

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

Tero Vartiainen

Mikko Siponen

Department of Information Processing Science

University of Oulu

Oulu, Finland

tero.vartiainen@oulu.fi

Liisa Myyry

Department of Social Research

University of Helsinki

Helsinki, Finland

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 à la 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 its 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).

	The first problem case
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 least 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 1. Examples of the scores of integrative complexity (scores 1 to 5)

	The first problem case
Score 6	<p>I wouldn't inform B or C, but I wouldn't continue discussing it with A either. If A wanted to meet B or C, I would perhaps need to drop a hint to them as to A's real self. Also, in case B or C were very interested in A, I would let them know, gently and insinuatingly, of A's disclosures. If talk went on in a light manner (talking about everyday matters), I wouldn't see any reason why A's disclosures should be made public. In this way, I wouldn't offend anyone, including A, who asked me not to tell. What B and C do not know does not offend them. However, if I decided, for one reason or another, that B and C should be told the truth, I would just guide them to the right track. In this way, I wouldn't betray A's trust, because I haven't disclosed his/her private information. All in all, this issue would be a difficult one to decide, and would be influenced by many factors. In case someone else could be offended, it would good to bring forth the truth, but otherwise there would be no point in offending anybody any more. I would also let A know that if he/she goes on lying, then I would disclose the information about him/her.</p> <p>One of the "good" things about the internet is that anybody is able form a new personality and lead the life of the person he/she would like to be. People's real selves and names are not required. Perhaps one attempts through this kind of "artificial self" to compensate for one's deficiencies and raise one's self-regard. However, lies have short wings, and if the individual wants something beyond chatting (for instance a meeting), the truth would be revealed very quickly. Accordingly, those who present themselves untruthfully have to be satisfied with writing to others, and thus cannot offend anybody, because nobody will find out the truth except if they disclose the truth about themselves. Those who want something beyond writing are perhaps forced to present themselves more truthfully to make it possible to, e.g., see the pen pal. On the other hand, people always attempt to embellish their traits, extenuate or be evasive or leave out something, to give a better and more interesting impression of themselves. This is not very 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 deal with others' weaknesses once you are acquainted with all of their strengths. Life is a game.</p>

Table 2. Examples of the scores of integrative complexity (score 6)

	Pre-test	Post-test
Experimental group		
M	2.11	2.59
SD	0.92	1.09
N	79	79
Control group		
M	2.16	1.66
SD	0.79	0.76
N	16	16

Table 3. Means and standard deviations of the integrative complexity score in the pre- and post-test.

	Regression	No change	Progress	n
Experimental group	14%	43%	43%	79
Control group	31%	63%	6%	16

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

	Time 1	Time 2
Regression	“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	“Universality theory 1 (the Golden Rule) in a positive form applies here. I’d want to get it copied for me, too.” Score 1.
No change	“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	“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.
Progress	“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	“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

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

Taken the question on usefulness of universality thesis presented to the subjects of experimental group, 75.9% of them described in their responses that they were useful. Next, two extracts follow that represent the perceived usefulness and uselessness, respectively, of the universality thesis:

“It helped in the sense that I thought more specifically about how I would act in more general settings, but it did not change my grounds for my presumed method of action.”

“It is hard to understand the universality-thesis. I solved the cases in accordance with my own perceptions of right and wrong.”

To summarize our findings, the hypothesis “The experimental group will progress more than the control group in integrative complexity over the course of the educational program” was supported.

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

experimental group's mean scores from the pre-test to the post-test was significant, whereas the control group's mean scores declined. Moreover, compared to the control group, the experimental group's mean score on integrative complexity increased significantly from the pre-test to the post-test: although 14 percent of the respondents regressed more than half a point on complexity, three times as many (43%) made progress. The same number of respondents remained on approximately the same level. From the control group, one-third regressed more than half a point, nearly two-thirds showed no change in the level of complexity, and only one progressed more than half a point. These results corroborate previous findings indicating that instruction may prompt complexity (Hunsberger et al., 1992). However, it seems that, with regard to reasoning in moral conflicts, it is essential to have discussions and demonstrations of how to apply the ethical concepts. In sum, these results support the use of the chosen versions of the universality thesis in IS ethics education, as does the fact that 75.9 percent of the experimental group perceived the use of the thesis as useful.

