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Effectiveness of Teaching Ethics: Assessment of Changes in Associative Networks

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Is Teaching Ethics Effective? A Look at Associative Networks to Assess Changes in Perception

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Abstract

Concern about unethical behavior in the business world has motivated many business colleges to examine the coverage of ethics in their coursework. Though some people think ethics cannot be effectively taught in college curricula because of a belief that ethics are formed by one's upbringing, family and social influences, this study shows that ethical perceptions, as measured in associative networks, can change after presenting information and having instructor-led discussion of ethical issues. Pathfinder analysis is used in this study to generate an associative network for individuals and for group averages. These associative networks (also known as cognitive networks) can be used to measure changes before and after presentation of information and group discussions of ethical issues. The results of this study show that people's perceptions of ethical concepts do change on average. It remains to be seen whether a change in one's associative network persists over time or whether it could lead to changes in behavior. Beyond assessment of changes in associative networks and the impact of education presented in this article, there is a brief discussion of how Pathfinder analyses might also be used by instructors to plan individualized education.

Keywords: Ethics, ethics education, IT and ethics, associative network, cognitive model

1. INTRODUCTION

Ethics as a topic in business education has been a point of discussion and concern in recent years. Past scandals such as Enron and WorldCom heightened awareness of ethical business practices. As a result, there has been a push to teach more ethics in business curricula. However, some people argue that trying to teach ethics at the college level comes far too late because ethics

are taught through one's upbringing under the influence of one's family and peers. The focus of this study is to determine if ethics education and discussion had a measurable impact on people's perceptions. The context of the study is ethical issues that might arise in situations involving the use of information systems (IS).

From a practical standpoint for IS personnel in businesses, this study and past research indicate that ethics education, at least in terms of teaching what is acceptable and what is not acceptable, can be combined with preventive, detective measures in the work place to impact how people behave. Many people report that they rely on their personal values in making ethical decisions, but they can also be influenced by what is presented to them as expected behavior. The possibility of detection and consequences for unethical behavior may also affect one's decisions, according to some research (Kreie & Cronan, 2000).

2. ASSOCIATIVE NETWORKS AND PATHFINDER ANALYSIS

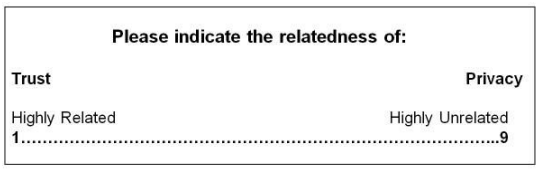
The researchers in this study believe Pathfinder analysis can be a useful assessment tool that extends analyses used in previous ethics research in IT and people's perceptions of ethical issues. The purpose of this study is to measure a person's perceptions or associative network of ethics concepts within the context of a scenario and determine whether the associative network changes after ethics education by means of presentation of information and instructor-led discussion.

Pathfinder was developed by Schvaneveldt (1990) and Schvaneveldt, Durso and Dearholt (1987) to visualize and analyze a person's associative mapping or network of certain concepts. Pathfinder has been used in several fields of study to examine people's associative networks of certain concepts within a subject domain. For example, it has been used in medical research to examine cognitive differences between healthy and schizophrenic subjects (Vinogradov et al., 2003) and in human-computer interaction to assess how users visualize the computer systems they use (Chen, 1998; McDougall et al., 2001). For this study, Pathfinder associative networks graphically depict how an individual relates ethics concepts such as privacy, trust and personal responsibility.

Overview of Pathfinder

A Pathfinder associative network is a network that represents the strength of relationships between concepts. These relationships are derived from pairwise ratings of terms in a subject domain. Meaningful terms in the subject domain are identified by people who are knowledgeable in the domain. To determine a person's associative network of ethical terms, for instance, the person rates the relatedness of pairs of ethical terms. Figure 1 shows an example of one pair of ethics terms with a possible rating from 1 (highly unrelated) to 9 (highly related).

