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ABSTRACT

The purpose of this study was to describe the cognitive styles of both international and domestic graduate students attending Marshall University (West Virginia). A total of 41 American and international graduate students were administered the Group Embedded Figures Test (GEFT), and 20 of the international students were interviewed. The study found that 70 percent of the American students and 82 percent of the Chinese students tested were classified as field independent in cognitive style. The four students from Saudi Arabia had GEFT scores in the field dependent range. Although Americans tended to score higher than international students, and men tended to score higher than women, the results indicated that age, gender, nationality, and academic major had little influence on students' cognitive style. Interview data about international students' attitudes towards teaching techniques, teacher-student interaction, examinations, research papers, and differences between American and home country universities are also presented. (Contains 17 references.) (MDM)

COGNITIVE STYLE OF SELECTED INTERNATIONAL AND DOMESTIC GRADUATE STUDENTS AT MARSHALL UNIVERSITY

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Abstract

The purpose of this study was to describe the cognitive styles of both international and domestic graduate students at Marshall University. A purposive sample (n = 41) was selected by faculty members (Business, Education, Fine Arts, Liberal Arts, and Science) to participate in this study. The study employed a mixed-method approach (both qualitative and quantitative methods) to answer the research questions. Two instruments were used to obtain information essential to the study: (1) The Group Embedded Figures Test (GEFT) was administered to all participants, and (2) individual interview schedules were completed with 20 students. The GEFT has a tested reliability in the range of high .80's to low .90's. The interview schedule was developed by the researchers and content validity was confirmed by a panel of experts familiar with interview techniques. In this study, the division between field independent/dependent was set at a score of 12, as recommended by Witkin, Ottman, Raskin, and Karp (1971). The magnitude of the correlations indicate that the predictability of the GEFT based upon these variables (geographic area, age, gender, nationality status, and academic major) would not be substantial. The majority of (70%) of U.S. students were field independent. Students from Saudi Arabia had GEFT scores in the field dependent range. The results of this study suggest that teachers should find ways of helping students to diversify their learning strategies.

COGNITIVE STYLE OF SELECTED INTERNATIONAL AND DOMESTIC GRADUATE STUDENTS AT MARSHALL UNIVERSITY

Introduction

Brislin (1981) defines learning styles as "the various ways people acquire new information and attitudes, and the effects of the context in which learning takes place." Learning style can be subdivided into affective, physiological, and cognitive styles. Each learner has preferred ways of perception, organization, and retention that are distinctive and consistent. These differences are called cognitive styles.

In recent years, cognitive styles of various learner groups have been classified. However, there is a paucity of research in the area of international students studying in the United States (U.S.) universities. Because of culture; international students may vary from the norm of American students in the area of cognitive style.

The two dimensions of cognitive style presented in this research originated from the research of Dr. H. A. Witkin (1974). His research divided cognitive style into the dimensions of field dependent and field independent. A field dependent person is one who approaches situations in a global way, seeing the whole instead of the parts. This person is likely to rely on external referents as guides in information processing and is likely to have social orientation. The field independent person is one who consistently approaches as wide variety of tasks and situations in an analytical way, separating elements from background. This person tends to give greater credit to internal referents and tends to have a nonsocial orientation.

According to the literature, the selection of an academic major, nationality, age, gender, and culture can influence cognitive style.

Related Literature

Knowledge of different cultures is mandatory in the discipline of education. A study by Miller and Escolme (1990), revealed that U.S. students and Asian students exhibited similar independent tendencies. These researchers also found that African students had fairly equal field dependent and field independent tendencies, and South American students showed the highest percentage of field dependent individuals.

Different results concerning gender differences in cognitive style have been found. Some studies suggest there are gender differences with males being more field independent than females (among American college students, Witkin et al; 1971; among Spanish children, Nebot, 1989). Other studies not showing significant gender differences (among Canadian college students, McRae & Young, 1988; among Dutch children, Pennings, 1988 and among Hispanic adults, Moore, 1992). In a previous cross-cultural study, difference was significant for Canadian students but not for Pakistani students in high school (Alv: et al., 1986).