5.1 Limitations of the study

This study carries the typical limitations. As in all qualitative studies, the validity of the interpretation of the text is a concern. In order to minimize this concern with respect to the analysis of integrative complexity of thought, we used a certified coder. To be more precise, the protocols for moral conflicts were scored for integrative complexity by a coder with a 0.93 reliability rating with an expert coder from the University of British Columbia, according to the scoring manual (Baker-Brown et al., 1992).

Moreover, the critical reader may say that the measurement of pre- and post-test responses in paper format only captures superficial perceptions, and that face-to-face interviews would give a deeper understanding of the respondents' views. We disagree. Because we used written responses, the students had time to ponder their decisions. Here it is worth noting that the respondents' time frame was not limited. In the case of interviews, there is only a limited time in which to come up with answers. Higher complexity scores are usually obtained after some thinking and with few or no time constraints, whereas strict time limits and responses produced with little prior thought reduce the complexity. Furthermore, the empirical evidence suggests that people express their thoughts more clearly when they put them on paper (compared to responding in interviews). Thus, written materials tend to produce higher scores than oral material (Baker-Brown et al., 1992).

The third limitation is related to the fact that, because the respondents answered through email, their identities were not anonymous. This could mean that they did not answer as frankly as they might have done in an anonymous study, or that they tried to please the professors by putting extra effort into what they wrote. In order to minimize this effect, we used a control group, which also responded through email. In any case, the author who received the answers did not score the protocols according to integrative complexity, which was done by another author who was blinded to the identity of the respondents.

Fourthly, one could argue that the sample population of this type of study should comprise "real" IS or computing professionals rather than students. There are conflicting

views in the literature on whether the evaluations of students and "real professionals" ultimately differ (Barrier & Davis, 1994), but in our opinion the use of students was justified in this case. In other words, given that we are studying problems in IS ethics education at the university level, the students are the real population. The targets of IS ethics education at universities are not current employees of existing organizations but IS students and future professionals. If IS scholars do not study the effect of ethics education on their students, the education will suffer. This could have negative effects on the knowledge and competence of future professionals, who may not recognize morally significant issues in ISD, for example.

Fifthly, it could be argued that the post-test instruction to "solve the problems using any of the universality theories presented during the lecture" would influence the respondents' answers and thinking. Nevertheless, this method corresponds to the one used by Hunsberger et al. (1992) in terms of prompting the complexity of the experimental group — in other words, of those who received the instruction based on the universality thesis.

Finally, it could be argued that our control group was too small to derive statistically valid results. Although the experimental group and the control group indeed differed considerably in size, however, their variances did not differ significantly from each other (the Levene's test for equality of the error variances were $F(1,93)=0.59$, ns. for the pre-test score and $F(1,93)=3.74$, ns. for the post-test score). To test whether there was a difference between the experimental group and the control group in their progress in integrative complexity after the intervention, we conducted an analysis of covariance. Here, the difference between the post-test score was analyzed after the pre-test score was covariates, i.e., it was assumed that everyone had the same pre-test score. Nevertheless, the same result was obtained by using different methods, for instance, repeated measures of ANOVA ($F(1, 93)=10.49$, $p<.01$, $\eta^2=.10$); this is typically used when there are more than two repeated measures. We also calculated a difference score of the integrative complexity (the pre-test score – the post-test score; $M=0.49$, $Sd=1.16$ for the experimental group and $M=-.50$, $Sd=0.82$ for the control group). The T-test comparison of these two scores revealed a significant difference ($t(93)=3.24$, $p<.01$).

5.2 Implications for IS Ethics Education and Research

The following recommendations for IS ethics education arise from this study.

Recommendation 1: Integrate the universality thesis into the ethics course

Given that 43 percent of the students in the experimental group progressed in terms of integrative complexity of thought, it could be argued that the teaching of the universality thesis had a positive effect on their moral reasoning. In other words, those receiving the instruction perceived more characteristics or dimensions in the given case than those who did not.

Recommendation 2: 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 interventions 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).

7. ACKNOWLEDGEMENTS

We would like to thank Emeritus Professor Klaus Helkama (University of Helsinki) for his help.

8. REFERENCES

Baker-Brown, G., Ballard, E.J., Bluck, S., deVries, B., Suedfeld, P. & Tetlock, P.E. (1992) "The Conceptual/integrative Complexity Scoring Manual", in C.P. Smith (ed.) *Motivation and Personality: Handbook of Thematic Content Analyses*. New York: Cambridge University Press, pp. 401-418.