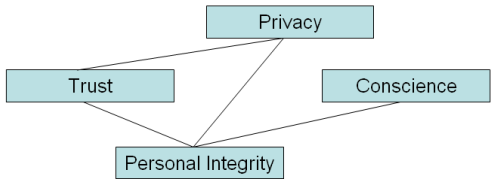
Figure 1: Example of Rating Pairs of Ethics Terms



Distance and Neighborhood Characteristics.

Two characteristics of Pathfinder associate networks are *distance* and *neighborhood*. Distance reflects how closely related any two terms are. Figure 2 depicts a hypothetical associative network of ethics terms that might be derived from an individual's pairwise ratings. A distance of one means two terms are directly, closely related and have no intermediate node. In the associative network of the individual depicted in Figure 2, conscience is more closely related to personal integrity than to trust or privacy.

Figure 2: Example of a Pathfinder Associative Network



The *neighborhood* characteristic is the set of terms directly related to a central term. Figure 2 shows the term *trust* has a neigh-

borhood consisting of privacy and personal integrity. Personal integrity's neighborhood is trust, privacy, and conscience; therefore, it is closely related to more terms than privacy or trust.

Comparing Networks to Determine If Changes Occur.

Pathfinder analysis measures the similarity of two networks as a *closeness ratio—a* ratio of the links in common divided by the number of links in either network. The closeness ratio can range from 0 (no shared links) to 1 (identical networks). A statistical test used for similarity is the Tail Probability, which is the probability that two networks would share a given number of links or more by chance. Assessing the similarity of networks in this study is used to determine whether one's associative network of ethical concepts shows any significant change after participation in a presentation about ethics and a discussion of ethics. Similar comparisons have been done with associative networks in education research to assess whether a student's associative network changes after training and whether the student's network more closely matches a teacher's network after training. Pathfinder analysis has also confirmed the results of traditional measures of learning, such as exams (Curtis & Davis, 2003).

3. THE STUDY

For this study three ethical scenarios dealing with different issues are used because ethical perceptions have been shown to be issue-contingent (Kreie et al, 2007). A summary of the scenarios used follows:

Scenarios Used in Study

Scenario 1: Making Unauthorized Program Modifications. A programmer modifies a bank's accounting system to hide his overdrawn account and avoid an overdraft charge. After making a deposit, the programmer corrects his modification.

Scenario 2: Using Company Resources For Personal Purposes. A programmer uses company computer equipment to write programs for his friends on his own time on weekends. The programmer does not charge anything for his programs.

Scenario 3: Copying Data. A marketing company employee performs some data processing on contract for a government agency. The data concerns information about children and their parents. The employee is told by his boss to make a copy of the data for the company's use. The contract with the government agency does not explicitly prohibit this, so the employee makes a copy of the data.

Methodology

Since Pathfinder analysis uses pairwise ratings of terms in a subject domain, a list of ethics terms is needed. When rating pairs of terms, it is desirable to keep the list of terms short in order to reduce the total number of pairwise ratings that must be made ([n(n-1)/2] = number of pairwise ratings where n = number of terms). As few as 10 terms have been shown to be effective in Pathfinder analysis. For this study, an initial list of 17 ethics terms were gleaned from several articles in journals about business ethics. To reduce the list of 17 terms three IT instructors read the scenarios for this study then ranked the 17 ethics terms based on how relevant they were to the scenarios as a whole. The top 12 terms were taken from this combined ranking. Using these 12 terms, the IT teachers again read each scenario and completed the pairwise ratings of similarity. An average instructor associative network for each scenario was derived from these ratings.

The subjects in this study were drawn from a graduate-level MIS course (Cappel & Windsor, 1998; Benham & Wagner, 1995). Thirty-seven subjects completed the study; one did not. Most of the students were in the MBA program (MBA: 27, engineering: 4, accounting: 3, finance: 1, management: 1, no program of study given: 1). There were 17 females and 20 males. The average years of full-time work experience was five.

This study followed a pretest-posttest design and data were collected through a sequence of Web pages. In phase one of the study each subject answered demographic questions then the subject was randomly assigned to a Web page with one of the three scenarios. After reading the scenario, the subject answered some questions about whether the described behavior was acceptable or not, whether the subject would likely

act the same as the actor in the scenario and how important was the ethical issue involved. After these questions, the subject was instructed to keep the scenario in mind while rating pairs of ethics terms. Pathfinder generated associative networks for individual subjects and an average associative network for subjects, by scenario.

