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LEARNING STYLES OF EGYPTIAN BUSINESS STUDENTS

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ABSTRACT

The *Index of Learning Styles* (ILS) instrument based on the Felder-Silverman Learning Style Model was used to determine distribution of learning styles of eighty Egyptian business students enrolled in an Egyptian institution of higher education. Results show that Egyptian business students surveyed in this study prefer sensing, visual, active, and sequential learning styles over intuitive, verbal, reflective, and global learning styles respectively. The majority of business students have a balanced learning style in all four dimensions of the Felder-Silverman model. Gender difference in learning style preference was statistically significant for only two of the four dimensions. The small gender difference was deemed inconsequential for designing teaching and learning methods. More than 85 percent of Egyptian business students are likely to benefit from teaching methods geared toward sensing, visual, active, and sequential learners.

INTRODUCTION

Research in the field of educational psychology has indicated that a person's learning style affects educational achievements of a student in addition to factors such as intellectual ability and aptitudes (Loo, 2002a). Different researchers have defined learning style in slightly different ways. According to Loo (2002a), "learning style refers to the consistent way in which a learner responds to or interacts with stimuli in the learning context." Felder (1996) claims that students have different learning styles which he defines as "characteristic strengths and preferences in the ways they take in and process information." Campbell (1991) cites Gregorc (1979) who defines learning style as "the distinctive behaviors which serve as indicators of how a person learns from and adapts to his environment."

A number of articles have reported studies related to distribution of learning styles of students in accounting and business education. Loo (2002a) discusses the results of studies by Kolb (1984), Baldwin and Reckers (1984), Baker *et al.* (1986), and Holley and Jenkins (1993). These results indicate varying proportion of students falling under different learning styles. Loo (2002b) performs a meta-analytic examination of eight studies involving business majors and concludes that Kolb's (1984) learning styles are not equally distributed. A study of the learning styles of business students by Biberman Buchanan (1982) indicated that predominant learning styles were different for different business disciplines. Loo (2002a) studied the difference in learning style distribution between hard and soft business majors and between male and female business students. He found an equal distribution of styles for the soft majors but not for the hard majors. He did not find any significant difference in distribution with respect to gender. However, a study by Keri (2002) of college students found that the predominant learning styles of male and female students were different. A study of business majors by Wynd and Bozman (1996) indicated that the learning styles of students with higher GPA differed from that of students with lower GPA. Recently, Naik (2009) investigated the learning styles business students in an

American university using the Felder-Silverman model and found that majority of the business students prefer sensing, visual, active, and sequential learning styles. A study of Asian international students in Australia by Wong (2004) indicated that learning style may be contextually-based rather than culturally-based. The implication of differing learning style is that different students prefer and use different learning methods that match their learning styles.

Just as students prefer learning methods that match their learning styles, teachers seem to prefer teaching styles that match their own learning styles. This implies that teachers tend to teach the way they themselves learn the material (Campbell, 1991). If the predominant learning style of the students in a class differs markedly from the learning style of the teacher, a serious mismatch may occur between the teaching method used by the teacher and the preferred learning method of majority of the students. Charkins *et al.* (1985) suggest that the greater the mismatch between teaching style and learning style, the lower is the achievement of the students in the course. Felder (1993) argues that if the teaching style of a course matches with the learning style of the students, it helps them to retain information longer, to apply material learned more effectively, and to foster a positive post-course attitude. Teachers who are aware of the distribution of the learning styles of their students can orient their primary teaching methods to the students with the modal learning styles (Bell, 1998) and diversify their teaching methods to meet the needs of other students.

Due to increasing globalization, American institutions of higher education are likely to encounter increasing number of international students in their campuses in future. Consequently, faculty members in American universities are likely to face increasingly diverse student population in classrooms. Prior research, though limited, shows differences in learning styles of students from different cultures and ethnic backgrounds (Baron and Arcodia, 2002; Ladd and Ruby, 1999). Teachers trying to adapt their teaching methods to match student learning styles would benefit if they get a better understanding of the impact of cultural and ethnic diversity on learning styles of students. Published research investigating the differences in learning styles of students from different countries and cultures seems to be lacking. Recently, Naik, Tech, and Franco (2010) compared the learning styles of business students in Dominican Republic with the learning styles of business students in the U. S. Although a few studies have focused on international students studying in foreign universities, further investigation of learning styles of a homogeneous group of students studying in universities in the home country is necessary.

