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Effects of dogmatism on computer literacy*

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ABSTRACT

Dogmatism and other individual characteristics affect the level of computer literacy (information fundamentals) reached in the introductory courses in Management Information Systems (MIS), perhaps as much as the investment education institution have made in software and hardware. This paper reports on the results of a questionnaire on computer literacy, dogmatism, and Kolb's Learning Styles Inventory (KLSI) given to 80 students at the end of an introductory MIS course. Differences in the literacy and learning styles were analyzed from the perspective of dogmatism. The results indicated that the scores in dogmatism inversely matched the scores in computer literacy. The effects of dogmatism on learning styles was mixed. To increase the levels of computer literacy, we need to examine other personal characteristics as they apply to learning computer and information technologies.

INTRODUCTION

Success in tomorrow's businesses will require people who are computer literate. To help meet this future requirement, colleges allocate faculty, hardware, software, and physical space to teach introductory courses in computers and information fundamentals. These allocations, however, do not alone assure higher levels of literacy. Individual characteristics, such as dogmatism and learning style, may also affect people's levels of computer literacy.

As professors, our purpose here was to understand better which factors influence levels of computer literacy and influence the learning process itself. This knowledge, based upon validated test scores of individual factors, could assist administrators in sequencing courses of those incoming students who approach computers differently. Some students may learn more with a graphic user interface, a hands-on approach, lecture, or self-study and discovery. Obviously, students also need to know about computers for other courses (Eyob, 1991), as well as making themselves more marketable.

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The authors surveyed over 100 university students on computer literacy to obtain data on students who had completed the first MIS course. Just before the end of the course, students were administered tests on dogmatism and learning style. These surveys produced 84 viable cross referencing questionnaires in computer literacy, learning style, and dogmatism, which provided enough data to test our research hypothesis. As the last part of a three-part study, the overall goal remained: find and analyze factors that impact computer literacy.

This paper discusses (1) an overview of dogmatism, computer literacy, and learning styles in the literature; (2) the need for the research and the research hypotheses; (3) the design, methodology, and nature of the three surveys; (4) the results and tests. Finally, we provide (5) conclusions about incoming students finishing their first college-level computer course and offer suggestions for future areas of research.

LITERATURE FINDINGS

Background on Dogmatism

Dogmatism (Rokeach, 1960) is the degree to which an individual's belief system is open or closed. A belief system is that which a person at a given time accepts as true or rejects as true about the world in which he or she lives. It is a person's framework for understanding his or her universe and the systems and subsystems that exist within it. Dogmatic behavior is generally termed "close-minded," while someone who appears less dogmatic is known as "open-minded." Rokeach's standardized test measures dogmatism, which is shown in the following questionnaire.

QUESTIONNAIRE

GENERAL INFORMATION: Please complete the following general information items. All information will be kept in strict confidence.

NAME:

STUDENT NUMBER:

GENDER:

INSTRUCTIONS: The following questionnaire collects opinions on what individuals think about a number of important social and personal questions. The best response to each statement below is your personal opinion.

Mark each statement in the provided blank space according to how much you agree or disagree with it. Please mark every one. Write +1, +2, +3, or -1, -2, -3 depending on how you feel in each case.

- | | |
|--------------------------|-----------------------------|
| +1: I agree a little | -1: I disagree a little |
| +2: I agree on the whole | -2: I disagree on the whole |
| +3: I agree very much | -3: I disagree very much |

- _____ 1. The United States and Russia have just about nothing in common.
- _____ 2. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.
- _____ 3. Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups.

