



# Differences in Learning Style Preferences: A Study of Mainland Chinese College Students Studying in Hong Kong

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## Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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## ABSTRACT

The purpose of this study is to investigate if college students from mainland China have different learning style preferences from local college students in Hong Kong. Participants of this study were college students in Hong Kong, they include 55 (31%) local Hong Kong college students, 69 (39%) students from a Cantonese speaking city in mainland China, and 53 (30%) from a non-Cantonese speaking city in mainland China. They were coming from different cultural background and they used different medium of instruction and languages in learning. A 35-item questionnaire was used to collect their learning style preferences through an online survey website. Two-tailed independent samples t-tests were used to compare the learning style preferences of these groups in terms of visual, auditory, tactile, kinesthetic, group, and individual styles. Results revealed that local Hong Kong students and students from mainland China have significant differences in learning preferences in visual, kinesthetic, and tactile styles to different extents. Recognizing the group difference in learning style preferences of learners enables us to develop more cost effective solutions to address students' learning style preferences in the form of groups with common preferences.

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## 1. INTRODUCTION

Individual difference is one of the major challenges in teaching and learning, group difference is of equal importance. Learners coming from different backgrounds may have different preferences in learning styles. Generally speaking, a learning style is the way that a learner prefers in learning. More specifically, learning styles refer to “the concept that individuals differ in regard to what mode of instruction or study is most effective for them” [1, p.105]. More effective learning takes place when teaching styles match the learning styles of learners [2]. As [3] found that students perform better when the teaching methods match their learning styles. In addition, learning styles adopted by students were also found to have impacts to their academic achievement [4]. Therefore, learning style preferences take an important part in academic success of students.

In recent years, there has been an increasing number of mainland Chinese students studying in Hong Kong. The Hong Kong Government had planned for years to turn Hong Kong to an education hub of Asia, it tended to attract more students from neighbor regions to study in Hong Kong. China is definitely one of the biggest potential sources of non-local students. In a recent study on global flow of tertiary-level students reported by UNESCO in 2014 [5], China topped the list with 712,157 Chinese students studying abroad. Among which, 260,914 destined to the United States and 25,801 destined to Hong Kong.

In fact, local Hong Kong students are greatly influenced by the western culture. Although there are fundamental similarities among students from mainland China and local Hong Kong students, they differ considerably in culture and behavior. They are different in, at least two major areas, cultural background and medium of instruction in learning. Recognizing the learning style preferences of students from mainland China may help in providing relevant resources and assistance to students. In Hong Kong, over 90% of citizens are Chinese. Despite the fact that local Hong Kong students are mainly Chinese, they are of quite different educational and cultural backgrounds in comparing with students from mainland China. In Hong Kong, both Chinese and English are acknowledged as official languages, with Cantonese being acknowledged

as the de facto official spoken variety of Chinese in Hong Kong. Regarding usual languages, 89.5% use Cantonese, 1.4% use Putonghua (major language to be used over mainland China), and 3.5% use English [6]. However, major medium of instruction to be used in colleges and universities in Hong Kong is English while major written language to be used in mainland China is simplified Chinese and major spoken language used is Putonghua. With challenges of subculture and medium of instructions in the learning environment, it may be necessary for the students to adjust their learning preferences to adapt to the new environment.

This study focuses on target groups with two distinctive characteristics, the cultural background and the medium of instruction used in learning. Accordingly, three target groups of interest were identified. The first group was local Hong Kong students, they were having different cultural backgrounds from students coming from mainland China. In addition, it is interesting to know if students from mainland China have different learning style preferences from local college students in Hong Kong. To differentiate the influence of spoken language, the group of mainland Chinese students was further divided into the Cantonese speaking group and the non-Cantonese speaking group.

The purpose of this study is to investigate if college students from mainland China have different learning style preferences from local college students in Hong Kong. If so, do Cantonese speaking students and non-Cantonese speaking students make a difference? In other words, the research questions is: Are there any differences in learning style preferences among the groups of local Hong Kong students, Cantonese speaking students from mainland China and non-Cantonese speaking students from mainland China? The research questions are formulated into the following hypotheses.

**Hypothesis 1:** Local Hong Kong students and students from a Cantonese speaking city in mainland China have different learning style preferences.

**Hypothesis 2:** Local Hong Kong students and students from a non-Cantonese speaking city in mainland China have different learning style preferences.

**Hypothesis 3:** Students from a Cantonese speaking city and students from a non-Cantonese speaking city in mainland China have different learning style preferences.

## 2. LITERATURE REVIEW

Although numerous studies have been performed in learning style preferences, so far there is not a unified view to the influence of learning styles on learning. Many studies found learning style preferences an important part in effective learning [4,7-10]. One of the most influential conceptual models is meshing hypothesis. Meshing hypothesis refers to the claim that matching of teaching methodology to preferred learning style improves learning. There are both proponents and opponents in the concept of matching teaching styles with preferred learning styles.

The study of [7] is just one of the examples on the proponent side of the learning style theory. It revealed that a student's ethnic and cultural background had an influence on his/her learning style preferences. In the study of a group of upper secondary class students, [4] found that learning style preferences had significant impacts to their academic achievement on learners of high, moderate, and low achievers. The effect does not restrict to just one particular subject, but across different subjects [9]. also emphasized that understanding individual learning style preferences was one of the dominant factors which affect the academic success of students.