The objective of this research is to examine the distribution of learning styles of Egyptian business students using the *Index of Learning Styles (ILS)* instrument (Felder, 1996). A convenience sample of 80 business students at a prominent institution of higher education in Egypt was surveyed in this research. The findings of this research are expected to contribute to the current limited understanding of learning styles of students from middle-eastern countries and cultures. In view of the recent developments in Egypt and the possibility of greater number of Egyptian international students in American universities in future, investigation of the learning styles of Egyptian students seems timely. Since this research surveys Egyptian students in an Egyptian institution, the findings of this research would also be relevant and useful in Egyptian institutions of higher education.

A brief description of the model used for determining the learning styles of business students is described next followed by the methodology used in this research. The results of the analysis of data are presented, followed by a discussion of appropriate teaching methods in the light of the results of this research. Finally, a conclusions section completes the paper.

FELDER-SILVERMAN LEARNING STYLE MODEL

A number of learning style models has been devised by researchers to identify individual learning styles of people. Felder (1996) briefly describes the essential elements of four of these learning style models, viz., the Myers-Briggs Type Indicator, Kolb's Learning Style Model, Herrmann Brain Dominance Instrument, and Felder-Silverman Learning Style Model. Felder and Silverman (1988) synthesized the results of a number of studies to develop their model which they claim to be particularly relevant to science education. Felder-Silverman Learning Style Model classifies students into five dichotomous categories: sensing learners or intuitive learners, visual learners or verbal learners, inductive learners or deductive learners, active learners or reflective learners, sequential learners or global learners.

Felder (1996) with Barbara Soloman has developed an *Index of Learning Styles* (ILS) instrument that classifies students on four of the five dimensions of Felder-Silverman Model (it excludes the inductive-deductive dimension). The ILS can be administered either by a printed copy of the survey questionnaire or online on the Web (Felder and Soloman, 1998). The characteristics of the four dimensions of the ILS are briefly explained next.

Sensing learners like learning facts and solving problems by well-established methods. They dislike complexities and surprises such as being tested on material not covered in the class explicitly. They understand material better with real-world examples and applications. They also like brain storming with group-mates. Intuitive learners, on the other hand, are comfortable with abstract ideas, mathematical formulations, and innovative methods of problem solving. They dislike memorization and routine calculations. In the extreme cases, sensing learners may rely too much on memorization without understanding, and intuitive learners may not pay attention to details and be careless in calculations.

Visual learners prefer pictures, diagrams, flow charts, photographs, videos, and demonstrations. They like color-coding, highlighting, and drawing boxes, circles, and lines to show connections. Verbal learners, on the other hand, are comfortable with written or spoken explanations and like to outline material in their own words. They prefer discussing material in groups, and explaining and listening to each other.

Active learners like hands-on activities, group discussions and group problem-solving. They dislike simply sitting in the class and taking notes. Reflective learners like to think about a concept or problem quietly first. They like to study and solve problems alone, take notes and summarize material. In the extreme cases, active learners can jump into activities prematurely without thinking and reflective learners may never get anything done.

Sequential learners first understand the connection between parts in sequential steps to understand the whole. On the other hand, global learners gain an overall understanding first by

absorbing material at random and then see the significance of the parts to the whole. Sequential learners dislike teachers who jump around topics and skip steps. They learn new topics better when related to that already learned. Global learners can solve complex problems faster but may not be able to explain how they did it. In the extreme cases, sequential learners may know a lot about specific aspects of a topic but have difficulty in relating them to different aspects or different topics. Extreme cases of global learners may not have any clue of what is going on until the light bulb of the big picture turns on.

Although the dimensions of the Felder-Silverman model used in the ILS have been presented as dichotomous categories, Felder (1993) emphasizes that these dimensions should be treated as continua and not as either/or categories. He argues that a student's preference could be represented on a scale as weak, moderate or strong in one side of a dimension. He also points out that learning style preferences for a particular student may vary with subject and learning environment, and can change over time. A brief description of the methodology for determining the distribution of learning styles used in this research is presented in the following section.

RESEARCH OBJECTIVES AND METHODOLOGY

The business curriculum contains a number of required courses that are quantitative in nature (e.g. business statistics, accounting, finance, operations management). Often many business students perceive these courses to be uninteresting and difficult due to the quantitative nature of the subjects. Given the choice, many business students would prefer not to take these courses even though these courses are essential for success in business degree programs and business decision making in the real world. However, the negative attitude for quantitative courses might be less due to the nature of the course material and more due to the mismatch between the students' learning styles and the teaching methods used in these courses.