Age may be another factor in cognitive development among adults. Findings by Moore (1992) indicated that the relationship of age to cognitive style was negative and insignificant ($r = -.08$). Although regression in cognitive development has sometimes been found among older adults, other studies have not confirmed this (Blackburn, 1980; Sinnott, 1975).

Purpose and Objectives

This study sought to describe the cognitive styles of both international and domestic graduate students. Five research questions were used to guide the research:

1. What is the relationship between the nationality of a student and cognitive style?
2. What is the relationship between the gender of a student and cognitive style?
3. What is the relationship between the age of a student and cognitive style?
4. What is the relationship between academic major of a student and cognitive style?
5. What factors of educational background might help identify problem areas an international student may encounter when studying in an American University?

Limitations of the Study

1. Due to limited time, only full-time graduate students were included in the study.
2. Results are generalizable only to the sample in this study.
3. The only aspect of learning style studied was cognitive style.
4. Due to the small sample sizes information may not appear to be in the proper perspective (i.e. accuracy may be limited due to small sample size(s)).

Methodology

Forty-one full-time graduate students (Spring Semester, 1994) of Marshall University were purposefully selected by faculty members (Business, Education, Fine Arts, Liberal Arts, and Science) to participate in this study. A purposive sample uses research-established selection criteria (Babbie, 1986). And, while it limits the generalizability of findings to the present study, it

is an appropriate alternative, especially for exploratory studies that are predominantly descriptive in nature (Babbie, 1986; Miles and Huberman, 1984).

The study employed a mixed-method approach (both qualitative and quantitative methods) to answer the research questions. Two instruments were used to obtain information essential to the study: 1) The Group Embedded Figures Test (GEFT) was administered to all participants, and 2) individual-interview schedules were completed with 20 students.

The GEFT has a tested reliability in the range of high .80's to low .90's (Goldstein and Blackman, 1980). Correlations of the GEFT with other tests of cognitive style have shown that the GEFT has concurrent validity in the field independent/dependent constructs (Witkin, Ottman, Raskin and Karp, 1971). The interview schedule was developed by the researchers and content validity was confirmed by a panel of experts familiar with interview techniques.

Upon completion of the GEFT, individual scores were categorized by orientations. Possible scores on the GEFT ranged from 0 to 18. In this study, the division between field independent/dependent was set at a score of 12, as recommended by Witkin, Ottman, Raskin, and Karp (1971). Students scoring 12 or above on the GEFT were classified as field independent, as they more easily completed the task of finding the "hidden" figures. Students scoring 11 or below were classified as field dependent, as they could less easily dissemble the "hidden" figure from the surrounding pattern.

Since the data were collected from a sample chosen purposefully, no inferential statistics were considered necessary. The data for the first four research questions were analyzed with descriptive statistics. The data for research question five, obtained by interviews, were analyzed with qualitative data analysis techniques.

Results

The data in Table 1 indicate characteristics of graduate students who participated in this study by completing the Group Embedded Figures Test (GEFT). Most of the participants (51%) were international graduate students.

Insert Table 1 about here

The majority (70%) of U.S. students were field independent. Students from China had similar orientations with 82% of the students classified as field independent. Students from Saudi Arabia had GEFT scores in the field dependent range. The GEFT scores ranged from 1 to 18, with 1 being highly field dependent and 18 being highly field independent. The average score for U.S. students was 10.4. The average score for international students was 12.3. Males were 32% of the participants as compared to 68% females. Females had an average GEFT score of 12.1; males had an average score of 10.0. Males from the U.S. tended to be more field independent (80%), while males from other countries tended to be field dependent (62.5). Ninety-two percent of the international females were field dependent, while 66.7% of the U.S. females were field independent (see Table 1).

Relationship of Variables

Correlations of variables determined relationships among student characteristics and cognitive style (see Table 2). The interpretation of the correlation coefficient is based on the set of descriptors by Hinkle, Wiersma and Jurs (1979): .00 to .30 -- little if any correlation; .30 to .50 -- low correlation; .50 to .70 -- moderate correlation; .70 to .90 -- high correlation; and .90 to

1.00 -- very high correlation. There was a low correlation (r = .40) between the GEFT score and the geographic area of the students.