In phase two an in-class, instructor-led presentation and discussion of ethics formed the education portion of this study. The instructor covered a set of topics and questions presented through PowerPoint. These PowerPoint slides included discussion points about ethics scandals such as Enron and WorldCom, legislative protection via the Sarbanes-Oxley act and its impact on corporate governance, and concluded with a list of personal, religious and social factors that might influence one's ethical decisions. This classroom presentation and discussion did not focus on any of the scenarios used for the Pathfinder analyses.

In the week after the ethics discussion, phase three was completed when subjects again accessed the study's Web site and were automatically directed to the scenario they saw in phase one. They reread the scenario, answered the same questions and completed the pairwise ratings as in phase one.

4. ANALYSIS OF RESULTS

Table 1 (see appendix) summarizes responses of subjects about the scenarios regarding acceptability, probability of doing the same and importance of the ethical issue. The responses confirm findings in previous research in which the majority of people say the behaviors in scenario 1 and 3 are unacceptable while many say the action in scenario 2 is acceptable. Also in line with past research, scenarios 1 and 3 are judged by all or a large majority of subjects as representing an important ethical issue. This contrasts with scenario 2 where subjects are fairly evenly split on how important the ethical issue is.

By scenario, Pathfinder analysis compares the pre- and posttest average student associative network to the average instructor network. Table 2 (see appendix) summarizes the comparisons and shows a significant change between "before" and "after" for Scenarios 1 and 3. In contrast, Scenario 2 shows a strong similarity between the student and instructor networks both before and after the ethics discussion so no significant change is found.

Scenario 1: Making Unauthorized Program Modifications

Figures 3 and 4 show the associative network for the average student before the ethics discussion as compared to the average instructor associate network. The three common links between the instructor and student networks indicate agreement that there is a strong link between *legality* and *consequence*, between *personal responsibility* and *personal integrity*, and between *policy* and *personal responsibility*. For the instructor associative network, *personal integrity* has the most complex neighborhood (direct links to other terms) which indicates it is central to this scenario in the view of instructors. For students, however, both *consequence* and *personal responsibility* have the most complex neighborhoods; both with five direct links.

After the ethics discussion, the average student associative network changes (Figure 5). The number of common links between the teacher and student networks increases from three to five. The student network adds links between *personal integrity* and *conscience* and between *personal integrity* and *trust.* For students, *personal responsibility* is still the central term (the most complex neighborhood) but next to it, *personal integrity* has the most complex neighborhood with two added links.

Figure 3: Scenario 1-Before Ethics Discussion Average Instructor Network

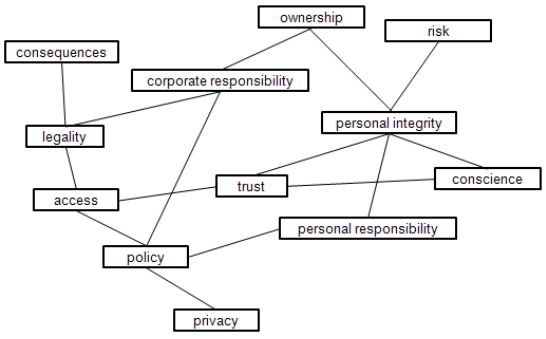


Figure 4: Scenario 1-Before Ethics Discussion Average Student Network

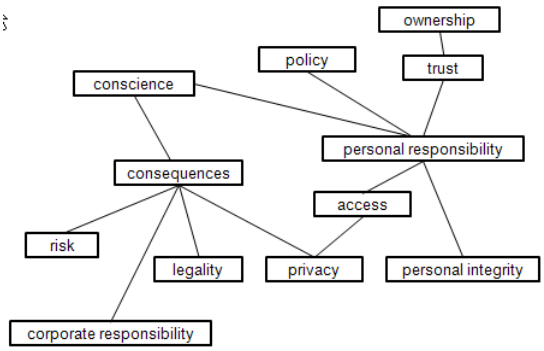
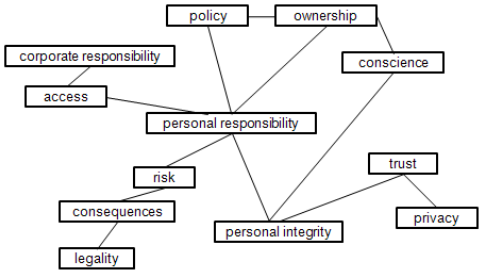