This research aims to create a profile of learning styles of Egyptian business students and suggests appropriate teaching approaches that might reduce the negative student attitude for quantitative courses. A secondary objective of this research is to see if learning styles of Egyptian business students significantly differ by gender requiring special consideration of female or male students in devising teaching methods. As mentioned earlier, a convenience sample of 80 business students enrolled in an Egyptian institution of higher learning was used for this research. The *Index of Learning Style* (ILS) instrument (Felder and Soloman, 1998) based on Felder-Silverman Learning Style Model was selected since it was designed for use in science education where many courses are quantitative (Felder, 1993). The survey instrument administered was made anonymous and voluntary.

The ILS was administered to the students in the form of a printed questionnaire. The ILS has 44 questions and takes about 15 minutes to complete. Demographic questions identifying gender and nationality were added to the printed questionnaire. No other identifying information was collected. The responses to the learning style questions for each student were then entered into a Web-based template. The responses of a particular student were processed online and the result of the analysis was displayed as a report for each respondent. The gender and class status responses were added to the displayed result and the report was printed. Thus 80 printed reports corresponding to 80 respondents formed the basis of the data analysis and results presented next.

DATA ANALYSIS AND RESULTS

The analysis report for a student consists of scores on a scale of 1 to 11 (odd numbers only) for one of the dichotomy in each of the four dimensions of the ILS. A score of 1 to 3 in either dichotomy of a dimension indicates a learning style preference that is fairly balanced in that dimension. A score of 5 to 7 indicates a moderate preference in the associated dichotomy of the concerned dimension. A score of 9 to 11 indicates a strong preference. For example, assume that the analysis report for a hypothetical student respondent contains the following scores: 3 for reflective, 5 for sensing, 7 for visual, and 9 for global styles. These scores of the hypothetical student indicate a balanced preference for the active-reflective dimension, a moderate preference for sensing style in the sensing-intuitive dimension, a moderate preference for visual style in the visual-verbal dimension, and strong preference for global style in the sequential-global dimension.

The data in the analysis reports for the 80 respondents were organized into four cross-tabulations corresponding to the four learning style dimensions shown in Tables 1 to 4. The column variable includes the five categories of preference and the row variable includes the two genders.

	Strong Sensing	Moderate Sensing	Balanced SEN-INT	Moderate Intuitive	Strong Intuitive	Total
Male	7	5	22	5	0	39
Female	1	14	20	4	2	41
Total	8	19	42	9	2	80

Table 1: Cross-Tabulation for Sensing-Intuitive Dimension

	Strong Visual	Moderate Visual	Balanced VIS-VRB	Moderate Verbal	Strong Verbal	Total
Male	5	10	19	4	1	39
Female	6	14	18	2	1	41
Total	11	24	37	6	2	80

Table 2: Cross-Tabulation for Visual-Verbal Dimension

	Strong Active	Moderate Active	Balanced ACT-REF	Moderate Reflective	Strong Reflective	Total
Male	1	4	26	7	1	39
Female	1	12	27	1	0	41
Total	2	16	53	8	1	80

Table 3: Cross-Tabulation for Active-Reflective Dimension

	Strong Sequential	Moderate Sequential	Balanced SEQ-GLB	Moderate Global	Strong Global	Total
Male	1	9	26	3	0	39
Female	1	6	28	5	1	41
Total	2	15	54	8	1	80

Table 4: Cross-Tabulation for Sequential-Global Dimension

For better comparison, the row percentages in the cross-tabulation shown in Tables 1 to 4 have been calculated and presented in Tables 5 to 8.

	Strong Sensing	Moderate Sensing	Balanced SEN-INT	Moderate Intuitive	Strong Intuitive	Total
Male	17.95	12.82	56.41	12.82	0.00	100.00
Female	2.43	34.15	48.78	9.76	4.88	100.00
Total	10.00	23.75	52.50	11.25	2.50	100.00

Table 5: Row Percentages for Sensing-Intuitive Dimension

	Strong Visual	Moderate Visual	Balanced VIS-VRB	Moderate Verbal	Strong Verbal	Total
Male	12.82	25.64	48.72	10.26	2.56	100.00
Female	14.63	34.15	43.90	4.88	2.44	100.00
Total	13.75	30.00	46.25	7.50	2.50	100.00