+1: I agree a little

+2: I agree on the whole

+3: I agree very much

-1: I disagree a little

-2: I disagree on the whole

-3: I disagree very much

- _____ 4. It is only natural that a person would have a much better acquaintance with ideas he believes in than with ideas he opposes.
- _____ 5. Man on his own is a helpless and miserable creature.
- _____ 6. Fundamentally, the world we live in is a pretty lonesome place.
- _____ 7. Most people just don't give a "damn" for others.
- _____ 8. I'd like it if I could find someone who would tell me how to solve my personal problems.
- _____ 9. It is only natural for a person to be rather fearful of the future.
- _____ 10. There is so much to be done and so little time to do it in.
- _____ 11. Once I get wound up in a heated discussion I just can't stop.
- _____ 12. In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.
- _____ 13. In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying.
- _____ 14. It is better to be a dead hero than a live coward.
- _____ 15. While I don't like to admit this even to myself, my secret ambition is to become a great person, like Einstein, or Beethoven, or Shakespeare.
- _____ 16. The main thing in life is for a person to want to do something important.
- _____ 17. If given a chance I would do something of great benefit to the world.
- _____ 18. In the history of mankind there have probably been just a handful of really great thinkers.
- _____ 19. There are a number of people I have come to hate because of the things they stand for.
- _____ 20. A person who does not believe in some great cause has not really lived.
- _____ 21. It is only when a person devotes himself to an ideal or cause that life becomes meaningful.
- _____ 22. Of all the different philosophies which exist in this world there is probably only one which is correct.
- _____ 23. A person who gets enthusiastic about too many causes is likely to be a pretty "wishy-washy" sort of person.
- _____ 24. To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.
- _____ 25. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.
- _____ 26. In times like these, a person must be pretty selfish if he considers primarily his own happiness.
- _____ 27. The worst crime a person could commit is to attack publicly the people who believe in the same thing he does.
- _____ 28. In times like these it is often necessary to be more on guard against ideas put out by people or groups in one's own camp than by those in the opposing camp.
- _____ 29. A group which tolerates too much difference of opinion among its own members cannot exist for long.

- | | |
|--------------------------|-----------------------------|
| +1: I agree a little | -1: I disagree a little |
| +2: I agree on the whole | -2: I disagree on the whole |
| +3: I agree very much | -3: I disagree very much |

- ___30. There are two kinds of people in this world: those who are for the truth and those who are against the truth.
- ___31. My blood boils whenever a person stubbornly refuses to admit he's wrong.
- ___32. A person who thinks primarily of his own happiness is beneath contempt.
- ___33. Most of the ideas which get printed aren't worth the paper they are printed on.
- ___34. In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.
- ___35. It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.
- ___36. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.
- ___37. The present is all too often full of unhappiness. It is only the future that counts.
- ___38. If a person is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all."
- ___39. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what is going on.
- ___40. Most people just don't know what's good for them.
-

Dogmatism is included in prior research studies among various business disciplines, including information systems. In purchasing, for example, ". . . highly dogmatic and mobile buyers are superior at securing price concessions, but they are not better overall performers" (Dion, 1987, p. 29). And in group decision making, dogmatism significantly affects the satisfaction group members have with the group's decisions (Fiechtner, 1986). There are other examples presented in Paddock (1986-87).

Learning and dogmatism are also related. There is, for example, a relationship between the dogmatic tendency of a skilled reader and the rhetorical structure used to recall information from what is read: close-minded readers recall better with a simple collection structure, while open-minded readers use a more organized comparison structure (Rickards, 1987). Another study compared students with a learning-orientation (those interested in knowledge and enlightenment) to those with a grade orientation (those who only want a good course grade) (Kauffman, 1987). While learning-orientation correlated with dogmatism, and grade-orientation did not, the researchers' expectation was that learning-oriented persons would be open-minded to new ways of thinking and learning did not materialize.

Background to Computer Literacy

At first, computer literacy was defined as "knowledge of and fluency in computer usage and terminology" (Rosenberg, 1987, p. 117). Now, however, the term has taken on a variety of meanings and is defined in different ways for specific groups of people (Bjorn-Anderson, 1983; Wynne, 1983). For example, it means far more than a person's ability to work with a microcomputer or terminal. It may describe a worker's ability to use appropriate application software such as spreadsheets, database, or word processing programs (Gattiker & Paulson, 1987).

Computer literacy may even be used to describe people's awareness of the role of computers in their lives (Capron, 1990). Last year computer literacy has come to include ". . . the two dozen words or terms [that] are all anyone needs to talk intelligently about computers . . ." (Dvorak, 1991, p. 44).

In this present study, computer literacy exhibits these three levels or definitions of the term:

- Knowledge of what a computer is and of how it works, but does not deal with how the computer does its work (digital circuits). This requires a specific vocabulary of computer terms and information system components because the terms are unique and descriptive (Freedman, 1993). [A questionnaire, shown in Appendix, captured this knowledge].
- Interaction with a computer. This means the ability to understand and properly use specific types of software for specific purposes.
- Computer awareness. Included in this is an understanding of the importance, versatility, pervasiveness, and potential use of computers for both positive and negative purposes within society (Capron, 1990).
- To be computer literate in management requires the ability to define information system requirements effectively and have an understanding of decision support tools such as spreadsheets, query languages, report writers and financial planning systems (Freedman, 1993).