On the other hand, opponents to the meshing hypothesis do exist. Extant studies [1,11,12] doubted if learning style exists. On the opponent side, [1] argued that there was no adequate evidence base to justify incorporating learning style assessments into general educational practice. They emphasized that simply studying the preferences had minimal implications to educational practices and policies. Firstly, optimal instructional method was likely to vary across different disciplines. Secondly, a student might benefit from a particular kind of teaching method at one time while the student might benefit from another teaching method the other time. They concluded that practical support was needed in the application level. Students must be properly assessed, grouped by their learning styles, and then provided with some sorts of customized instructions. Moreover, additional teacher training and validation of instructional

activities might be required. As a result, interventions built around learning styles would be costly.

Despite the fact that learners have their own preferences of learning styles, perceptual learning styles can be changed as individuals grow and develop [13,14]. According to another study in learning style preferences of ESL (English as a Second Language) students, [15] found that learning styles might change with experience or academic environment. In the levels of secondary and postsecondary schools, student learning styles became more immutable and consistent regardless of the subject concerned or learning environment [16]. As [15] concluded that identifying the learning style preferences of nonnative speakers might have wide implications in curriculum design. In a study of three groups of Russian-speaking ESL students, [17] found that ESL students and foreign language students did make a difference in learning style preferences even though they came from a similar cultural background.

Regarding gender difference, [18] used Paragon Learning Style Inventory (PLSI) to examine the learning styles between male and female of EFL (English as a Foreign Language) students. There were a number of similarities and differences in the learning styles between male and female participants. Results found that female students tended to be more extrovert, while male students showed a greater preference to the feeling dimension. However, as [19,20] found that gender differences existed but were not statistically significant in the learning style preferences.

First of all, ethnic and cultural backgrounds have influence on learning style preferences [7]. Secondly, familiarity with the language also makes a difference in preferences of learning styles [17]. Therefore it is interesting to know if local Hong Kong students and students from a Cantonese speaking city or non-Cantonese speaking city have different learning style preferences. Although there does not exist a unified conclusion to whether matching teaching methods to learning styles is an effective approach for teaching and learning, understanding of learning styles provides input for supporting students in developing different learning style as well as enhancing social and collaborative learning.

### **3. RESEARCH DESIGN**

To address the research questions, an online survey website served to collect data through an anonymous questionnaire. This study employed a quantitative approach to compare patterns of learning style preferences of college students in Hong Kong and students from mainland China.

#### **3.1 Participants**

Convenience sampling was employed in this study because this method suits the exploratory survey and is often used in small-scale surveys. Students of higher diploma, associate degree and degree levels from Caritas Institute of Higher Education (CIHE) and Caritas Bianchi College of Careers (CBCC) formed the target sample frame. A total of 177 first and second year students have been invited to participate in the survey. Participants were students studying in various disciplines, including general business, accounting, corporate management, marketing management, hospitality management, language and translation, and health sciences.

#### **3.2 Methods and Methodology**

Data were collected by survey questionnaire posted on a public survey website. A designated home page for online survey served to gather responses through an online system, which provided more convenience to the participants and the researcher. With consideration of privacy, anonymous survey was used, and no private or sensitive information have been collected. Invitation e-mail with a link to the online survey site located at the end of a participant information statement was sent to students of the eight programmes. The 35-item questionnaire was comprised of two sections, demographic information and questions relating to preferred learning styles. Anonymous survey was used and a total of 177 responses from students were collected throughout the period from January to April, 2016.

Learning Style Inventory (LSI) and Perceptual Learning Style Preference Questionnaire (PLSPQ) are two widely adopted survey tools with established reliability. The LSI questionnaire is one of the self-reports developed by [21] using it for measure of modality preferences. The PLSPQ questionnaire developed by Joy Reid was adapted in the present study because this questionnaire was the most widely used instrument for non-native speakers of English [22].

The instrument was comprised of two sections. The first section collected the participant information including gender, age, level of study, discipline of study, and whether they were local, mainland students coming from a Cantonese speaking city, or students coming from a non-Cantonese speaking city in mainland China. The second section consisted of 30 statements. In this model, there were six distinct learning style dimensions, namely visual, auditory, tactile, kinesthetic, group, and individual. There were five items in each of the dimensions which summed up to a total of 30 items in the questionnaire. With visual learning style, learners learn well from seeing words in books or boards, remember and understand information and instructions better when they read them. With auditory learning style, learners learn from hearing words spoken and from oral explanations. They learn by reading aloud or moving their lips as they read. With kinesthetic learning style, learners learn by being involved physically in classroom experiences. They remember well when they actively participate in activities, field trips, and role plays. With tactile learning style, learners learn best through hands-on experience with materials via senses such as touch, hearing, taste and sight. They remember better through writing notes, doing experiments, or building models. With group learning style, learners learn through interacting with other learners. They remember information better when they work with other classmates. With individual learning style, learners learn by study alone. They remember information better when they are studying alone. They use conceptual and abstract information to understand the real world and solve problems.