Table 6: Row Percentages for Visual-Verbal Dimension

	Strong Active	Moderate Active	Balanced ACT-REF	Moderate Reflective	Strong Reflective	Total
Male	2.56	10.26	66.67	17.95	2.56	100.00
Female	2.44	29.27	65.85	2.44	0.00	100.00
Total	2.50	20.00	66.25	10.00	1.25	100.00

Table 7: Row Percentages for Active-Reflective Dimension

	Strong Sequential	Moderate Sequential	Balanced SEQ-GLB	Moderate Global	Strong Global	Total
Male	2.56	23.08	66.67	7.69	0.00	100.00
Female	2.44	14.63	68.29	12.20	2.44	100.00
Total	2.50	18.75	67.50	10.00	1.25	100.00

Table 8: Row Percentages for Sequential-Global Dimension

The combined percent frequency values for both genders are presented for each of the five learning style preference categories in each of the four dimensions of learning styles in Table 9. Pie charts based on the data in Table 9 are shown in Figures 1 to 4 for better visualization and understanding of the data. Figure 1 shows that about 52 percent of the respondents show balanced preference in the sensing-intuitive dimension. About 24 percent have moderate and 10 percent have strong preference for sensing learning style. Thus, about 86 percent of the respondents would feel comfortable with teaching techniques geared toward sensing learners. Figure 2 shows that about 46 percent of the respondents have balanced preference in the visual-verbal dimension. About 30 percent have moderate and 14 percent have strong preference for visual learning style. Thus, about 90 percent of the respondents would like teaching techniques geared toward visual learners.

Preference	% Freq.	Preference	% Freq.	Preference	% Freq.	Preference	% Freq.
Strong Sensing	10.00	Strong Visual	13.75	Strong Active	2.50	Strong Sequential	2.50
Moderate Sensing	23.75	Moderate Visual	30.00	Moderate Active	20.00	Moderate Sequential	18.75
Balanced SEN-INT	52.50	Balanced VIS-VRB	46.25	Balanced ACT-REF	66.25	Balanced SEQ-GLB	67.50
Moderate Intuitive	11.25	Moderate Verbal	7.50	Moderate Reflective	10.00	Moderate Global	10.00
Strong Intuitive	2.50	Strong Verbal	2.50	Strong Reflective	1.25	Strong Global	1.25
Total	100.00	Total	100.00	Total	100.00	Total	100.00

Table 9: Percent Frequency Values for the Five Categories of each of the Four Dimensions

In the active-reflective dimension shown in Figure 3, about 66 percent of the respondents are balanced learners, 20 percent are moderate active learners, and 3 percent are strong active learners. Thus 89 percent of the respondents will benefit from teaching techniques preferred by active learners. Figure 4 shows that about 68 percent of the respondents are balanced learners in the sequential-global dimension. About 19 percent of the respondents have moderate and 2 percent have strong preference for sequential learning style. Thus 89 percent of the respondents would benefit from teaching techniques geared toward sequential learners.

An examination of the Figures 1 to 4 shows that majority of the Egyptian business students are balanced in the four dimensions. Comparatively more students have strong and moderate preferences for sensing, visual, active, and sequential learning styles. Strong or moderate intuitive, verbal, reflective, and global learning styles are not preferred by a small percentage of the Egyptian business students.