To measure computer literacy, the researchers tested questionnaire items that captured a comprehensive view of the course materials in the introductory MIS course, beyond just a computer language (Cheng, Plake, & Stevens, 1985). This survey included definitional questions (Duffy, 1989; Capron, 1990; Ingalsbe, 1989; *Webster's*, 1988) from all subject areas covered in the introductory course. The first two pages of the questionnaire are shown on the following page. This same questionnaire was first given with a demographic survey and later given with a learning style survey, which allowed the researchers to determine the amount of learning taking place in the introductory course (Brock, Kohl, & Thomsen, 1991).

The first 10 questions were demographic in nature, and the 90 items which followed involved computer literacy. Rather than multiple choice, these 90 questions were constructed as matching questions to reduce the use of space and reading time by the participants. Besides, researchers have found that matching questions reduce guessing by participants and to be easier to construct and score (Sax, 1989).

The nontrivial literacy questions assured that the researchers did not capture cursory and chance knowledge, which were also checked for item difficulty level and discrimination indices (ITEMANtm, 1986). No student scored perfect on either the beginning or ending test, so an interval scale could be used in testing.

Then during the last two weeks of the semester, the questionnaire was given again to the nine introductory classes. Between the first and last administrations, the construction of the questionnaire was changed only to substitute learning style questions for demographic questions as shown in the Learning Style Survey.

Demographic Questions in the First Questionnaire

Column A - Questions

- ___ 1. How many computer courses have you taken?

- ___ 2. How old are you?

- ___ 3. How many words per minute (wpm) can you type?

- ___ 4. How much computer experience have you had? (Mark all that apply.)

- ___ 5. Have you used any of the following computers? (Mark all that apply.)

Column B - Answers

- A. None
 - B. One
 - C. Two
 - D. Three
 - E. Four or more
-
- A. Younger than 19
 - B. 19 to 21
 - C. 22 to 29
 - D. 30 to 39
 - E. Over 39
-
- A. None, cannot type
 - B. Less than 20 wpm using a few fingers
 - C. Less than 20 wpm using all fingers
 - D. Between 20 and 50 wpm
 - E. More than 50 wpm
-
- A. None
 - B. Played video games
 - C. Used one or more word processors (Names _____)
 - D. Used one or more spreadsheets (Names _____)
 - E. Programmed one or more languages (Names _____)
-
- A. IBM or IBM compatible
 - B. Macintosh or Apple
 - C. Commodore
 - D. Atari
 - E. Other, specify _____

Demographics (continued)

- | | |
|---|--|
| ___ 6. Do you have access to a computer off campus? | A. None
B. Yes, at home
C. Yes, at work
D. Yes, at home and work
E. Yes, at friend's |
| ___ 7. Do you own a computer? | A. No
B. Yes, a desktop
C. Yes, a portable
D. Yes, a laptop |
| ___ 8. How many hours per week do you work in outside employment (not course work)? | A. None
B. Less than 10
C. 10 to 19
D. 20 to 40
E. Over 40 |
| ___ 9. How many courses are you taking this semester? | A. One
B. More than one
Number _____ |
| ___ 10. What major do you plan to take in college?
(_____) | A. Undecided
B. Major, Specify |

Literacy Questionnaire

Column A - Definitions

- ___ 11. Has four functional parts: input, processing, storage (programs and data), and output.
- ___ 12. Performs the mathematical operations and any comparisons required.
- ___ 13. Physical parts of a computer
-
- ___ 14. Standard method of representing a character with a number inside the computer.
- ___ 15. The base 2 numbering system that uses digits 0 and 1.
- ___ 16. Number system that uses the ten digits 0 through 9 and the six letters A through F to represent values in base 16.

Column B - Terms

- A. Arithmetic/logical unit
B. Computer system
C. CPU
D. Firmware
E. Hardware
-
- A. Alphanumeric
B. ASCII
C. Binary
D. Hexadecimal
E. Numeric data
-
- ___ 17. Process of joining two character strings.
- ___ 18. Order in which calculations are executed.
- ___ 19. Indicates how fast a computer can process data.

- A. Clockspeed
B. Code
C. Concatenation
D. Documentation
E. Precedence

Literacy (continued)

-
- ___ 20. Smallest part of a display screen that can be controlled.
- ___ 21. Standard keyboard arrangement.
- ___ 22. Uses position of light on a computer screen to record information.
-
- ___ 23. File used in building a turn-key application that requires very little input from a user before starting.
- ___ 24. File used by DOS after the boot process is finished to further set up your computer system.
- ___ 25. Hidden file in DOS that manages each character that is typed, displayed, printed, received, or sent through any communications adapter.
-
- ___ 26. High-level language designed for scientists, engineers and mathematicians to solve complex numerical problems.
- ___ 27. High-level language oriented toward organizational data processing procedures, particularly in business.
- ___ 28. High-level language which the user with very little programming knowledge can use.
-

Kolb developed a theory and a nine-question instrument that provides a learning style inventory (KLSI). His theory moves a person's learning through a four-stage process in which a person:

1. Starts with a concrete experience (CE),
2. Moves to reflective observation (RO),
3. Goes on to making abstract concepts (AC), and
4. Settles into active experimentation (AE).

