Abstract

Learning styles are important contributors to the characteristics and performance of students. Especially for the international business program which is newly developed in Chinese higher education system, it is vital to understand the learning styles of students so that courses and teachings can be well organized for this newly developed program. This study surveys students who are enrolled in the international business program, and researched their characteristics by cluster analysis based on their learning styles. This research can be helpful to educations and administrators of international business schools in their future management decisions.

Introduction

With the development of Chinese economy, a number of Chinese companies enhanced their global involvement in international market. To better serve the emerging demand of Chinese economy and Chinese enterprises, the Master of International Business (MIB) Program is officially approved with the foundation of National MIB Education Steering Committee since 2011. The operation of MIB program has become an important issue for a larger number of Chinese universities. And the understanding of Chinese students with their characteristics and learning styles is helpful to Chinese universities in designing and planning their course work.

To have a better understanding of the Chinese international business students with their learning styles, the research launched a survey to Chinese students involved in Master of International Business Program with Kolb Learning Style Inventory- 3.0 (Kolb, 1999). Cluster analysis is used to characterize the Chinese students by their different learning styles. The result of this research reveals important information that leads a way for Chinese international business students to be well trained for their future work and services to the global business area.
Literature Review

Dewey (1897) claimed that the process and goal of education are firmly related to each other. The process which enhances the students’ learning is important to the improvement of higher education. Kolb (1984) defined that knowledge is created by the transformation of experiences. And the learning style refers to individual differences in learning behaviors and characteristics based on preferences of different phases in learning styles.

The learning process can be defined by two pairs of learning competences (Kolb, 1981). Abstract Conceptualization (AC) and Concrete Experience (CE) function to grasp experiences, while Active Experimentation (AE) and Reflective Observation (RO) contribute to experience transformations. Zull (2002) pointed out that the two pairs of functions in learning process are related to the function of human brains. The creation of new abstract concepts occurs in the frontal integrative cortex, and concrete experiences are formed by the sensory cortex. Active testing is functioned by the motor brain, while reflective observation involves the integrative cortex at the back. Kolb & Kolb (2005) studied the differences of preferences between abstract conceptualization (AC) and concrete experiences (CE), and also differences of preferences between active experimentation (AE) and reflective observation (RO) based on the learning styles of U.S. students. Identified by differences between AC and CE, as well as differences between AE and RO, the study characterized the students’ learning style into four categories such as diverging, assimilating, accommodating, and converging.

The research of how do students learn from the course and trainings implies a great value to the Chinese universities in their MIB education systems. With the study of different competences of Chinese international business students, courses and trainings can be well developed. Understanding the different preferences of abstract concepts and concrete experiences is helpful to find out the thinking process of Chinese students in international business program. The research of active testing and reflective observation is also helpful to reveal the differences of Chinese students in their learning practices.

Research Method

This study used Kolb Learning Style Inventory- 3.0 and surveyed 61 master students involved in the international business program of China. Students are asked to grade different options of learning styles due to their preferences. 4 stands for the most preferred and 1 stands for the least. Different learning preferences such as abstract concepts, concrete experiences, active testing, and reflective observations are all included in the questions asked to the students. Cluster analysis is operated by SAS 9.2 to characterize different learning styles of Chinese MIB students. The grading of four different learning preferences is standardized and the Chinese students are
characterized by four different clusters.

**Result**

Table 1 shows that Chinese international business students are characterized into four different learning styles. Cluster 1 is the group that has a high value in abstract concepts and active testing, but low in concrete experiences and reflective observation. Cluster 2 has a higher level of concrete experiences and reflective observation, but low in abstract conceptualization and active experimentation, which is opposite to Cluster 1. Cluster 3 is higher in both abstract conceptualization and concrete experiences and reflective observation, but only low in active experimentation. Cluster 4 is relatively higher in concrete experiences and active experimentation, but low in abstract conceptualization and reflective observation. Table 2 shows the R square of the cluster analysis and Table 3 shows the initial seed of each group of students.

Table 4 explains the cluster distances of different learning styles. It is found that most of students are characterized by Cluster 1, relatively high in abstract conceptualization and active experimentation, but low in concrete experiences and reflective observation. Both Cluster 2 and Cluster 4 are neighborly positioned to Cluster 1. Cluster 2 is opposite to the characteristics of Cluster 1, while Cluster 4 is different from Cluster 1 in learning preferences of abstract conceptualization and concrete experiences, but similar in active experimentation and reflective observation. Cluster 3 is mostly different from other three groups, and only a limited number of students are in this group.

