The Effects of Teaching the Universality Thesis on Students’ Integrative Complexity of Thought

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ABSTRACT

The explosion in the use of computers has strengthened the need to address ethical issues in information systems (IS) education, and several frameworks have been expounded. However, little empirical research has been undertaken on their effects. This is a key problem: If IS scholars do not study the effect of information systems on IS students, IS ethics education suffers. This could mean that future professionals will neglect morally significant issues in their work. We carried out an interpretive empirical study on the effects and implications of an education program based on three theories of universality. The theory of integrative complexity was applied to see if the level of complexity of thought increased owing to a theory-based IS ethics teaching intervention. This intervention was based on pre-then-post testing with two groups, the experimental group receiving instruction in three versions of universality (n=79), and the control group (n=16). Our results show that the change in integrative complexity varied significantly between the two groups, with the experimental group making significant progress compared to the control group. The application of the universality thesis had a positive effect on deliberation skills among 43 percent of the experimental group. These results carry implications for IS education and research.

Keywords: Ethics, Student research, Learning goals & outcomes, Critical thinking

1. INTRODUCTION

The importance of providing IS users and professionals with a proper knowledge of ethics has been increasingly recognized. This is evident from the large number of frameworks for IS ethics education proposed by scholars (e.g., Kallman & Grillo, 1996; Maner, 1980; Martin & Huff, 1997; Tavani, 2001; Siponen and Vartiainen 2002; Vartiainen and Siponen 2010) and professional organizations such as ACM and IEEE. One of the main elements of these frameworks is the utilization of relevant theories of ethics. Although it is worthwhile to construct conceptual-analytical IS ethics frameworks (cf. Hare, 1981), there is an equal need for empirical research, specifically on the effects and implications of ethics theory when used in an IS context. In particular, it would be useful to know how students experience such theories, and what effect they have on their thinking and the development of their moral reasoning. This should confirm the practical value of the frameworks, which of course should be the ultimate goal of the training programs. Unfortunately, we find no IS studies that have studied the effects of theories of ethics on students’ thinking. As a step towards remedying this gap in the literature, we test the effects of an education program based on the universality thesis. By teaching the universality thesis, we aim to encourage students to acquire more diverse viewpoints on ethical issues and thereby to develop them in reasoning in moral conflicts. Therefore, we assess the effects of three versions of the universality thesis on students’ thinking in terms of integrative complexity (Suedfeld, Tetlock & Streufert, 1992), which represents individuals’ cognitive styles and different ways of processing information. Integrative complexity is an established social science measurement tool, used to measure the effect of education in social and personality psychology, in addition to attitude change (e.g., Conway et al. 2008; Winter, 2007). In our study, we assess whether students progress in terms of integrative complexity during the educational intervention.
Our study is a continuation of our efforts to develop ethics teaching in IS education using the approach of empirical research (e.g., Vartiainen and Siponen 2010 on students’ intention to use theories of ethics).

This paper is organized as follows. The second section presents the theoretical framework, and the third considers the research methods used. The results are presented in the fourth section, and their limitations and significance are discussed in the fifth. The final section reiterates the key findings.

2. THEORETICAL FRAMEWORK

The theoretical framework of this study is twofold. First, given that in one study we are only able to test a limited number of theories, we first discuss the rationalizations as to why we selected the universality thesis to constitute the substance of the teaching intervention. To be more precise, we introduced three versions of this thesis to students during an IS ethics educational intervention program. Second, we applied the theory of integrative complexity in order to assess whether IS ethics teaching based on the three universality theories positively modified complexity of thought. The three theories are discussed next.

2.1 Three aspects of the universality thesis

There are several alternative theories of ethics, including utilitarianism (Bentham, 1876; Mill, 1895), universal prescriptivism (Hare, 1981), Kant’s theory (1993), intuitionism (Moore, 1966; Ross, 1930), and the theory of information ethics (Floridi, 1999). A common element is the so-called universality thesis. Hare (1981) defines this doctrine as follows:

“If one judges that one’s action in a particular situation is right, one must then acknowledge that a similar act by anybody else in a similar situation would also be right.”