Figure 5: Scenario 1-After Ethics Discussion Average Student Network



Scenario 3: Copying Data

Figures 6 and 7 show the "before" student associative network for scenario 3. There are three common links between the instructor and average student networks: *risk—consequence*, *trust—access*, and *trust—privacy*. Central to the instructor network are *corporate responsibility*, *privacy*, and *personal responsibility* while *trust* is central in the student network.

Figure 6: Scenario 3-Before Ethics Discussion Average Instructor Network

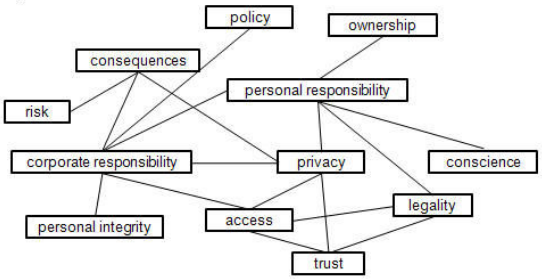


Figure 7: Scenario 3-Before Ethics Discussion Average Student Network

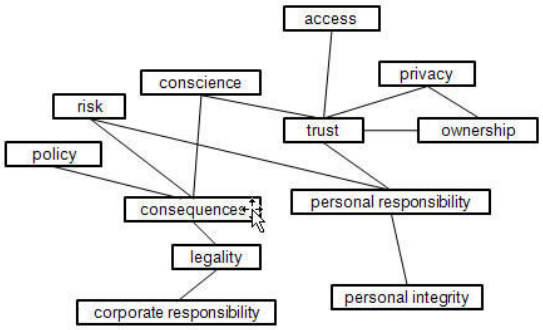
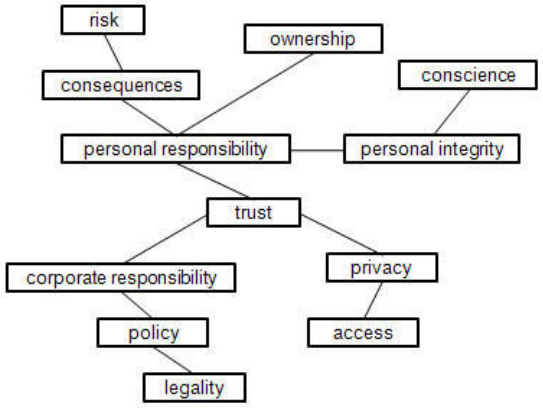


Figure 8: Scenario 3-After Ethics Discussion Average Student Network



After the ethics discussion, there is a significant increase in the common links between the teacher and the student network seen in Figure 8. The common links added are: *personal responsibility—ownership*, *policy—corporate responsibility*, and *privacy—access*. The most complex neighborhood in the average student network changes from *trust* to *personal responsibility*.

5. CONCLUSION & DISCUSSION

Changes in Associative Networks

The results of this study show a change can occur in one's perception of ethical concepts after participating in ethics education and discussion. For colleges, the outcome of this study supports the idea that including ethics topics in coursework can have an impact on individuals. For businesses in general and IT managers in particular, this study indicates that ethics training may be worthwhile. For

future research, the question is whether a change in one's associative network persists over time and whether this change is likely to affect one's behavior.

Limitations of Study

The changes that occurred in people's associative network after going through a presentation about and discussion of ethical issues may not be persistent. There is a need to study whether the change lasts over time. Expanding the types of scenarios used and investigating the relationship between changes in associative networks and behavioral intention (Does a change affect one's intention to behavior one way or another?) are important, necessary extensions of this study's findings.

Figure 9: Scenario 3-Before Ethics Discussion No common Links Between Instructor and Individual Student Networks.

