for both courses indicated strong and moderate preferences for the sequential dimension. Two POM students showed a strong preference for sequential type learning whilst only 1 student from the same course showed a similar preference for global type learning. As an overall comparison of the distribution of scores, the sequential-global dimension scores were more balanced as compared to the other three ILS dimensions.

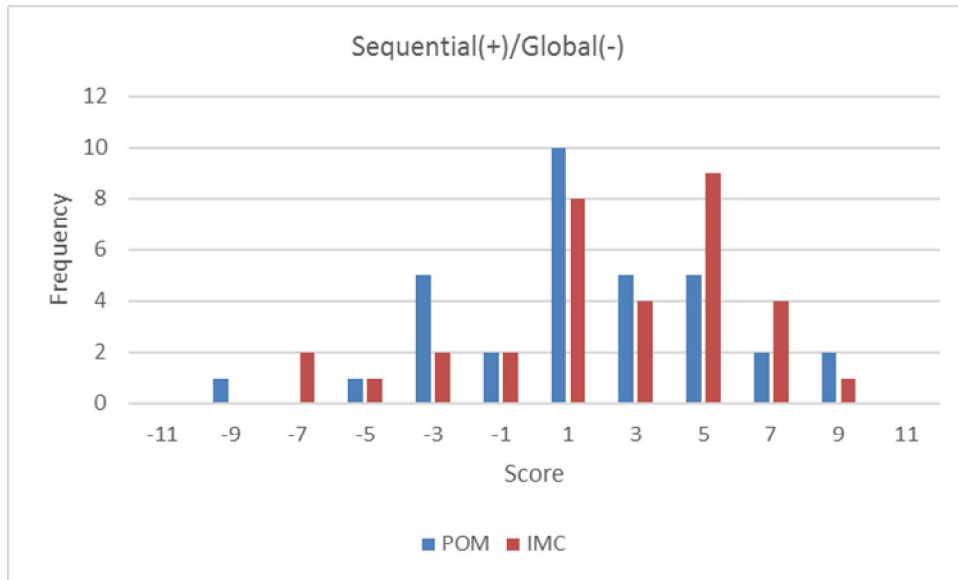


Figure 2d. Scores on the Sequential/Global Scale

A paired sample t-test was conducted to compare the scores of the 4 dimensions of ILS for POM and IMC. As illustrated in Tables 5a, 5b, 5c and 5d, these results suggest that the preferred learning styles of DPR students did not differ with respect to POM and IMC courses.

Table 5a. Comparison of scores between POM and IMC courses with respect to active learning style

Active Style	Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
POM	3.57	33	3.61	.63	-.87	.39
IMC	4.33	33	3.59	.63		

p>0.05

There was no significant difference in the scores for POM ($M = 3.57, SD = 3.61$) and IMC ($M = 4.33, SD = 3.59$) active learning styles; $t(32), p = .39$

Table 5b. Comparison of scores between POM and IMC courses with respect to sensing learning style

Sensing Style	Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
POM	2.82	33	3.82	.66	-.62	.54
IMC	3.36	33	3.66	.53		

p>0.05

There was no significant difference in the scores for POM ($M = 2.82, SD = 3.82$) and IMC ($M = 3.36, SD = 3.66$) sensing learning styles; $t(32), p = .54$

Table 5c. Comparison of scores between POM and IMC courses with respect to visual learning style

Visual Style	Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
POM	5.18	33	3.05	.53	-.62	.54
IMC	5.67	33	3.73	.65		

p>0.05

There was no significant difference in the scores for POM ($M = 5.18$, $SD = 3.05$) and IMC ($M = 5.67$, $SD = 3.73$) visual learning styles; $t(32)$, $p = .54$

Table 5d. Comparison of scores between POM and IMC courses with respect to sequential learning style

Sequential Style	Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
POM	1.55	33	4.01	.69	-.71	.49
IMC	2.27	33	4.02	.70		

p>0.05

There was no significant difference in the scores for POM ($M = 1.55$, $SD = 4.01$) and IMC ($M = 2.27$, $SD = 4.02$) sequential learning styles; $t(32)$, $p = .49$

7.0 Discussion and Conclusion

The purpose of this study was to compare the learning styles of business students majoring in accountancy and marketing at a Malaysian polytechnic. The Index of Learning Style inventory, developed by Felder and Soloman (1991) was used to identify the learning styles of the respondents. The overall results of the study showed that the most preferred learning style was visual and this supported the findings of a similar study of business students by Peresamy, Suryana and Govindan (2009) and Mazumder (2013). However, findings by Naik (2003) was slightly different where the dominant learning style was sensing, followed by visual, active and sequential. The results also revealed that more than 80 % of the respondents indicated preferences for visual, sensing and active modes of learning where DPR students displayed the highest score (97 %) for visual learning in the POM course. In comparing the learning style preferences according to program and course (Figure 1), the slight differences in the scores were to be expected due to different study samples from two different programs. This is somewhat parallel to the findings by Biberman and Buchanan (1986) who found that the styles of majors in accounting and economics/finance vary from majors in marketing and management. In comparing the scores of the 4 dimensions of ILS for POM and IMC courses, there were no significant differences with regards to the learning styles of DPR students. This indicated that the students employed the same mode of study even for different courses. This finding was consistent with another study by Wu (2014) who found that subject matter did not influence the learning styles of undergraduates. However, this should not be generalized with other programs of study. A case in point was the findings by Wishart (2005) when, in comparing computer science and information science students taking similar modules, a multitude of learning styles was exhibited by the students.

Disparities between teachers' teaching style and learning styles of students could arguably, lead to an ineffective learning environment. Many researchers recommended matching teaching and learning styles to improve student achievement (e.g., Henson, 2004; Zeeb, 2004 & Stitt-Gohdes, 2001). However, Coffield, Moseley, Hall and Ecclestone (2004) cautioned that it is more important to align the presentation with the nature of the subject, for example, by employing appropriate learning methods, rather than matching individual preferences. Thus, based on the outcomes of this study, polytechnic lecturers teaching business students should consider incorporating visual aids (e.g pictures, diagrams, flowcharts), use established methods in solving problems and encourage team work and practical experimentation in enhancing students' learning. As for the minority group that preferred the global, reflective and intuitive learning, the students would benefit by having clear learning outcomes and explanations of concepts (verbal and written). These considerations would help in creating an effective learning environment.

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