Throughout the questionnaire, 5-point Likert scale was used to represent the responses, with "5" representing "Strongly agree", "4" representing "Strongly disagree", and "3" representing "Undecided". In the anonymous survey, both English and Chinese versions of questionnaire were available. The English version of questionnaire is shown in the appendix. To ensure accurate translation of the English version to the Chinese version, the translated Chinese version questionnaire had been sent to designated staff in the language department for verification. It was confirmed that the Chinese version and the English version were equivalent. The instrument has been piloted in a group of 10 students to assure reliability and validity. Minor corrections, mainly on wordings of the questions in questionnaire, have been made to improve clarity.

### 3.3 Data Analysis

Collected responses were prepared for the following analysis. Firstly, descriptive statistics were used to understand characteristics of respondents. Secondly, assumption testing was used to justify normality of data. In addition, Cronbach's alpha value was used as a measure for internal consistency of the variables. Throughout the process, two-tailed independent samples t-tests were used to compare the distribution of various learning styles in the groups, while Levene's test was used to assess homogeneity of variances.

In data preparation, responses to items were grouped by dimensions, and the average values for each of the six learning style dimensions were calculated. Items 11, 15, 17, 29, 34 belonged to visual style; items 6, 12, 14, 22, 25 belonged to auditory style; items 7, 13, 20, 24, 31 belonged to kinesthetic style; items 16, 19, 21, 27, 30 belonged to tactile style; items 8, 9, 10, 26, 28 belonged to group style; and items 18, 23, 32, 33, 35 belonged to individual style. The mean scores for each of the learning style dimensions indicate the level of preferences in students' learning styles.

In the data analysis stage, IBM SPSS 22 package was used. Firstly, internal reliability was used to assess the reliability of data. Secondly, descriptive statistics were used to capture the characteristics of the participants. Normal Q-Q plot was used to test if the distributions of data in learning style preferences conformed to the normality assumption. In addition, Cronbach's alpha coefficient was used as a measuring tool to assess the reliability of the items. After that, Levene's test was used to examine the homogeneity of variances before t-test analysis. Finally, t-test was used to examine whether there exists a significant difference in learning style preferences among the groups.

## 4. RESULTS

Results are presented in three sections. The first section provides descriptive statistics about the characteristics of the respondents. The second section looks into the results of assumption testing. The third section reports the results of two-tailed independent samples t-tests in comparing the learning style preferences among the groups of local Hong Kong students, students from a Cantonese speaking city in mainland China, and students from non-Cantonese

speaking city in mainland China. Here, Levene's test was used to test for homogeneity of variance.

### 4.1 Descriptive Statistics

Table 1 summarizes the demographic statistics of the respondents. Although both English and Chinese versions of questionnaire were available, 170 (96%) respondents attempted the Chinese version while only 7 (4%) respondents responded the English version. A total of 177 responses were collected from college students of the two institutes in this study. Of this total, 72 (41%) respondents were male while 102 (58%) respondents were female. Most of the respondents were in the age group of 18 to 19 (59%), followed by the age group of 20 to 21 (29%). They came from different disciplines of study, including General Business (25%), Accounting (14%), Corporate Management (17%), Marketing Management (10%), Hospitality Management (12%), Language and Translation (4%), Social Sciences (1%), Health Sciences (15%) and others (1%).

Regarding city of origin of the respondents, Fig. 1 shows that the distribution of respondents from the three groups of students are quite even, 55 (31%) respondents were from local Hong Kong, 69 (39%) respondents were coming from a Cantonese speaking city in mainland China, and 53 (30%) respondents were coming from non-Cantonese speaking city in mainland China.

In term of their learning style preferences, there are similarities and differences among the groups. Fig. 2 shows that the group of local Hong Kong students (Group 1) and students from a Cantonese speaking city in China (Group 2) exhibit similar patterns in learning style preferences, they are higher in visual and individual, and lower in auditory style. However, local Hong Kong students demonstrated stronger levels of preference as a whole, which are significantly different from the other two groups. For the group of students from non-Cantonese speaking city, it exhibits very little variance among the styles of visual, auditory, kinesthetic, and tactile styles, though the levels were even lower. In addition, students had higher tendency toward the preference of individual style.

### 4.2 Reliability and Assumption Tests

Before comparing the learning style preferences, assumption testing was used to justify that data were suitable to be analyzed with the statistical