The different versions of the universality thesis form the core element in Confucianism (Hansen, 1991), Judeo-Christian ethics (Outga, 1972), Kant’s theory (1993), Mackie’s theory (1981), Rawls’ theory of justice (Rawls, 1971; Kukathas & Pettit, 1990), and universal prescriptivism (Hare, 1981), for example. There are a number of reasons why the thesis is applicable to IS ethics teaching. First, in terms of offering indoctrination-free education, an ideal IS ethics curriculum would introduce all key theories of ethics to the students. This may be difficult to implement in practice, however, given the restricted teaching resources. For example, if ethics is just one element in a course, there will be limited time, or the teachers may not have sufficient knowledge in the field of moral philosophy to cover all of the theories. It has been argued that the universality thesis is appropriate in such situations because it is fairly simple and familiar (Siponen & Vartiainen, 2002). Second, according to Kohlberg’s theory of Cognitive Moral Development, moral decision-making and a universal universality thesis represents the highest stage of moral development.

We chose the following three versions of the thesis so as to offer students enough variety without overburdening them: the Golden Rule, Mackie’s universality theory (Mackie, 1981), and Rawls’ (1971) veil of ignorance. While other theories, like utilitarianism, can also be used to form an IS ethics education framework, we leave the examination of other theories for future research. Each of those mentioned is briefly outlined next.

The first version, the Golden Rule, is found in several religious doctrines, including the Judeo-Christian tradition, Buddhism, Islam, Zoroastrianism, and Confucianism. According to the Golden Rule, “One ought to treat others as one would wish them to treat oneself” (Hare, 1981).

Secondly, we focus on the third stage of Mackie’s (1981) universality thesis. The first stage ensures that irrelevant details such as references to persons, groups, gender, nations, professions and skin color do not obscure moral thinking. If we use a name as a constant (and not as a variable) in a judgment such as “If John uses Microsoft’s software he ought to...” we have not reached the first stage of universality, whereas “If a user uses the software of a software developer he ought to...” would pass the first stage. The same idea is present in Hare’s (1981) and Rawls’ (1971) theories as well. The second stage requires us to put ourselves in other people’s shoes. In the case of the unauthorized copying of software, in accordance with Mackie’s second stage we would ask ourselves, If we were the software developer, would we like it if someone copied our software without paying the fee? The third stage, which incorporates the first and second stages, states that we should also take into account other people’s preferences, values, and ideals as well as our own – all these at the same time – when making moral judgments (Mackie, 1981, p. 93). In the case of copying software, we should take the viewpoint of each party (e.g., users, software providers) and ask if unauthorized copying should be allowed.

The third version of the universality thesis is Rawls’ (1971) concept of the veil of ignorance, which is the key element in his theory of justice and seeks to guarantee fair and just treatment for all members of society. It is applied in an imaginary negotiation for the purpose of achieving justice or equality in society. Behind the veil of ignorance, ideally, all negotiation partners are unaware of who they are, of their gender, preferences, profession, financial situation, status, and interests in society. According to Rawls, the process of deciding behind a veil of ignorance is fair and just because we are then forced to choose impartially (as we do not know who we are in society). However, the participants do know certain facts, such as inequalities. When the principles to be followed under the veil are decided, each participant has the right to veto an agreement. This protects the least advantaged parties (e.g., disabled people), because no one knows who s/he will be after the raising of the veil. Another aim of the concept is to resolve moral conflicts (Collins & Miller, 1992): an imaginary negotiation takes place behind the veil, during which the participants try to find a solution.

2.2 Integrative complexity of thought

We examined reasoning in moral conflicts in terms of integrative complexity, which represents individuals’ cognitive style and different ways of processing information (Suedfeld, Tetlock & Streufert, 1992). Inherent in the construct are two cognitive structural properties, differentiation and integration. Differentiation refers to the number of characteristics or dimensions of a problem that an individual takes into account, whereas integration refers to
the development of complex connections among differentiated characteristics (Schroder, 1971; Suedfeld, Tetlock & Streufert, 1992). Integrative complexity belongs to the cognitive complexity approaches which emphasize structure of thought rather than its content. It is related both conceptually and empirically to cognitive developmental theories, like Kohlberg’s (1984) theory of moral judgment development deVries & Walker, 1986; Pratt et al. 1990). One of the typical characteristics of the cognitive developmental theories is that the developmental levels correlate positively with education (e.g. Rest, 1986; Pratt et al., 1991; Skoe & von der Lippe, 2002).

In terms of personality, integratively complex individuals have been found to be higher on openness and creativity than those who are less complex (Tetlock, Peterson & Berry, 1993). The evidence on age and gender differences in cognitive complexity is mixed, but it seems that integrative complexity is basically unrelated to age (e.g., Pratt et al., 1991) or gender (Suedfeld, Tetlock & Streufert, 1992).