An examination of the data in Tables 5 to 8 shows that there are some differences in learning style preferences between male and female respondents. These differences seem to be somewhat more discernible in the sensing-intuitive and active-reflective dimensions.
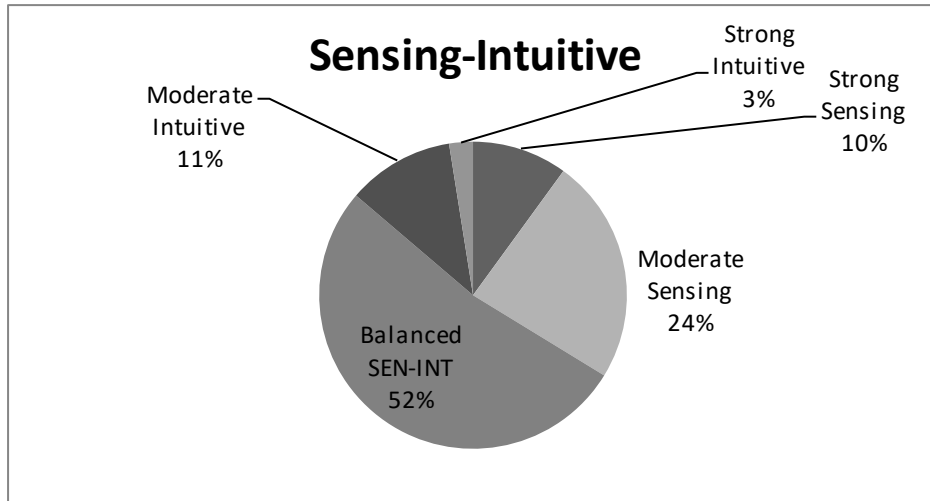
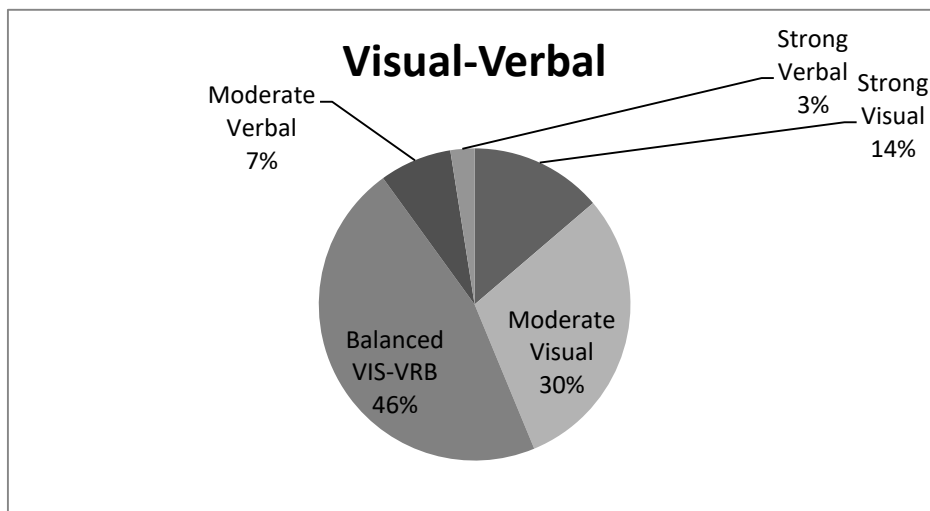Figure 1: Percent Frequency for Sensing-Intuitive Dimension

Figure 2: Percent Frequency for Visual-Verbal Dimension

A chi-square test of independence was performed for each of the four learning style dimensions to see if gender played a role in determining learning style preferences. The null and alternative hypotheses are given as follows:

H_0: The learning style preferences are independent of gender difference
H_a: The learning style preferences are not independent of gender difference

With five categories of preferences in each learning style dimension variable and two categories in the gender variable, the degree of freedom is 4. Assuming a significance level 0.10, the critical value of the chi-square test statistic to reject the null hypothesis is 7.779 (taken from the

chi-Square table). The chi-square test statistic values and p-values calculated for the four learning style dimensions are shown in Table 10.
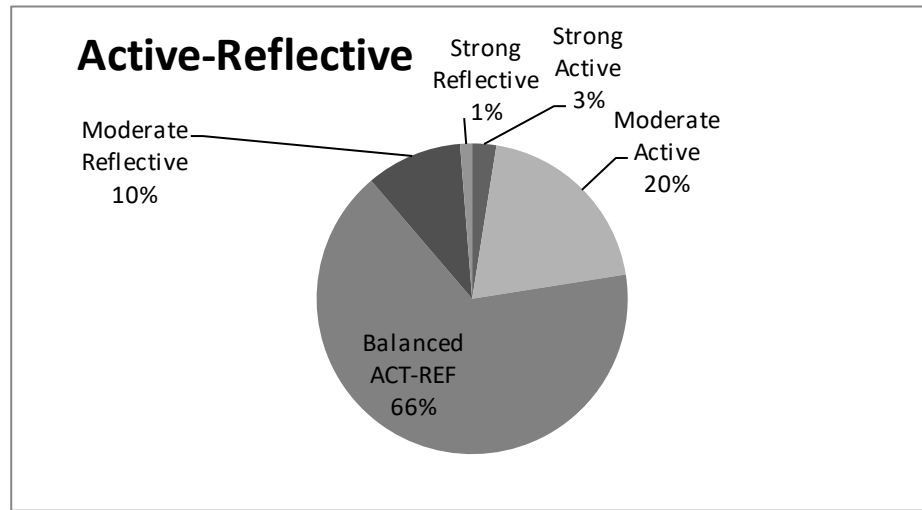