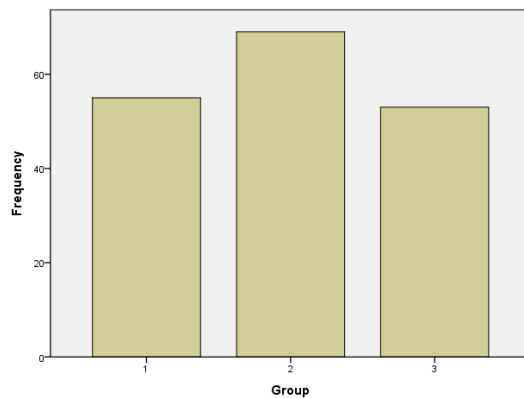
**Table 1. Respondent demographics**

| Demographics             | Response                                     | Frequency        | Percentage (%) |
|--------------------------|--|------------------|----------------|
| Gender                   | Male   | 72               | 40.7           |
|                          | Female                                       | 102              | 57.6           |
|                          | Total  | 174              | 98.3           |
|                          | Missing                                      | 3                | 1.7            |
| Age                      | 18-19  | 104              | 58.8           |
|                          | 20-21  | 51               | 28.8           |
|                          | 22-23  | 14               | 7.9            |
|                          | 24-25  | 4                | 2.3            |
|                          | 26 or above                                  | 4                | 2.3            |
|                          | Total  | 177              | 100            |
|                          | Missing                                      | 0                | 0              |
|                          | Discipline of study                          | General business | 45             |
| Accounting               |  | 24               | 13.6           |
| Corporate management     |  | 30               | 16.9           |
| Marketing management     |  | 18               | 10.2           |
| Hospitality management   |  | 22               | 12.4           |
| Language and translation |  | 7                | 4.0            |
| Social sciences          |  | 2                | 1.1            |
| Health sciences          |  | 27               | 15.3           |
| Others                   |  | 2                | 1.1            |
| Total                    |  | 177              | 100            |
| Missing                  |  | 0                | 0              |
| Level of study           | Associate degree                             | 53               | 29.9           |
|                          | Higher diploma                               | 42               | 23.7           |
|                          | Degree                                       | 81               | 45.8           |
|                          | Total  | 176              | 99.4           |
|                          | Missing                                      | 1                | 0.6            |
| City of origin           | Local Hong Kong                              | 55               | 31.1           |
|                          | Mainland China (Cantonese speaking city)     | 69               | 39.0           |
|                          | Mainland China (Non-cantonese speaking city) | 53               | 29.9           |
|                          | Total  | 177              | 100            |
|                          | Missing                                      | 0                | 0              |

tools. They included normality and reliability analysis. Here, Cronbach's alpha value was used as a measure for internal consistency. It was used in the analysis to examine how closely a set of items were related as a group. It measured the internal reliability of the items. The higher the alpha scores, the more likely the variables were measuring the same concept. Table 2. lists the Cronbach's alpha values for the key variables of learning style preferences.

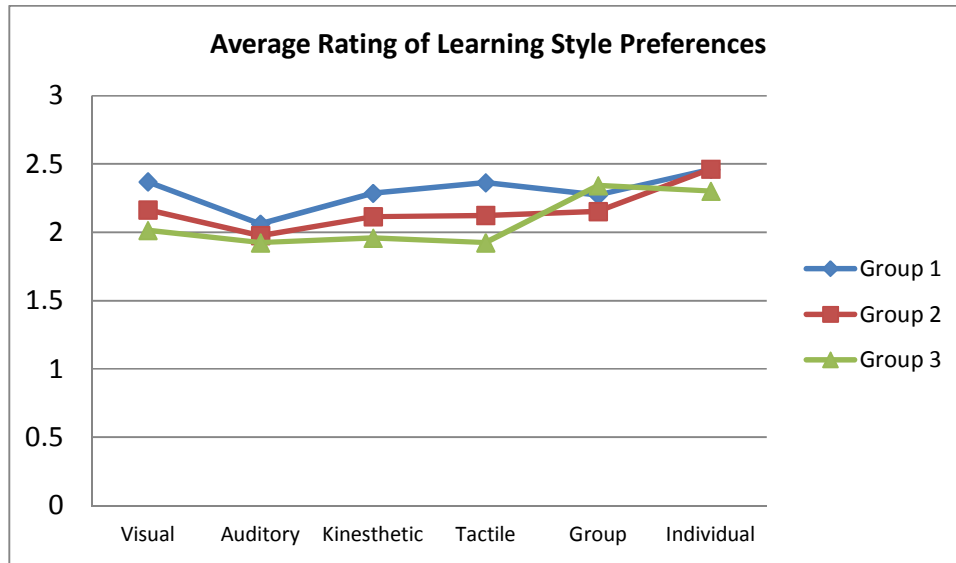
**Table 2. Reliability of key variables**

| Variables   | No. of items | Cronbach's alpha |
|-------------|--------------|------------------|
| Visual      | 5            | .667             |
| Auditory    | 5            | .572             |
| Kinesthetic | 5            | .732             |
| Tactile     | 5            | .792             |
| Group       | 5            | .902             |
| Individual  | 5            | .847             |



**Fig. 1. Distribution of respondents from the three student groups**

Group 1: Local Hong Kong students  
 Group 2: Students from mainland China (cantonese speaking city)  
 Group 3: Students from mainland China (non-cantonese speaking city)



**Fig. 2. Average ratings in learning styles for students from different groups**

*Group 1: Local Hong Kong students*

*Group 2: Students from a cantonese speaking city*

*Group 3: Students from a non-cantonese speaking city*

**Table 3. Reliability on visual items**

| Item | Question no. | Corrected item-total correlation | Cronbach's alpha if item deleted |
|------|--------------|----------------------------------|----------------------------------|
| V1   | 11           | .333                             | .658                             |
| V2   | 15           | .515                             | .581                             |
| V3   | 17           | .530                             | .585                             |
| V4   | 29           | .411                             | .620                             |
| V5   | 34           | .392                             | .638                             |