Although highly complex thinking is sometimes more harmful than simple thinking, for instance in emergency situations (Schroder et al., 1967), it could be argued that more integratively complex decision-making strategies are more effective in situations in which people have to resolve a conflict between a moral and a non-moral value, or between two moral values (e.g., helping and obeying the law). For example, Myyry & Helkama (2007) found that respondents reporting real-life moral conflicts in which they took no heed of others’ viewpoints used less complex thinking than those reporting conflicts in which different viewpoints were represented by different persons in a way that made it difficult merely to comply with others’ opinions.

As mentioned earlier, in Kohlberg’s theory of moral judgment the highest level involves applying universal moral principles in making moral judgments. However, Kohlberg’s moral judgment levels are usually measured by standard hypothetical dilemmas which are not particularly relevant to assess ethical decision-making in the IS context. Integrative complexity, on the other hand, can be scored from a variety of written materials. Thus, it is more content-free than Kohlberg’s theory. For this reason, we adopted the integrative complexity scoring system in our study.

The aim of the present study is to examine the impact of an educational program based on three versions of the universality thesis on students’ reasoning in moral conflicts. We took two groups, the experimental and the control group. Given the empirical evidence discussed above we hypothesized that:

H1: The experimental group will progress more than the control group in integrative complexity over the course of the educational program

3. RESEARCH DESIGN

3.1 Research subjects, teaching intervention, and data gathering

The study focused on two groups in a pre-then-post research setting: the experimental group and the control group. The experimental group received instruction based on the universality thesis, and the control group received no instruction. Both groups were given exactly the same pre-then-post tests.

3.1.1 The experimental group and the teaching intervention: The subjects selected for this group were students in the Knowledge Work and Necessary Equipment course at the University of Jyväskylä, Finland. The intervention covered two courses, the first of which was held in November 2001 and was designed for first-year students, and the second of which was held in January 2002 for open-university students. Forty-one students from the first course and 38 students from the second one responded to both the pre- and post-testing (n=79 students).

First, the students took a pre-test (before the IS ethics intervention). It comprised two ethical dilemmas (Figures 1 and 2), and the students were asked to explain how they would resolve them. We asked them in particular to explain the rationalization and justification behind their answers. Then later, as the actual intervention, the respondents were given a two-hour lecture on IS ethics covering the three versions of the universality thesis discussed in the second section, with a demonstration of how they could be applied. Finally, as a post-test after the intervention, the respondents were asked to apply these universality theories to the resolution of a moral conflict concerning the same cases they had resolved before the lecture using their own knowledge. In other words, as mentioned above, the same two problems were used in the pre- and post-tests. In addition, in the post-test the respondents were asked to “solve the problems by using any of the universality theories presented during the lecture when you deliberate on how you should act.” We asked them to justify their resolutions of the problems, and to state whether the universality thesis had helped them to resolve the moral conflicts, and what they felt about the application. The students were requested to send their responses to the researcher, after which they would be given two study points for completing the course. The duration between the pre and post-tests was three months.

The students were given the following problems in the pre-test:

“You own expensive word-processing software, which you use in your home computer to do academic exercises and for writing letters/word processing. Your friend asks you to lend him/her the installation diskette of a text-processing software program so that s/he could install it in his/her own computer. S/he tells you that s/he can never use the university computers because they are usually occupied, and that if s/he does not get the program soon s/he will not be able to finish the exercise in time and will therefore be unable to pass the course. It states in the manual of the software in question that unauthorized copying is strictly forbidden.”

“You spend a lot of time in an Internet chat room. You have discussed a lot, and you have gotten to know three people: A, B, and C. You have never met them in person, but you have discussed very personal matters with them. Recently you discussed personal matters with A. However, A’s posts are contradictory, and this makes you wonder whether he/she has told you the truth on certain matters. A reveals that the real A is totally different from the one B and C know. When you realize
this you are very disappointed. You know that B and C would be very disappointed as well if they knew the truth. However, A writes to you that you should not tell the truth to B and C.”