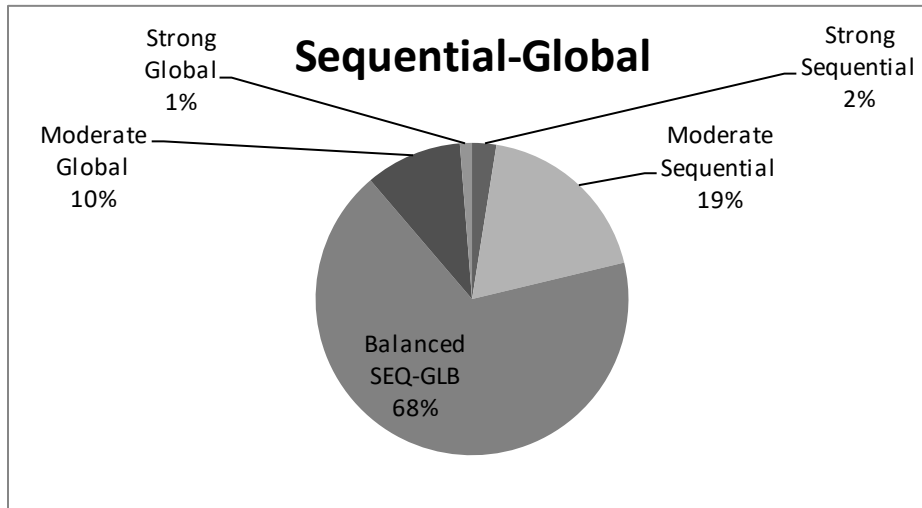Figure 3: Percent Frequency for Active-Reflective Dimension

Figure 4: Percent Frequency for Sequential-Global Dimension

Dimension	Chi-Square Test Statistic	p-Value
Sensing - Intuitive	10.92634	0.02740
Visual - Verbal	1.40215	0.84382
Active - Reflective	9.47479	0.05027
Sequential - Global	2.12540	0.71271

Table 10: Chi-Square Test Statistic Values

It can be seen from Table 10 that the null hypothesis is rejected only for the sensing-intuitive and active-reflective learning style dimensions since the values of the chi-square statistic are greater than the critical value of 7.779. Thus, the difference between learning style preferences of male and female Egyptian business students is statistically significant only for the sensing-intuitive and active-reflective dimensions. However, this difference is small and does not warrant any special consideration of teaching approach geared toward gender difference.

STRATEGY FOR TEACHING QUANTITATIVE BUSINESS COURSES

The results of this research indicate that teaching methods that are geared toward sensing, visual, active, and sequential learners would be compatible with the learning styles of majority of Egyptian business students and are therefore more likely to be effective for students learning the material in quantitative courses. To help the sensing learners, it would be desirable to work out a number of example problems step by step on the white board and explain the steps in the class. Sensing learners would like the instructor give them a clear indication of what type of questions and problems will be set in the quizzes and examinations. Further, sensing learners will understand the quantitative concepts better if the instructor provides examples of their application in the real world.

Visual learners would gain a better understanding of the quantitative concepts if a concept map relating different topics is created and explained in the class. Both visual and active learners will benefit from hands-on activities and simulations of probability and statistical concepts and operations management simulation games. Active learners would appreciate opportunities for group problem-solving activities in the class. Sequential learners would understand the quantitative material better if the instructor briefly reviews the material of the last class and relates the new material to what the students have learned before. Students may work on case studies where different steps of quantitative analysis can be performed in the correct sequence and the results can then be put together to find answers to the case questions.

CONCLUSIONS

Prior research indicates that individual learning styles of students significantly influence the effectiveness of classroom teaching. A mismatch between the teaching style of the instructor and the learning styles of majority of students can lead to poor performance in and negative attitude toward a course. Knowledge of the distribution of the learning styles of students in the class can help the instructor customize his or her teaching methods to match the modal learning styles of the students in the class. When instructors teach students from other countries and cultures this knowledge can be especially helpful.

In this research the authors used the *Index of Learning Styles* (ILS) instrument to survey 80 Egyptian business students enrolled in an institution of higher learning in Egypt. The analysis of the data shows that teaching methods geared toward sensing, visual, active, and sequential learning styles would be effective for majority of the Egyptian business students. This research also concludes that no special consideration of the gender difference is needed in developing appropriate teaching methods for business students. These conclusions are similar to those found by Naik (2009) for business students in an American university. Further research of learning

styles of business students from different countries may indicate commonality in the learning styles of business students across the globe. The implication of such a conclusion is that instructors across the globe would be able to use teaching and learning approaches found effective not only with the U. S. students but also with students in other countries.

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