*Cronbach's alpha value for visual: .667*

**Table 4. Reliability on auditory items**

| Item | Question no. | Corrected item-total correlation | Cronbach's alpha if item deleted |
|------|--------------|----------------------------------|----------------------------------|
| A1   | 6            | .311                             | .531                             |
| A2   | 12           | .299                             | .534                             |
| A3   | 14           | .382                             | .485                             |
| A4   | 22           | .392                             | .487                             |
| A5   | 25           | .295                             | .542                             |

*Cronbach's alpha value for auditory: .572*

Among the variables, their Cronbach's alpha values are greater than .70 with the exception of visual and auditory. Therefore, individual items within the variables of visual and auditory styles have been evaluated further in Tables 3 and 4 respectively. As shown in the last columns of Tables 3 and 4, the Cronbach's alpha values did

not increase even if individual items were removed from the variables. In consideration of the overall representativeness, it was decided that all items were remained in the variables.

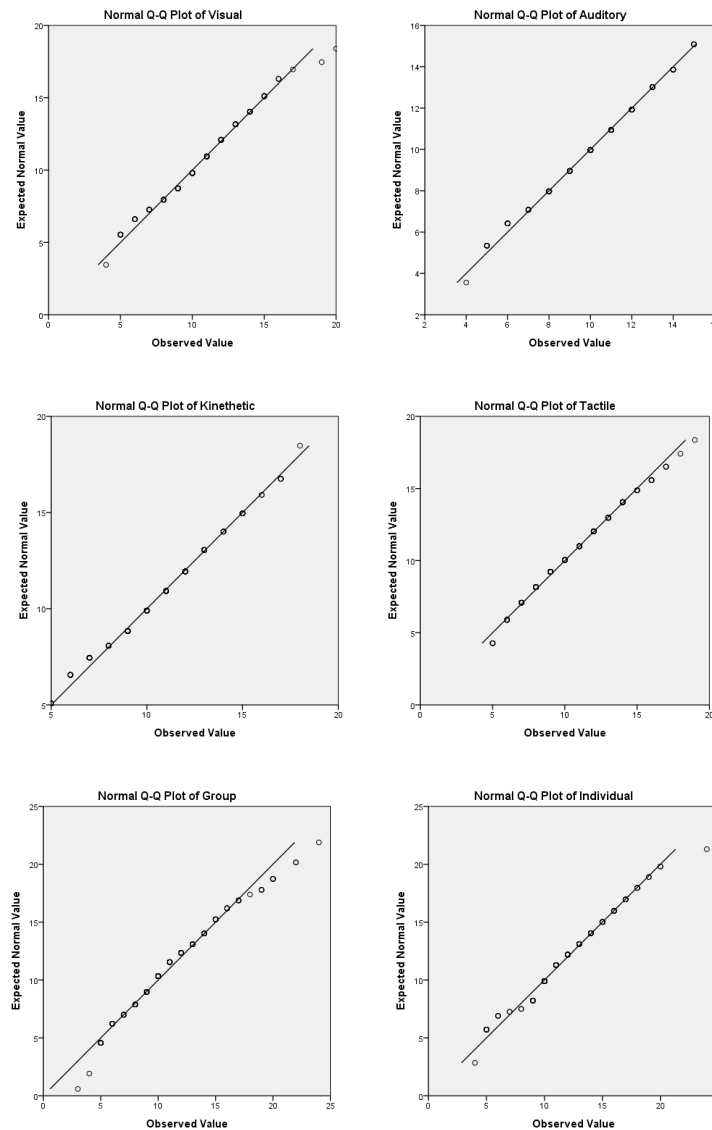
On the other hand, Q-Q plots are used to assess the normality of data. Fig. 3 shows that data points fall approximately on a straight line for each of the key variables. They indicate that the data collected conform to the assumption of normality.

#### 4.3 Comparisons of Learning Style Preferences among the Groups

Following the assessment of reliability and assumption test, the following section reports the results of comparisons of learning style preferences among the groups.

##### 4.3.1 Comparison between local Hong Kong students vs cantonese speaking Mainland China students

Having a preliminary understanding of the respondents' characteristics, the following section illustrates the results of t-test in measuring the differences in learning style preferences between local Hong Kong students and students from a Cantonese speaking city in mainland China. Details are summarized in Table 5.



**Fig. 3. Normal Q-Q plots for the variables**

Levene's test found that the assumption of homogeneity of variance was met,  $p > .05$  for all learning style variables; therefore a two-tailed independent samples t-test based on equal variances was carried out. By reviewing the t-value, degree of freedom and two-tail significance, it indicates any differences in learning style preferences between the groups. Significant differences were found for the learning styles of Visual,  $t(122) = 2.027$ ,  $p = .045$ ; and Tactile,  $t(122) = 2.295$ ,  $p = .023$ . They indicate that there were significant differences for local Hong Kong students and students from mainland China in their learning style preferences of visual

and tactile. Other than that there were not significant differences in other learning style preferences.