In addition to the three versions of the universality thesis, the lecture (IS ethics intervention) covered Johnson’s (1997) article on ethics on-line, the concept of the moral vacuum (the inability to extend moral deliberation to the area of computing, amorality in the area of computing) and the relationship between norms, laws, and codes of ethics. There was also a general discussion on moral conflicts in computing, and an interactive exercise during which computer-use-related acts were presented and analyzed from the perspectives of law and ethics.

The students were presented with the same problems in the post-test, but were given the following task: “Try to resolve the situation using any of the universality theories in your deliberations. Give arguments for your resolution.”

Furthermore, students were asked if the application of the universality thesis helped in solving the moral problem (usefulness of universality thesis), as follows: “Describe whether the universality thesis helped in solving the moral problem. If yes, how? If not, why not?”

3.1.2 The control group: The members of the control group (n=16) did not receive any instruction. However, both the pre-test and the post-test were exactly the same as for the experimental group (see Figures 1 and 2), except that the students were given the following explanation of the universality thesis: “The universality thesis refers to generalizability: what is right/wrong for me in a certain situation has to be right/wrong for you in the same situation.”

The populations of the experimental and control groups were similar in that they were all students, and the time between the pre- and post-interventions was the same. The data from the control group was gathered from two populations: the first during late 2008 and the second during summer 2009. Finally, the data-collection procedures were the same for both groups. Hence, as mentioned above, the only difference between them was that the experimental group received IS ethics instruction based on the universality thesis and the control group received none.

3.2 Research Method Used: Complexity Scoring
A certified scorer, who has obtained 0.93 reliability with an expert scorer from University of British Columbia, scored all the protocols according to the integrative complexity scoring manual (Baker-Brown et al., 1992), blind to the data. The scores ranged from one to seven, with one representing the absence of differentiation and integration, three representing moderate or high differentiation but no integration, five representing moderate or high differentiation and moderate integration, and seven representing high differentiation and high integration. Scores of two, four, and six represented transitional levels of differentiation and integration. Global scores for integrative complexity across cases (i.e., summing score for case 1 and case 2 divided by two) were formed for each respondent for pre- and posttest separately.

4. RESULTS: THE INTEGRATIVE COMPLEXITY OF THOUGHT
The integrative complexity scores for the experimental group ranged from one to 5.5 in the pre-test and from one to five in the post-test, whereas for the control group the ranges were 1-4 and 1-3.5, respectively. In Tables 1 and 2, examples of the integrative complexity scores are presented. The responses that attained a score of 1 represent simple black and white, good or bad thoughts; here, other viewpoints are categorically rejected and no ambiguity is tolerated (“It is so common to copy programs and people are used to it, and don’t get caught”). A score of 2 represents the transitional level between 1 and 3, with emerging awareness of differentiation (“I don’t believe the company that made the program incurs big loss”). Score 3 represents clear differentiation, where the stimulus is perceived in at least two distinct ways that are considered relevant and justifiable ("How I act depends on whose place I imagine myself in"). A score of 4 represents the transition between differentiation and integration, including emerging awareness of connectedness between the alternatives (“At this stage we already face conflicting interests.”). A score of 5 represents integration, where alternative perspectives or dimensions are not only held in focus simultaneously, but are further combined to produce a result that none of them could have produced alone ("I might end up with the solution in which I would let my pal do his/her job with my PC, in order to get the course finished in time. After that, my friend could gradually acquire money to program his/her own"). Beyond this point, a score of 6 represents generating an overarching principle or perspective pertaining to the nature of the relationship or connectedness between alternatives ("This is not much different from real life. You always start with not mentioning your weaknesses, or leave them for others to find out, because it is easier to suffer others’ weaknesses once you are acquainted with all the strengths. Life is a game"). There were only two responses that received a score of 6 in the data, and no response received a score of 7.

Table 3 shows the means and standard deviations of the scores for both groups in the pre- and post-test. The control group had slightly higher scores on the pre-test, but the difference was not significant (t(93)=−0.197, ns). The increase in the experimental group’s mean scores from the pre-test to the post-test was significant (t(78)=−3.734, p=0.000), whereas the control group’s mean scores declined significantly (t(15)=2.449, p=0.027). A between-group analysis of covariance was conducted on the change in the integrative complexity score with the pre-test score as a covariate: the change varied significantly between the experimental group and the control group (F(1, 92)=12.721, p=0.001), indicating that the former made significantly more progress than the latter.