Words that describe CE, RO, AC, and AE stages or modes of these four respective learning stages are feeling, watching, thinking, and doing. The process is continuing, cyclic, and directed by a person's needs and goals (Kolb, 1984). Thus, the process is highly individualized - and could be influenced by the demands of the day.

A nine-item questionnaire, which requires self-description, produces scores for the KLSI. Each item has a set of four words with which a person rank orders the words so the sequence describes him or herself. Researchers recently used the questionnaire to analyze the learning style of software end users (Bostrom, Olfman, & Sein, 1990), but it has also had dissenters (Freedman, 1980). A half-sized version of the questionnaire is shown below, modified to reflect the current usage of "best" as being number "1."

Learning Style Survey

Name _____ Student ID _____

Nine sets of four words listed below characterize learning style. Would you rank-order the words in each set so the order describes you. Keep in mind that there are no right or wrong answers—all choices are equally acceptable.

Assign numbers to the left of the words that characterize your learning style:

- 1 for the *best*.
- 2 for the *next best*.
- 3 for the *next to least*.
- 4 for the *least*.

Example:

SET

0. 2 fast 3 understanding 4 slow 1 big picture

The suggested way of ranking is to find the *best* - 1, the *least* - 4, and then the *next best* - 2 and finally the *next to least* - 3. Be sure to assign a different rank number to each of the four words in each set.

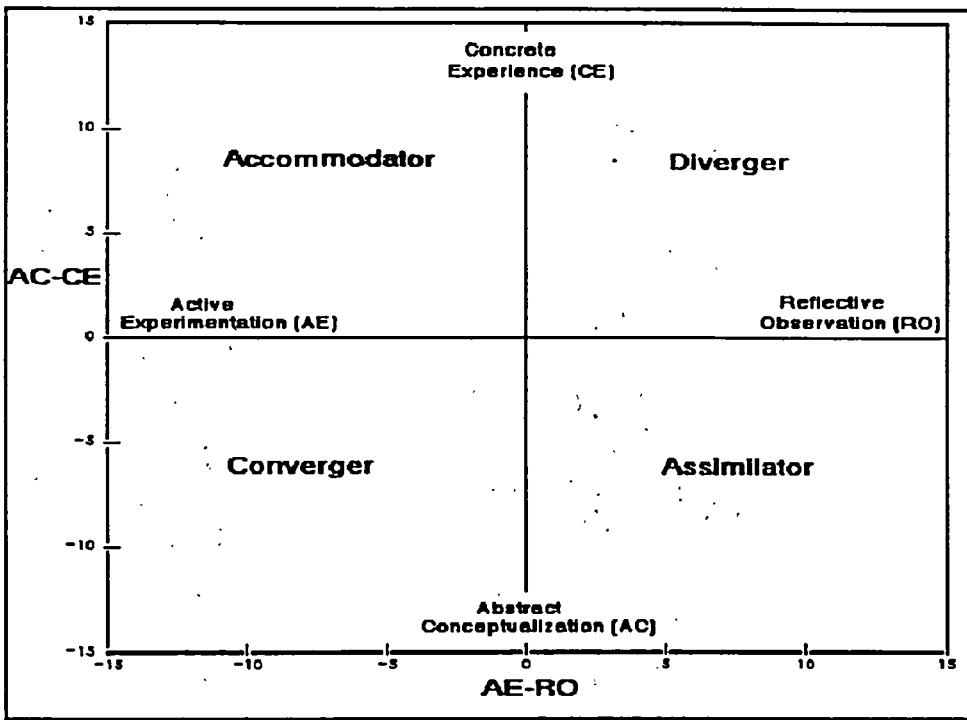
SET

1. _____ discriminating _____ tentative _____ involved _____ practical
2. _____ receptive _____ relevant _____ analytical _____ impartial
3. _____ feeling _____ watching _____ thinking _____ doing
4. _____ accepting _____ risk-taker _____ evaluative _____ aware
5. _____ intuitive _____ productive _____ logical _____ questioning
6. _____ abstract _____ observing _____ concrete _____ active
7. _____ present-oriented _____ reflecting _____ future-oriented _____ pragmatic
8. _____ experience _____ observation _____ conceptualization _____ experimentation
9. _____ intense _____ reserved _____ rational _____ responsible