Insert Table 2 about here

Although this was the highest correlation, very little of the variance (16%) between the two variables was explained. There was little, if any correlations between GEFT score and other selected variables (age, gender, nationality status, and academic major).

Qualitative Analysis of Interviews with International Students

Interviews were conducted with 20 international students. Four of these students were from two middle eastern countries, and sixteen from five different Asian countries. Five students were classified as field dependent (FD) and fifteen were classified as field independent (FI).

During the interview, students described teaching techniques, testing, and teacher/student interaction. In this analysis, the answers were categorized by the field dependent, or field independent orientation of the student.

Teaching Techniques

Both field dependent and field independent students indicated that the most commonly used techniques in elementary, high, and college/university were lecture, memorization, and reading. Two thirds of the field independent students also indicated that multi-media (i.e. videos, films) teaching techniques was used at college/university level in their home countries.

Teacher/Student Interaction

Students were asked to describe the amount of teacher/student interaction while attending elementary and high school in their countries. The majority of both field dependent and field independent students responded that there was "limited interaction" between teachers and students.

Characteristics of an Ideal University Professor

Both field dependent and field independent students had similar respond to the question: "What characteristics do you think an ideal university professor should have?" Students perceived an ideal university professor as one who is: knowledgeable of subject, does thorough preparation and organization of course work, is easy to approach, and responsiveness to students in and out of the classroom.

Testing and Examinations

The majority of field independent students responded that essay, multiple choice, and closed book were the most common types of exams used in their countries. Field dependent students reported that essay was the only type of exams used often in their educational environment. A majority of the field dependent and field independent students indicated that two to three tests and exams were administered for each course during a semester in their countries. However, one third of the field independent students replied that they had one comprehensive exam during a semester.

Cognitive Level of Test Questions

During the interview, students were asked to circle words which, to the best of their ability, they recalled from high school tests. Students were asked to underline words which they

recalled from university tests and exams. The number of times students underlined and circled words was tabulated. The words most often selected by students are shown in Table 3.

Insert Table 3 about here

Words on the list were selected from a list of vocabulary useful in developing objectives and test items at various cognitive levels (Newcomb & Trefz, 1987). The vocabulary words were classified by different cognitive levels. The lowest level was remembering (recall of memorized facts). The category of Processing contained words which caused students to go beyond memorization of facts. Creating and evaluating levels required students to take known facts and combine them in a new creative or evaluative way.

Vocabulary from the Processing level were most often used in high school and university level tests by both field dependent and field independent students. At the **high school level**, field dependent students were most often asked to "summarize", "rephrase" and "determine main concept". Field independent students were most often asked to "distinguish" and "rephrase". At the **university level**, field dependent students were not often asked to "analyze" and "compare". Field independent students at the **university level** were most often asked to "apply", "compare", "rephrase", and "summarize".

Field dependent students were asked to "recite" and "name" tasks (remembering level) only at the **high school level** (see Table 3).

Data from Table 3 revealed that field dependent students were required to "evaluate" and "argue" only at the **university level**.

Research Papers

Students were asked if they were required to read and do research in order to write a paper for class. Almost all field dependent and field independent students gave a positive response. Students indicated that the topics of the papers were usually chosen by either the teachers or students.

Methods of Note-Giving

No differences were established between responses of field dependent and field independent students in regard to the method of note-giving. Giving lecture outline was used most often by teachers for both field dependent and field independent students. Other methods of note-giving included dictating notes, or writing notes on the chalkboard.

Differences Between U.S. Universities and Home Universities

Students were asked to give their impressions about the differences between their university experience in their home countries and in the U.S. All field dependent and fourteen out of fifteen of field independent students noticed differences in the types of teaching techniques and tests used in American universities. The major differences noticed by both field dependent and field independent students in research activities were very similar. They all stated that U.S. universities encourage more research activities, more student participation, and free discussion. Over 50% of the field independent students and 40% of field dependent students felt there was less emphasis on textbooks in U.S. universities.

Field Dependent

"Freedom of argument and disagreement".

"More research activities, more student participation, and more activities than what I had in my country."

Field Independent

"More emphasis on outside reading and writing".

"A great deal of interation".

"More discussion, student input".

"Free discussion".