Table 4 shows the regression and progression trends in both the experimental and the control groups. Although 14 percent of the respondents from the experimental group regressed more than half a point on complexity, three times as many (43 percent) made progress between the pre-test and the post-test. The same number of respondents remained on approximately the same level. Of the control group, one-third regressed more than half a point, nearly two-thirds
showed no change, and only one person progressed more than half a point.

Examples of responses for the categories of regression, no change, and progression are presented in Table 5. In the case of regression, in Time 1 the respondent almost recognizes that there might be different viewpoints on the matter (a pal may reciprocate the favor; there would be some but not exorbitant harm: score 2). In Time 2 the respondent only invokes the Golden Rule: one ought to treat others as one would wish them to treat oneself (score 1). In the no-change situation in Time 1 the respondent recognizes that there is a possibility that the others will not say who they really are (score 2). In Time 2 she/he invokes the Veil of Ignorance and the Golden Rule, but does not elaborate her/his main point any further. All would probably agree to disclose their identities (score 2). In the case of progress, in Time 1 the respondent takes a critical view of chatting and does not think different viewpoints are relevant (score 1). In Time 2 she/he takes the standpoint of B and C and perceives different aspects of the situation (disappointment at being cheated, and a possible conflict if you have promised A not to tell others about her/him: score 3).

| Score 1 | I would let my friend install the program. I believe he wouldn’t need to explain it to me, because it is so common to copy programs and people are used to it, and don’t get caught. |
| Score 2 | I would probably loan the software. At least my friend has good grounds for using it. And if he only installs it without making a copy of the software, I don’t believe the company that made the program incurs a big loss. Particularly if my friend wouldn’t buy it anyway. |
| Score 3 | Let’s apply the Golden Rule. How I act depends on whose place I imagine myself in. If I imagine I’m my friend, I let him/her install the program, because he/she wants it (otherwise he/she wouldn’t have asked, I guess), but if I imagine I’m the person who made the program, I don’t give my friend the disk, because then the programmer is deprived of his/her reward for the work he/she has done. |
| Score 4 | The Golden Rule: “Do unto others as you would have others do unto you.” Would I want my friend to let me install the word processing software in my machine? I would, especially if finishing my studies would depend on it. Would I want my friend to help and urge me to do the wrong thing? No, I wouldn’t want that. At this stage, we already face conflicting interests. Getting the software cheaply versus doing the wrong thing. If I were the person who designed the software, would I want my friends to illegally copy my software? No. I would want people to do the right thing, and I would get the recompense I deserve for my design and others’ use of the program. And last of all would I want people to perpetrate illegal acts because of me. |
| Score 5 | If I use Rawls’s veil of ignorance and attempt to find a solution that would be satisfactory to me, my pal, and the programmer, I might end up with the solution in which I would let my pal do his/her work with my PC in order to get the course finished in time. After that, my friend could gradually acquire money for software of his/her own. In this way, I would keep my pal and not fall into piracy. |

<table>
<thead>
<tr>
<th>The first problem case</th>
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<tbody>
<tr>
<td>Score</td>
</tr>
<tr>
<td>Score 2</td>
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<tr>
<td>Score 3</td>
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<tr>
<td>Score 4</td>
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</tbody>
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Table 1. Examples of the scores of integrative complexity (scores 1 to 5)

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<th>The first problem case</th>
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<tbody>
<tr>
<td>Score</td>
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<tr>
<td>Score 3</td>
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<td>Score 4</td>
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</tbody>
</table>

Table 2. Examples of the scores of integrative complexity (score 6)
Table 3. Means and standard deviations of the integrative complexity score in the pre- and post-test.

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
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</thead>
<tbody>
<tr>
<td><strong>Experimental group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.11</td>
<td>2.59</td>
</tr>
<tr>
<td>SD</td>
<td>0.92</td>
<td>1.09</td>
</tr>
<tr>
<td>N</td>
<td>79</td>
<td>79</td>
</tr>
<tr>
<td><strong>Control group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.16</td>
<td>1.66</td>
</tr>
<tr>
<td>SD</td>
<td>0.79</td>
<td>0.76</td>
</tr>
<tr>
<td>N</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 4. Percentage regression and progression (more than half a point) in integrative complexity from the pre-test to the post-test

<table>
<thead>
<tr>
<th></th>
<th>Regression</th>
<th>No change</th>
<th>Progress</th>
<th>n</th>
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<tbody>
<tr>
<td><strong>Experimental group</strong></td>
<td>14%</td>
<td>43%</td>
<td>43%</td>
<td>79</td>
</tr>
<tr>
<td><strong>Control group</strong></td>
<td>31%</td>
<td>63%</td>
<td>6%</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 5. Examples of integrative complexity scoring in the case of regression, no change and progress