Tallying the numbers assigned to the four words for the questions in prescribed combinations measures a person's relative preferences for the four learning modes or abilities (CE, RO, AC, and AE). Using these numeric assignments, Kolb created a graphic that is produced by subtracting CE from AC and RO from AE. The plots of these two numbers, AC-CE and AE-RO, allows placement of people on a Learning Style Grid, such as the one shown in

Figure 1. These placements in the quartered grid allow people to be designated as Converger, Diverger, Assimilator, and Accommodator (Kolb, 1984). Our interest in this report was the relative positioning of style as related to an increased level of dogmatism. Other studies have allowed categorization of students by their majors (Brown & Burke, 1987) and level of education (Baker, Simon, & Bazeli, 1986, 1987)

Figure 1. Kolb's Learning Style Type Grid



Research on Dogmatism and Computer Literacy

Need for Research

The literature and our previous research includes computer literacy, demographics, and learning styles (Brock, Kohl, & Thomsen, 1991). However, there appears to be no information available on the linkage between dogmatism and computer literacy on learning styles.

The purpose of this research was to examine the connection between dogmatism and computer literacy and between dogmatism and learning style. Both of these linkages may be important in explaining the individual characteristics that are necessary to become competent in computers and information management. The results of this study may suggest avenues for further research into what helps students attain higher levels of computer literacy.

Research Hypothesis

The hypothesis of this research study was that: *increasing levels of dogmatism would sufficiently decrease students' level of computer literacy and indicate different learning styles.*

Definitions in this hypothesis are:

Increasing level of dogmatism—more than the mean dogmatism questionnaire score (148) and incremental standard deviations from this mean. In effect, this was the experimental treatment, the independent variable.

Sufficiently decrease—scores below the mean score on the computer literacy questionnaire. Specifically, the score would be less than 48.1 out of 90 literacy questions.

Level of computer literacy—test score obtained on the questionnaire that had questions on hardware, software, systems operations, computer languages, data and information, and systems analysis. The score was the dependent variable and ranged from 0 (not used) to 90.

Indicate different learning styles—mean scores of CE, RO, AC, AE, AC-CE, and AE-RO scores on Kolb's Learning Style Inventory that were significantly different. This also was a dependent variable.

Four supporting null hypotheses dealing with dogmatism influence on computer literacy and learning style are:

There was NO difference in students' computer literacy for those who:

H₀1: Had a higher than average dogmatism score.

H₀2: Had higher dogmatism scores than those with low dogmatism scores.

H₀3: Had extremely high dogmatism scores than those with extremely low dogmatism scores.

With higher levels of dogmatism, there was NO difference in the students for those who:

H₀4: Had different learning styles.

Method of Determining Dogmatism, Computer Literacy, and Learning Styles

The general research problem was to determine the level of computer literacy (as defined above) of students measured at the ending of their introductory computer course. The primary reason for this particular study was to assure that a measurable level of literacy could be affected by measurable levels of dogmatism. The secondary purpose included the evaluation of the effect dogmatism had on learning style types to see how they impact different levels of computer literacy. To do this, three questionnaires were required in computer literacy, dogmatism, and learning style inventory, which were described above.

We administered questionnaires on dogmatism, computer literacy, and learning styles inventory in only four of our beginning MIS classes of a medium-sized university in the Southwest. Matching dogmatism and computer literacy resulted in 84 viable questionnaires, and matching dogmatism and learning style resulted in 89. For this sample, five questionnaires did not overlap. Those students who took the questionnaires were volunteers because both students and instructors found reasons not to complete one or all the questionnaires. Most claimed they did not have time.

The process for this study involved administering two questionnaires. The questionnaires on computer literacy and learning styles were given during the last meeting of the classes. The dogmatism questionnaire was administered during the week preceding the last meeting.

The general procedures used in the administration of the questionnaire to all classes were:

1. After the instructor briefed students about the course and questionnaires, the instructor introduced the researcher to the class.
2. The researcher told the students that the survey would take about 20 minutes, and the results in no way affected their grade. They were reminded that answering the survey was voluntary.
3. The researcher then read the questionnaire instructions and passed out the questionnaires.
4. The researcher recorded the time when the students turned in the questionnaire.
5. Data analyses included several precautions geared toward assuring the validity of the data (e.g., eliminating questionnaires that had none of the last 10 questions attempted).

The data were analyzed using two simple 2 by 2 factorial design: dogmatism scores (1) above the mean and (2) equal to and below the mean versus (a) computer literacy scores and versus (b) learning style inventory scores. Each was tested using t-tests. For the dogmatism versus computer literacy, the analyses were expanded to look at the extremes: the first and fourth quartile dogmatism scores and those dogmatism scores plus and minus one standard deviation from the mean dogmatism score.