**4.3.2 Comparison between local Hong Kong Students vs cantonese speaking Mainland China students**

The following section illustrates the results of t-test in measuring the differences in learning style preferences between local Hong Kong students and students from a non-Cantonese speaking city in mainland China. Details are summarized in Table 6.



Levene's test found that the assumption of homogeneity of variance was met,  $p > .05$  for all learning style variables. Significant differences were found for the learning styles of Visual  $t(106) = 3.322, p = .001$ ; Kinesthetic,  $t(106) = 2.889, p = .005$ ; and Tactile,  $t(106) = 4.120, p < .001$ . They indicate that there were significant differences between local Hong Kong students and students from mainland China in their learning style preferences of visual, kinesthetic and tactile. Other than that there were not significant differences in other learning style preferences.

**4.3.3 Comparison between cantonese speaking Mainland China students vs non-cantonese speaking Mainland China students**

The next section illustrates the results of t-test in measuring the differences in learning style preferences between students from a Cantonese speaking city and students from a non-Cantonese speaking city in mainland China. Details are summarized in Table 7.

Levene's test found that the assumption of homogeneity of variance was met,  $p > .05$  for all learning style variables except the group style,  $p = .045$ ; therefore a two-tailed independent samples t-test based on equal variances was assumed except the group style. Significant difference was found for the learning styles of

Tactile,  $t(120) = 2.176, p = .032$ . They indicate that there was significant difference between students from a Cantonese speaking city and students from a non-Cantonese speaking city in tactile learning style. Other than that, no significant differences were found in other learning style preferences.

**5. DISCUSSION**

Based on the results in the previous section, the following section provides detailed discussion on the respondents' profiles, results of reliability and assumption test, and most importantly comparisons of learning style preferences among the three designated groups.

**5.1 Descriptive Statistics**

In this study, samples collected were evenly distributed in gender. In addition, city of origin of respondents also fell evenly among the three groups. As shown in Fig. 2, obvious differences in learning style preferences were found among the groups, particularly in visual, auditory, kinesthetic and tactile styles. Briefly speaking, local Hong Kong students had the strongest levels in style preferences, followed by students from a Cantonese speaking city, and then students from a non-Cantonese speaking city. Detailed comparisons among the groups will be provided in the following sections.

**Table 5. Comparison in learning style preferences between local Hong Kong students and students from cantonese speaking city in mainland China**

| Learning style preferences | Leven's test |         | t-test |     |         |
|----------------------------|--------------|---------|--------|-----|---------|
|                            | F            | p value | t      | df  | p value |
| Visual                     | .514         | .475    | 2.027* | 122 | .045    |
| Auditory                   | 2.733        | .101    | 0.974  | 122 | .332    |
| Kinesthetic                | 1.063        | .305    | 1.631  | 122 | .106    |
| Tactile                    | 1.274        | .261    | 2.295* | 122 | .023    |
| Group                      | 3.596        | .060    | 0.874  | 122 | .364    |
| Individual                 | 1.419        | .263    | -0.016 | 122 | .988    |

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Table 6. Comparison in learning style preferences between local Hong Kong students and Students from non-cantonese speaking city in mainland China**

| Learning style preferences | Leven's test |         | t-test   |     |         |
|----------------------------|--------------|---------|----------|-----|---------|
|                            | F            | p value | t        | df  | p value |
| Visual                     | 1.706        | .194    | 3.322**  | 106 | .001    |
| Auditory                   | 0.843        | .361    | 1.449    | 106 | .150    |
| Kinesthetic                | 0.666        | .416    | 2.889**  | 106 | .005    |
| Tactile                    | 2.608        | .109    | 4.120*** | 106 | < .001  |
| Group                      | 0.046        | .831    | -0.432   | 106 | .667    |
| Individual                 | 0.016        | .900    | 1.303    | 106 | .195    |

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Table 7. Comparison in learning style preferences between students from cantonese speaking city and students from non-cantonese speaking city in mainland China**

| Learning style preferences | Leven's test |         | t-test |     |         |
|----------------------------|--------------|---------|--------|-----|---------|
|                            | F            | p value | t      | df  | p value |
| Visual                     | 0.667        | .416    | 1.642  | 120 | .103    |
| Auditory                   | 0.646        | .423    | 0.644  | 120 | .521    |
| Kinesthetic                | 0.026        | .872    | 1.580  | 120 | .117    |
| Tactile                    | 0.296        | .588    | 2.176* | 120 | .032    |
| Group                      | 4.108        | .045    | -1.303 | 118 | .196    |
| Individual                 | 1.622        | .205    | 1.254  | 120 | .212    |

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ 

## 5.2 Reliability and Assumption Tests

Assumption tests including Q-Q plot, reliability test with Cronbach's alpha values, and Levene's test have been conducted. Straight diagonals exhibiting in the Q-Q plots indicated that the samples conformed to normality as stated in the assumption. Regarding the reliability of the variables, Cronbach alpha's values demonstrated high inter-item reliability among most of the variables, though the one for auditory was comparatively low. Lastly, as results of  $p$  values in the Levene's tests also found to be much greater than .05, they conformed to the assumption of homogeneity in variance equality.