<table>
<thead>
<tr>
<th></th>
<th>Time 1</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>“I’d give the software but the decision has nothing to do with being in a hurry. I regard it as a favor to a pal, which will probably be returned in some form. Anyway, the program would not be distributed to a wider circle, nor would the harm be exorbitant, because I would get it back right away and the program would not be disseminated more widely.” Score 2</td>
<td>“Universality theory 1 (the Golden Rule) in a positive form applies here. I’d want to get it copied for me, too.” Score 1</td>
</tr>
<tr>
<td>No change</td>
<td>“In case 2 I would tell my new friends, perhaps they would also say if they really were who they said they were.” Score 2</td>
<td>“In case 2 we have a more difficult situation. In this case I’d apply the Rawlsian Veil of Ignorance. Behind the veil we would agree on the principles and then disclose the real identities. Probably they would all agree to tell each other in this kind of case, if you know that someone is lying. The Golden Rule also applies here. I’d report it because I would want to be told.” Score 2</td>
</tr>
<tr>
<td>Progress</td>
<td>“I don’t believe I’d report it. In general it’s ridiculous to lie in the IRC or somewhere that you are [someone else, e.g. a famous movie star, for there’s always a risk that you will be found out, if you make an appointment for instance. Then whoever shows up turns out to be [an ordinary student]. I don’t take chats so seriously myself. Of course I try not to offend others and appear as myself.” Score 1</td>
<td>“Universality theory 1: Golden Rule, positive version. I would perhaps be somewhat disappointed if I were in B/C’s shoes and found out later about A, particularly if I’d had more to do with A. In other words, I’d mention this to others. But, on the other hand, in that case you have to refrain from promising anything to A (otherwise you’d have a conflict situation there).” Score 3</td>
</tr>
</tbody>
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5. DISCUSSION

The purpose of this study was to assess the impact of an educational program based on three versions of the universality thesis on students' reasoning in moral conflicts. We examined their reasoning in terms of integrative complexity, which represents individual cognitive styles and different ways of processing information (Suedfeld, Tetlock & Streufert, 1992). As an experimental group, we had 79 students from two courses that included a two-hour lecture on IS ethics. The students were given two moral conflicts concerning computer ethics and interpersonal relationships before and after the lecture. In the post-test they were asked to apply the universality thesis presented in the lecture to the resolution of the conflicts. The control group, 16 students, had slightly higher complexity scores in the pre-test than the experimental group. However, the increase in the
recommendation: Longer and stronger ethics instruction is needed

Our results revealed that students receiving instruction on the universality thesis regressed, stayed at the same level, or
progressed in terms of complexity of thought. A reduced complexity score could be attributable to a general lack of motivation to take the same test twice. Regression has also been found in studies on the development of moral sensitivity (Clarkeburn, 2002; Myyry & Helkama, 2002). The reason for staying on the same level from the pre-test to the post-test may be that the intervention was not strong enough to cause changes in some of the respondents’ thinking. Research in the domain of moral development has revealed that professional ethics programs lasting longer than a few weeks and emphasizing dilemma discussions are effective in promoting moral-reasoning skills (for reviews see e.g., Rest, 1986; Bebeau, 2002). The findings of Vartiainen and Siponen (2010) suggest that students might internalize theories of ethics better if they used them repeatedly. Therefore, stronger and longer intervention might prompt repeated use of the universality thesis, along with dilemma discussions in successive courses, for example. The effects of such interventions on students’ complexity of thought should be studied.

**Recommendation 3: Explicate the appropriate use of the universality thesis**

We found that 39.2 percent of the respondents used the universality thesis, the Golden Rule in particular, in an inadequate manner in solving the first problem. They used it to pay lip service to their earlier (pre-test) view, and/or only considered one party, often their friend in the first problem, while failing to recognize the interests of the other party (e.g., the developers of the software). Thus, special attention should be given to explicating the appropriate use of the universality thesis in IS ethics education.

The following recommendations for IS research arise from the study.