RESULTS AND COMMENTS

The hypotheses, means of the survey, results of t-tests, and levels of significance are shown in Table 1. Figures 2, 3, and 4 show the incremental effect of increasing and decreasing dogmatism on computer literacy scores and learning style.

(Table 1 on next page)

Table 1. Tests of the Experimental Results

HYP	Independent Variables	n	Mean	Std. Error	t-score	Significance
H ₀ 1	Computer literacy Dogmatism > 148	38	47.1	9.7	1.13	ns
	Dogmatism ≤ 148	46	49.8	12.0		
H ₀ 2	Computer literacy Dogmatism Qrt 4	21	44.4	12.0	1.21	ns
	Dogmatism Qrt 1	21	48.6	10.6		
H ₀ 3	Computer literacy Dogmatism > 173	9	40.2	13.2	2.23	p < 0.05
	Dogmatism ≤ 123	12	51.9	9.8		
H ₀ 4	Learning Style Grid CE					
	Dogmatism > 148	42	15.1	2.7	1.52	ns
	Dogmatism ≤ 148	47	16.2	4.1		
	RO					
	Dogmatism > 148	42	13.6	3.4	1.93	p < 0.1
	Dogmatism ≤ 148	47	15.3	4.5		
	AC					
	Dogmatism > 148	42	17.0	3.4	-0.52	ns
	Dogmatism ≤ 148	47	16.6	4.0		
	AE					
	Dogmatism > 148	42	17.0	3.1	-1.29	ns
	Dogmatism ≤ 148	47	16.1	3.6		
	AC-CE					
	Dogmatism > 148	42	1.9	5.1	-1.34	ns
	Dogmatism ≤ 148	47	0.4	5.6		
	AE-RO					
Dogmatism > 148	42	3.4	5.4	-2.17	p < 0.05	
Dogmatism ≤ 148	47	0.9	5.6			