## 5.3 Comparisons among the Groups

Regarding comparisons in learning style preferences among the groups, some findings were highlighted as follows. Firstly, as denoted in hypothesis 1, comparison between local Hong Kong students and students from a Cantonese speaking city showed that they had significant differences in visual and tactile learning style preferences. It is likely to be out of the reason that local Hong Kong students were used to using English as the medium of instruction in colleges and universities. In contrast, mainland students found it a great challenge to switch from the Chinese to the English environment. Therefore they exhibited lower preference to visual learning style. With tactile learning style, learners involve more hands-on experience. However, guiding learners in attaining such experience may also involve more detailed instructions. Medium of instruction, no doubt, takes an important part in motivating students in using the tactile style in learning.

Similarly, results of hypothesis 2 found that there were significant differences between local Hong Kong students and students from a non-Cantonese speaking city in mainland China in

visual and tactile learning style preferences. In addition, significant difference was also found in the kinesthetic style. With kinesthetic style, students learn by being involved in classroom activities such as small group discussion. For students coming from a Cantonese speaking city in mainland China, they could at least interact with teachers and classmates in group discussion using Cantonese or English supplemented by Cantonese. However, students from a non-Cantonese city did not have such flexibility. It made a difference with local Hong Kong students that non-Cantonese speaking students had lower preference to the kinesthetic style in learning.

Lastly, in comparison between students from Cantonese speaking and non-Cantonese speaking cities, there was no significant difference except the tactile style. As explained before, use of Cantonese as supplementary language enabled students to interact with others and enriched their learning experience in class. Therefore, up to certain extent, students from a Cantonese speaking city were usually more participative in class activities.

After all, the results reflected that students from these groups exhibited differently in their preferences toward different learning styles. This might be out of the reasons that they were coming from different cultural background and they adapted to the use of English as medium of instruction to different extents. As [7] found that a student's ethical and cultural backgrounds had influence on his/her learning style preferences. In general, the results were consistent with previous analyses. Firstly, students tended to have multiple learning styles. As [23] found that motivated learners were found to have a greater variety of learning styles, while learners with instrumental orientation concentrated on fewer learning styles. Secondly, results were in line with previous study of [19] that Chinese college students were less favoured to group learning,

and tended to learn individually. In fact, language does matter. Familiarity with English and use of Cantonese signified the differences among the groups. The results also aligned to certain extent with the study of [19] that English majors and Non-English majors showed statistically significant differences in their tactile learning and kinesthetic learning. Moreover, in a study of mainland Chinese students studying in culturally dislocated environments, [24] found that many Chinese students chose case study as their first priority over the other instructional techniques. It was possibly that learning through case studies or projects might fit their preferences of kinesthetic style better.

### 5.4 Limitations

Even though this research was carefully prepared, there were some limitations and shortcomings. Firstly, participants of this study were sampled from two institutes only, results cannot be generalized to the population of the whole higher education sector in Hong Kong. Secondly, although respondents were distributed among a range of disciplines, the numbers of responses in certain disciplines were far more than the other disciplines. Moreover, in view of the difficulty in classification of language proficiency, it was assumed that students from a Cantonese speaking city speak Cantonese while students from a non-Cantonese speaking city do not speak Cantonese.

## 6. CONCLUSIONS AND IMPLICATIONS

The following sections summarize the results of findings, highlight the implications in real-life situations, and suggest directions for further research.

### 6.1 Conclusion

College students from mainland often differ significantly in various ways from local Hong

Kong students. This project examined the learning style preferences of students from different backgrounds. It focused on two distinct characteristics, one was cultural background and the other was medium of instruction in learning. Respondents were categorized into three groups in comparisons of their learning preferences. Results showed that students with closer cultural background and use common language demonstrated higher similarity in their choices of learning style preferences. Table 8. summarizes the results of the hypotheses for this study. In hypothesis 1, local Hong Kong students and students from a Cantonese speaking city have significant differences in visual and tactile learning style preferences. In hypothesis 2, local Hong Kong students and students from a non-Cantonese speaking city have significant differences in visual, kinesthetic and tactile learning style preferences. In hypothesis 3, students from a Cantonese speaking city and students from a non-Cantonese speaking city have significant difference in tactile learning style preference only. After all, the greater the differences of background, the greater the differences in learning style preferences.

In summary, it is found that students coming from different cultural backgrounds and adapting to languages or medium of instruction to different levels exhibit differently in their learning style preferences. The following group differences were found in this study. Firstly, difference in visual factor might be out of different medium of instructions, local Hong Kong students were more familiarized with the English medium environment while students from mainland China used Chinese as medium of instruction. With higher adaptation to the English environments, local Hong Kong students have more choices in learning through reading books, periodicals, journals, and other supplementary materials. Secondly, differences in tactile learning style preferences were probably out of the cultural background.