"Lecture more on what he/she thought was interested (in student country)".

Flexibility in tests was the major difference noticed by more than half of both field dependent and field independent students when compared with tests in their countries. Most field dependent students found tests more comprehensive in U.S. universities. Very few field independent students mentioned that difference.

Field Dependent

"Sometimes (in U.S.) you have to memorize everything in the textbook".

"In my country, it was really hard, sometimes dangerous, to disagree with teachers or professors".

Field Independent

"I have adjusted".

Discussion and Conclusions

1. This study sought to determine relationships between student characteristics and cognitive style. All of the relationships discovered were either low or negligible.

The magnitude of the correlations indicate that the predictability of the GEFT based upon these variables (geographic area, age, gender, nationality status, and academic major) would not be substantial. This conclusion agrees with the research results of Miller and Escolme (1990).

2. U.S. and Chinese students had similar field independent tendencies. However, all of the students from Saudi Arabia in this study, demonstrated field dependent tendencies. This finding is an indication, that Arab students have to adapt academically to a critical/analytical style of education when they come to North America to study.
3. International female graduate students were proportionally more field dependent than males in this study. Based on this finding, it would appear that international female graduate students are less analytical and more global (seeing the whole instead of the parts) in their approach to learning.
4. Field dependent students had less exposure to multiple choice studies in the U.S. Therefore, this is an indication that students may use different reasoning procedures because of cognitive style and cultural background.

Implications

The results of this study imply that students with different educational and cultural backgrounds will approach learning in different ways. This requires teachers to be sensitive to these differences in their teaching approach.

Teachers' own cognitive style appears to be an important factor in the teaching-learning process (Kuchinskas, 1990). Matching teachers' and students' cognitive styles may not be feasible nor the most helpful in a learning situation. Instead, teachers may need to adapt their teaching methods to helping students to diversify their learning strategies". It should be remembered that cognitive styles are tendencies in people's approach to learning and thinking, not labels that put limits on students' learning potential and abilities.

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Table 1
GEFT Average Scores by Geographic Area and Gender (N = 41)

Characteristic	F. Dependent n	F. Dependent %	F. Independent n	F. Independent %	Total n	Total %	$\bar{X}$
GEOGRAPHIC AREA							
United States	6	30	14	70	20	49	**10.4**
International	6	40	15	60	21	51	**12.3**
China	2	18	9	82	11	26	
Inda	0	0.0	1	100.0	1	2.5	
Iran	0	0.0	1	100.0	1	2.5	
Japan	0	0.0	2	100.0	2	5.0	
Malaysia	0	0.0	1	100.0	1	2.5	
Saudia Arabia	4	100.0	0	0.0	4	10.0	
Thailand	0	0.0	1	100.0	1	2.5	
Cramer's V = .60							
GENDER							
Male					**13**	**32**	**10.0**
United States	1	20	4	80			
International	5	62.5	3	37.5			
Female					**28**	**68**	**12.1**
United States	5	33.3	10	66.7			
International	12	92.0	1	8.0			
Cramer's V = .70							

Table 2
Correlation of Selected Variables with Student GEFT Score (N = 41)

Variable	r	Strength of Correlations
Geographic Area	.40	Low
Age	-.21	Little, if any
Gender	.20	Little, if any
Nationality Status	.18	Little, if any
Academic Major	-.11	Little, if any

Table 3
Test Vocabulary Words Most Often Selected as Characteristic to Student Eductional Background (N = 20)

	High School		University	
	FD	FI	FD	FI
Remembering Level				
Define	5	13	1	7
Recite	4	7	0	5
Name	2	13	0	6
List	3	10	1	6
Processing Level				
Analyze	2	5	4	7
Apply	0	5	1	9
Compare	2	5	4	9
Determine main concept	4	5	1	5
Distinguish	3	10	1	8
Outline	2	2	1	8
Rephrase	4	6	2	9
State	1	5	3	8
Summarize	5	5	2	9
Creating Level				
Compose	1	1	3	4
Design	1	1	1	4
Formulate	1	6	0	5
Propose	0	1	0	4
Evaluating Level				
Argue	0	2	2	5
Evaluate	0	3	2	10