Figure 2. Decreasing Computer Literacy Scores with Increasing Dogmatism Scores

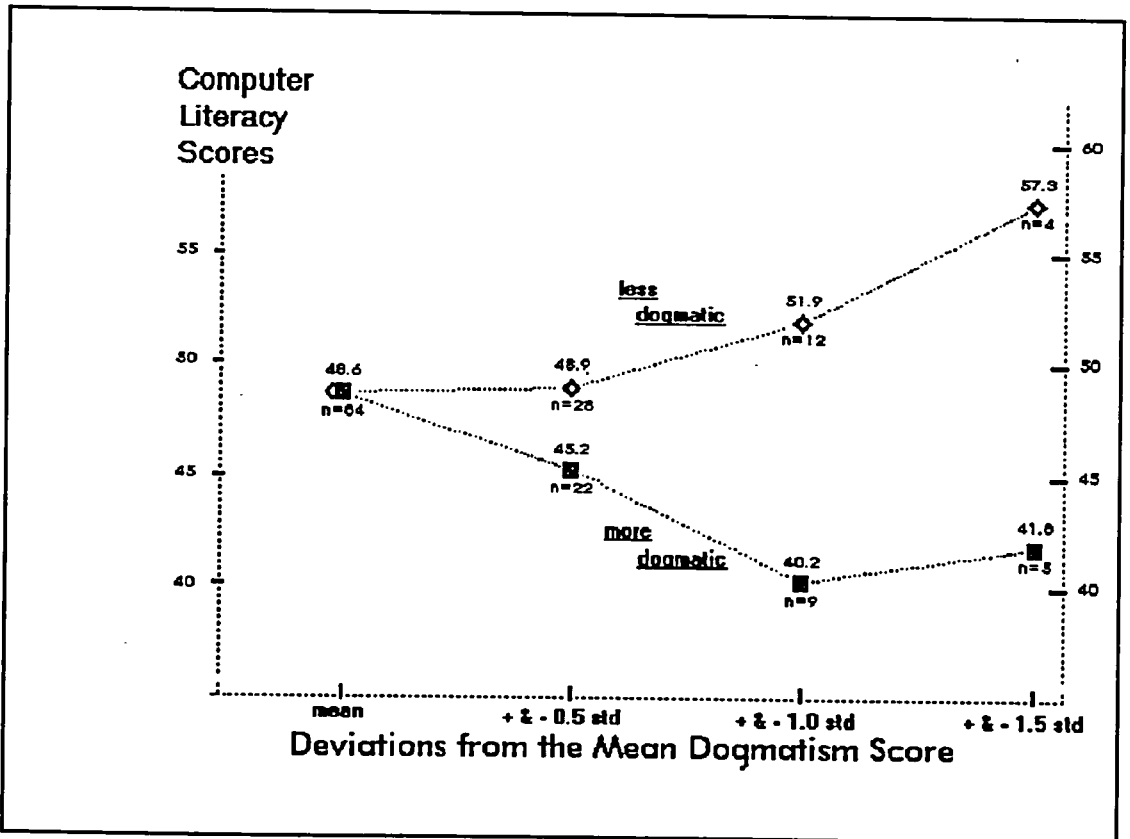


Figure 3. AE-RO and Increasing Dogmatism Scores

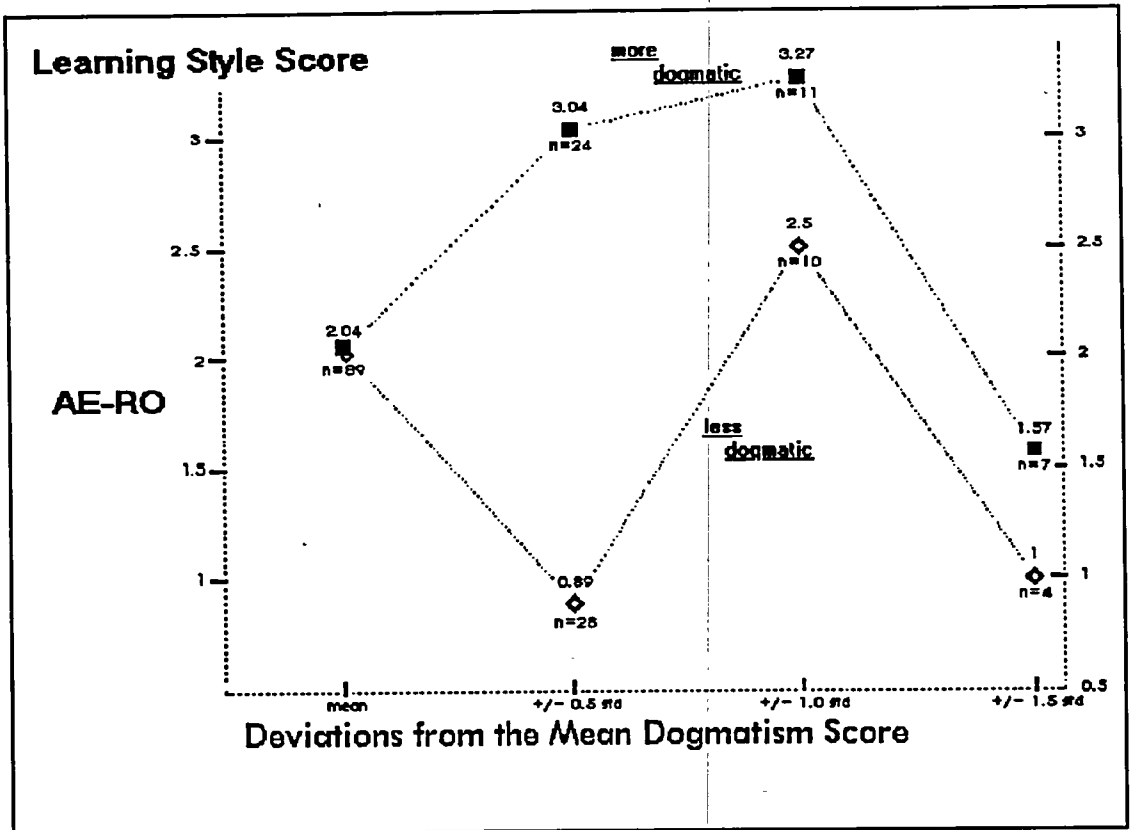
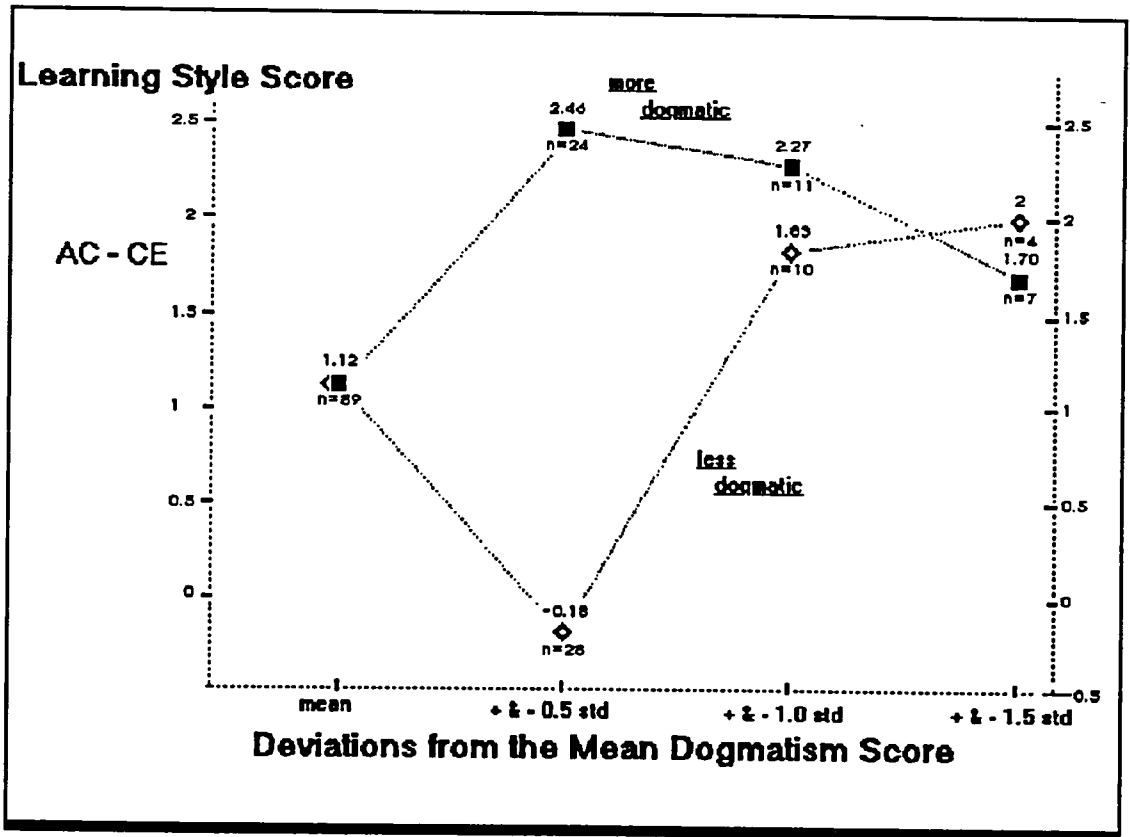