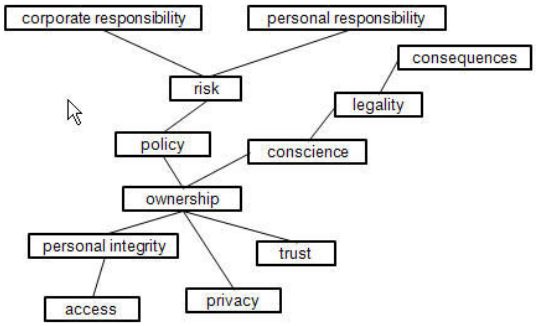
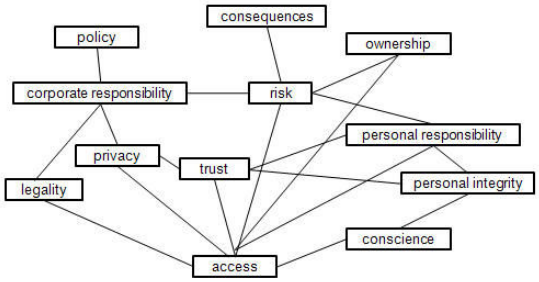


Figure 10: Scenario 3-After Ethics Discussion There Are Nine Common Links



Pathfinder As a Tool to Customize Education.

Besides measuring changes in networks, Pathfinder analysis could help customize education or training. For instance, the preliminary associative network of a student, such as shown in Figure 9, based on scenario 3 shows an extreme case with no common links between the student and the average instructor network. One way to use this information might be to have reading material or discussion items that emphasize the concepts directly linked in the target or desired network. The assumption, of course, is that there is a target network to train towards; a network derived from knowledgeable people in the subject domain. Based on the student's preliminary network specific reading assignments could be made and/or questions discussed. Figure 10 shows the "after" network for this individual student.

Nine common links are found in the comparison of the "after" student network to the average instructor network. The common links between the networks are: legality—access, policy—corporate responsibility, privacy—access, privacy—corporate responsibility, risk—consequence, trust—access, and trust—privacy. Though the "after" network shows a lot of change, tailoring the ethics topics and discussion might have an even stronger effect.

In terms of training effectiveness, it would be interesting to investigate whether targeted training based on the trainee's preliminary associative network would produce a greater change than using the same training for everyone.

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TABLE 1

Summary of Responses about Scenarios
Before and After Ethics Presentation and Discussion

	Scenario 1		***Scenario 2***		***Scenario 3***	
	Before	***After***	***Before***	***After***	***Before***	***After***
Judgment						
% Unacceptable	100%	100%	50%	75%	75%	92%
% Acceptable	0%	0%	50%	25%	25%	8%
Probability of doing the same *						
% Probable	0%	18%	25%	13%	17%	25%
% Undecided	6%	6%	0%	0%	0%	0%
% Improbable	94%	76%	75%	88%	83%	75%
Ever done the same						
% Yes	0%	6%	38%	25%	0%	0%
% No	94%	71%	38%	75%	92%	83%
No response	6%	24%	25%	0%	8%	17%
Importance of issue **						
% Very	100%	94%	50%	63%	82%	100%
% Undecided	0%	0%	25%	0%	18%	0%
% Not Very	0%	6%	25%	38%	0%	0%
Obligated to take corrective action ***						
% Not Obligated	0%	6%	75%	38%	17%	8%
% Undecided	6%	0%	13%	25%	0%	8%
% Obligated	94%	94%	13%	38%	83%	83%
Number of subjects	17	17	8	8	12	12

* Scale: Probable (1-3), Undecided (4), Improbable (5-7)
** Scale: Very important (1-3), Undecided (4), Not Very Important (5-7)
*** Scale reversed: Not Obligated (1-3), Undecided (4), Obligated (5-7)

TABLE 2

Comparison of average student with average teacher associative networks

	Scenario 1		***Scenario 2***		***Scenario 3***	
	Before	***After***	***Before***	***After***	***Before***	***After***
Number of common links	3	5	8	7	3	5
Expected common links	2.6	2.6	4.1	4.4	3.4	2.8
Tail Probability	0.494	0.069	0.015	0.095	0.717	0.107