**Recommendation 1: Research on the effects of ethics education on real-life behavior**

In the domain of moral research, findings concerning the relationship between actual and hypothetical behavior are mixed. For instance, in the context of impaired driving, respondents behave less morally in reality than they indicate they would do hypothetically (Denton & Krebs, 1990). However, in the business context, respondents in a real decision-making situation made more moral choices than respondents in a hypothetical setting (Carpendale & Krebs, 1995). More recently, Valdesolo and DeSteno (2007) produced evidence that individuals evaluate their own moral transgressions more favorably than the same transgressions committed by others, and Myyry et al. (2009) found that respondents’ hypothetical behavioral choices in the case of giving their password to colleagues were more convergent with information-security regulation than their own behavioral choices. Thus, the effects of ethics education (e.g., teaching the universality thesis) on students’ real-life behavior should be studied. To be more precise, issues worth future research include questions such as whether students apply theories of ethics in real-life situations, and what kind of teaching interventions would have the strongest effect on their moral behavior.

**Recommendation 2: Understanding the selection and application of the universality thesis**

Forms of the universality thesis differ in terms of how exhaustive a thinking process they require; compare the use of the Golden Rule and Rawls’ veil of ignorance, for example. There is thus a need for further studies on the choice of theory and on what characterizes the application process. This information might reveal factors that affect the selection process and potential mistakes in the application of the thesis, for example. Given that students’ different learning styles (e.g., visual, social, logical, and verbal) may also affect these selection and application processes, their roles should be studied.

**Recommendation 3: Integrating the universality thesis into the discussion on dilemmas**

Dilemma discussions have a positive effect on the development of students’ moral reasoning (Rest, 1994). The effect of integrating the teaching of the universality thesis into such discussions should be assessed in order to find out if it also has a positive influence. This kind of study could be realized through an educational program featuring pre-then-post testing with experimental and control groups.

**Recommendation 4: Study the effects of other theories of ethics and other affecting factors on the complexity of thought in ethics education**

The effects of teaching other theories of ethics (e.g., Kantian ethics, utilitarianism, virtue ethics) on students’ complexity of thought should be studied. In cases in which students regress, stay at the same level, or progress, there might be other affecting factors such as age, gender, and personality type, all of which lead to different outcomes. Future research should investigate whether there are such factors, and if so how they might give valuable information in terms of developing ethics education programs.

**Recommendation 5: Understanding the role of learning environments and theories of learning in IS ethics education**

Different learning environments such as e-learning, project-based learning, face-to-face instruction, and blended learning (mixing learning environments, methods, and techniques), and different theories of learning such as cognitivism and constructivism, offer different starting points for IS ethics education. Therefore, future studies should seek to establish what kind of learning environments and theories most efficiently support students’ moral development. They should also identify the strengths and weaknesses of the different environments and theories.

**6. CONCLUSIONS**

The explosion in the use of computers has strengthened the need to address ethical issues in information systems (IS) education. As a result, several frameworks for IS ethics education have been expounded. At the same time, it has been argued that existing theories of ethics are inadequate in this context. However, little empirical research has been undertaken on the effects of such IS ethics frameworks in practice. This is a key problem: if IS scholars do not study the effect of ethics education on IS students, the education suffers, which could mean that the knowledge and competence of future professionals will suffer. In order to
improve this situation, we carried out an interpretive empirical study (n=79) on the effects of an education program based on three theories of universality. This educational intervention was based on pre-then-post testing with two groups, the experimental group receiving the universality-thesis-based education and the control group. The results suggest that the students mostly perceived the theories as useful, and that they had a positive effect on their thinking. The application of the universality thesis had a positive effect on the deliberation skills with regard to moral conflicts among 46 percent of the respondents, and 76 percent considered it useful for resolving moral problems. The Golden Rule, one version of the thesis, was found to be particularly open to misinterpretation. On the basis of these findings, we offer the following recommendations for IS educators. Longer and stronger teaching inventions are needed in order to guarantee the development of students’ moral reasoning. In addition, the appropriate use of the thesis should be explained in order to avoid mistakes and bias in its application. In terms of future research on IS ethics education, we recommend studying the effects of ethics teaching on student’s real-life behavior, with a view toward determining what kind of teaching would have a positive effect. In addition, the process of selecting the type of universality thesis and its application should be better understood, and its integration into dilemma discussions should be tested. The effects of teaching other theories of ethics (e.g., utilitarianism) should also be studied. Finally, there is a need for research on the role of learning environments (e.g., e-learning, project-based learning) and theories of learning (e.g., constructivism).

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