Figure 4. AC-CE and Increasing Dogmatism Scores



Higher dogmatism scores resulted in lower literacy scores, and lower dogmatism scores issued higher computer literacy scores. As shown to the right of H_03 in Table 1, the students who registered one standard deviation above and below (173 and 123) the mean dogmatism score (148) scored significantly different from the mean computer literacy score (48). Figure 2 also shows the difference in literacy scores between those students who had higher and lower dogmatism scores, incremented at 0.5 standard deviations from the mean. The tests for H_01 and H_02 only suggested that higher dogmatism scores affect computer literacy scores.

People who scored higher than average on the dogmatism questionnaire have different learning styles than those who scored lower than average on the dogmatism questionnaire. Table 1, across from H_04 , shows the differences: AE-RO was significantly different. At higher and lower dogmatism scores, the differences in learning style scores did not persist, as Figures 3 and 4 show.

Because tests of the effects of dogmatism on learning style did not persist through different levels of dogmatism, only a conditional statement is warranted: dogmatism has some effect on learning style. Additionally, those scoring higher than average on the dogmatism survey tend to be higher in the Diverger quadrant in Kolb's Learning Style Grid (Figure 1). The sizes of the samples were quite small beyond a half of standard deviation from the mean. This constrained the t-tests.

On the other hand, the effect of dogmatism on computer literacy scores is more definite: increased levels of dogmatism lowers computer literacy. The range of literacy scores helped make the distinction.

CONCLUSIONS

These findings provide interesting possibilities and questions for both business firms and institutions of higher education.

- Should surveys for dogmatism be given before teaching a course.
- Should instructors tell students that they scored high or low on a dogmatism survey and how the score may affect their ability to learn a particular subject.
- Dogmatism may affect learning different subjects differently. Dogmatism may be beneficial in teaching some subjects, for example, law and accounting.

This current study has been only a beginning. Its findings are preliminary and may not be generalizable. However, based upon this we offer the following questions for further research:

- What motivates people to learn about computers?
- What are the differences between learning to use a computer (manually, artistically, and logically) and learning the computer terminology? Among the four, are there gender, aptitude, and age differences?

If computer literacy is needed for success in business and government, we need to know what factors will help and hinder our students in learning today. Our application of those factors in education/training will eventually shorten the time needed to bring about computer literacy.

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