**Conclusion**

The research of Chinese international business students revealed the learning styles of different students based on four different learning competences, including abstract conceptualization, concrete experiences, active experimentation and reflective observation. It is found that most Chinese students involved in Master of International Business Program are high in abstract conceptualization and active experimentation. This shows that students are good at abstract thinking, and also have a good preference of experimentation. This is helpful for students to transform what they have learned in their practices. The training for these students could be more emphasizing the concrete experiences and reflective observations. However, there are also a number of students in the opposite case. The program also needs to include the course works that improve the abstract conceptualization and active experimentations. Concerning the co-existence of both two different primary learning styles represented by Cluster 1 and Cluster 2, the international business program could be a composite of knowledge including different competences, and the team work assignments also can be a good way for both kinds of students to improve their learning competences.
Reference

Appendix

Table 1. Descriptive Analysis of Surveyed Students

<table>
<thead>
<tr>
<th>Cluster</th>
<th>AC</th>
<th>CE</th>
<th>AE</th>
<th>RO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.302086742</td>
<td>-0.472369810</td>
<td>0.439226464</td>
<td>-0.343298155</td>
</tr>
<tr>
<td>2</td>
<td>-0.462464607</td>
<td>0.333429446</td>
<td>-1.028059499</td>
<td>1.091478484</td>
</tr>
<tr>
<td>3</td>
<td>1.901687392</td>
<td>1.744092480</td>
<td>-1.993936499</td>
<td>0.296163318</td>
</tr>
<tr>
<td>4</td>
<td>-0.854381288</td>
<td>0.904695682</td>
<td>0.662466148</td>
<td>-0.787980640</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cluster</th>
<th>AC</th>
<th>CE</th>
<th>AE</th>
<th>RO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.826992907</td>
<td>0.601342654</td>
<td>0.658532380</td>
<td>0.708033467</td>
</tr>
<tr>
<td>2</td>
<td>0.749252556</td>
<td>1.037359833</td>
<td>0.731003001</td>
<td>0.608970142</td>
</tr>
<tr>
<td>3</td>
<td>1.688990200</td>
<td>0.265788849</td>
<td>0.23245297</td>
<td>0.826519826</td>
</tr>
<tr>
<td>4</td>
<td>0.906470313</td>
<td>1.123636238</td>
<td>0.685581696</td>
<td>1.074374338</td>
</tr>
</tbody>
</table>

Table 2. Statistics of Cluster Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total STD</th>
<th>Within STD</th>
<th>R-Square</th>
<th>RSQ/(1-RSQ)</th>
</tr>
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<tbody>
<tr>
<td>AC</td>
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<td>0.84038</td>
<td>0.529673</td>
<td>0.491810</td>
</tr>
<tr>
<td>CE</td>
<td>1.00000</td>
<td>0.81288</td>
<td>0.572826</td>
<td>0.594455</td>
</tr>
<tr>
<td>AE</td>
<td>1.00000</td>
<td>0.66504</td>
<td>0.578943</td>
<td>1.374978</td>
</tr>
<tr>
<td>RO</td>
<td>1.00000</td>
<td>0.74202</td>
<td>0.477403</td>
<td>0.913520</td>
</tr>
<tr>
<td>OVER-ALL</td>
<td>1.00000</td>
<td>0.76981</td>
<td>0.499712</td>
<td>0.794775</td>
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</tbody>
</table>

The FASTCLUS Procedure
Replace=FULL Radius=0 Maxclusters=4 Maxiter=1

Pseudo F Statistic = 14.65

Approximate Expected Over-All R-Squared = 0.50426
Cubic Clustering Criterion = -2.664
Table 3. Initial Seed of Learning Preferences

<table>
<thead>
<tr>
<th>Cluster</th>
<th>AC</th>
<th>CE</th>
<th>AE</th>
<th>RO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.891128879</td>
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<td>-0.996809432</td>
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<td>-0.495620332</td>
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</tbody>
</table>

Table 4. Cluster Distances of Learning Preference

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Frequency</th>
<th>Deviation</th>
<th>RMS Std</th>
<th>From Seed to Observation</th>
<th>Radius Exceeded</th>
<th>Nearest Cluster</th>
<th>Distance Between Cluster Centroids</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>34</td>
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<tr>
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<td>16</td>
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<td>1</td>
<td>2.3303</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>0.6566</td>
<td>1.3529</td>
<td>2</td>
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</tr>
<tr>
<td>4</td>
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<td>0.0601</td>
<td>3.1790</td>
<td>1</td>
<td>1.8658</td>
<td></td>
<td></td>
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</tbody>
</table>