**Table 8. Summary of differences in learning style preferences among different groups of students**

| Hypotheses | Student groups   | Results  |
|------------|--|--|
| H1         | Local Hong Kong students vs students from cantonese speaking city                  | Significant in visual and tactile              |
| H2         | Local Hong Kong Students vs Students from non-Cantonese speaking city              | Significant in visual, kinesthetic and tactile |
| H3         | Students from Cantonese speaking city vs Students from non-Cantonese speaking city | Significant in tactile only                    |

Despite the fact that it may not be cost justifiable to design and deliver different teaching modes to address diversified needs of individuals, it can be cost effective to adjust teaching and learning activities to fit students' learning style preferences in the form of groups with common preferences. Actually, most of the students are multimodal learners. They employ different styles in learning, though some exhibit higher preferences to certain kinds of learning styles than the others. Anyway, it is still more desirable to allow students to have choices about how they learn and adapt to the learning styles that match their preferences. As [25] suggested that teaching assignments with wide variety of learning tasks and more inductive instructional approaches such as a problem-based learning should be considered. In other words, "the more thoroughly instructors understand the differences, the better chance they have of meeting the diverse learning needs of all of their students (p.57).

## 6.2 Implications

The findings of this study provide several implications and recommendations to curriculum developers and instructors in consideration of using different resources and delivery modes for students coming from different backgrounds while they are facing with challenge such as adapting to new medium of instruction. As [1] pointed out that application of learning style preferences might involve assessment of learning style, grouping of students by their learning styles, customization of instructions and learning activities, and even provision of teacher training. It could be feasible only if the benefits would surpass the high costs involved. However, with the advancement in technology, various computer-based learning platforms have been developed. Customization and personalization of learning tools enable provision of more cost effective solutions to learners. It is optimistic that learners will be provided with more choices of learning facilities that match their learning style preferences.

Recent reports from human resource consultants and feedbacks from employers in the industries also reflected that communication skills and teamwork were crucial skills that required by today's workplace. In addition, findings showed that students also adapted much to the group learning style as their preferences. Therefore, understanding the differences in learning style preferences between local and mainland students may help not only in motivating student in their

classroom learning, but also enhancing their social and collaborative learning.

With better understanding of the learning style preferences of the learners, it is more likely that teachers can address group differences and apply different strategies in fulfilling the needs of learners. A major implication of this research is that identification of the dimensions of students' learning style preferences provides us with opportunities of using different resources and adjusting teaching modes to facilitate more effective learning. In addition, curriculum developers can take this into consideration in course design or pedagogical development. Although customizing teaching modes and assessment methods for individuals to fit their learning style preferences is still too costly to justify it, understanding and satisfying common needs of learners in the form of groups may become feasible. In fact, the solutions are not restricted to just matching teaching resources and teaching methods to learners' preferences. In contrast, understanding learners' preferences may help in strengthening their potential competences and remedying possible deficiencies. Future research may look deeper into the influences of various cultural and language differences to learning style preferences.

## COMPETING INTERESTS

Author has declared that no competing interests exist.

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## APPENDIX – QUESTIONNAIRE

The purpose of this study is to investigate if college students from mainland China have different learning style preferences from local students in Hong Kong. There are totally 35 questions, which take you about 10 minutes to complete.

### Section A: Personal Information

Instructions:

Check the box to provide your personal information as below.

1. Level of Study:  
 Associate Degree    Higher Diploma    Degree
  
2. Discipline Area:  
 General Business    Accounting    Corporate Management  
 Marketing Management    Hospitality Management    Language and Translation    Social Sciences    Health Sciences    Others
  
3. Gender:  
 Male    Female
  
4. Age:  
 18-19    20-21    22-23    24-25    26 or above
  
5. Where do you come from?  
 Local Hong Kong  
 Mainland China (Cantonese speaking region)  
 Mainland China (Non-Cantonese speaking region)  
 Others: \_\_\_\_\_

### Section B: My Learning Style Preferences.

Instructions:

Check the box that best describes the way(s) you prefer to learn.

|   | Strongly agree           | Agree                    | Neutral                  | Disagree                 | Strongly disagree        |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 6. When the teacher tells me the instructions I understand better.          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. I prefer to learn by doing something in class.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. I get more work done when I work with others.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. I learn more when I study with a group.                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. In class, I learn best when I work with others.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. I learn better by reading what the teacher writes on the chalkboard.    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. When someone tells me how to do something in class, I learn it better.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. When I do things in class, I learn better.                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. I remember things I have heard in class better than things I have read. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. When I read instructions, I remember                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

|   |                          |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| them better.  |                          |                          |                          |                          |                          |
| 16. I learn more when I can make a model of something.                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. I understand better when I read instructions.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. When I study alone, I remember things better.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. I learn more when I make something for a class project.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. I enjoy learning in class by doing experiments.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. I learn better when I make drawings as I study.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. I learn better in class when the teacher gives a lecture.               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. When I work alone, I learn better.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. I understand things better in class when I participate in role-playing. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. I learn better in class when I listen to someone.                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. I enjoy working on an assignment with two or three classmates.          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27. When I build something, I remember what I have learned better.          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. I prefer to study with others.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. I learn better by reading than by listening to someone.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 30. I enjoy making something for a class project.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. I learn best in class when I can participate in related activities.     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. In class, I work better when I work alone.                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. I prefer working on projects by myself.                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 34. I learn more by reading textbooks than by listening to lectures.        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 35. I prefer to work by myself.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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