Barrier, T., Davis D.L. (1994) "Are Graduate Students Appropriate Research Surrogates for Managers in Evaluating New IS Technology? The Case of Intelligent Systems Users." *Journal of Computer Information Systems* 34.2 (Winter 1993-1994): 58-61.

Bebeau, M.J. (2002). The Defining Issues Test and the Four Component Model: Contributions to professional education. *Journal of Moral Education*, 31, 271-295.

Bentham, J., (1876), *An introduction to the principles of morals and legislation*, Clarendon Press, Oxford, UK.

Carpendale, J.I.M. & Krebs, D.L. (1995). "Variations in level of moral judgments as a function of type of dilemma and moral choice." *Journal of Personality*, 63, 289-313.

Clarkeburn, H. (2002). "A test for ethical sensitivity in sciences." *Journal of Moral Education*, 31, 439-454.

Collins, W.R., K.W. Miller (1992) "Paramedic Ethics for Computer Professionals", *Journal of Systems Software*,

(17) 1, 23-38.

Conway, I., Thoemmes, F., Allison, A.M., Towgood, K.H., Wagner, M.J., Davey, K., Salcido, A., Stovall, A.N., Dodds, D.P., Bongard, K., Conway, K.R. (2008) "Two Ways to Be Complex and Why They Matter: Implications for Attitude Strength and Lying." *Journal of Personality & Social Psychology* Nov2008, Vol. 95 Issue 5, p 1029-1044

Denton, K. & Krebs, K. (1990). "From the scene to the crime: The effect of alcohol and social context on moral judgment." *Journal of Personality and Social Psychology*, 59(2), 242-248.

Floridi, L. (1999), "Information Ethics: On the Philosophical Foundation of Computer Ethics" *Ethics and Information Technology*. Vol. 1, No. 1, 37-56.

Hansen, C., (1991) *Classical Chinese Ethics*. In Singer P. (Ed.) *Companion to Ethics*, Blackwell, Oxford, UK.

Hare, R. M., (1981), *Moral Thinking: Its Levels, Methods and Point*. Oxford University Press, UK.

Hunsberger, B., Lea, J., Pancer, S.M., Pratt, M. & McKenzie, B. (1992). "Making life complicated: Prompting the use of integratively complex thinking." *Journal of Personality*, 60, 95-114.

Johnson, D. 1997. "Ethics Online." *Communications of the ACM*, Vol. 40 (1), 60-65.

Kallman E.A, Grillo J.P., (1996), *Ethical Decision Making and Information Technology, An Introduction with Cases*, The McGraw-Hill Companies Inc, New York.

Kant I. (1993) *The Moral Law: Groundwork of the Metaphysic of Morals*, Routledg, London.

Kohlberg, L., (1981), *The Philosophy of Moral Development: Moral Stages and the Idea of Justice. Essays on Moral Development, Volume I. And Volume II: The Psychology of Moral Development: The Nature and Validity of Moral Stages*. Harper & Row, Publishers San Francisco. USA.

Kukathas, C. & Pettit, P., (1990), *Rawls - A Theory of Justice and its Critics*. Stanford University Press, California.

Mackie, J.L. (1981), *Ethics, Inventing Right and Wrong*, London, Penguin.

Maner, W., (1980), *Starter Kit on Teaching Computer Ethics*, Helvetia Press. USA.

Martin, C.D. & Huff, C.W. (1997) "A Conceptual and Pedagogical Framework for Teaching Ethics and Social Impact in Computer Science", *Proceedings of 27th Annual Frontiers in Education Conference: Teaching and Learning in an Era of Change*. Vol. 1, 1997.

Mill, J.S., (1895), *Utilitarianism*. Routledge, London, UK.

Moore, G.E., (1966), *The Ethics*. Second edition. Oxford University Press. UK.

Myrly, L. & Helkama, K. (2002). "The role of value priorities and professional ethics training in moral sensitivity." *Journal of Moral Education*, 31, 35-50.

Myrly, L. & Helkama, K. (2007). "Socio-cognitive conflict, emotions and complexity of thought in real-life morality." *Scandinavian Journal of Psychology*, 48, 247-259.

Myrly, L., Siponen, M., Pahlila, S., Vartiainen, T. & Vance, A. (2009). "What levels of moral reasoning and values explain adherence to information security policies?" *European Journal of Information Systems*, 18, 126-139.

Outga, G., (1972), *Agape: An Ethical Analysis*, Yale University Press.

Pratt, M.W., Diessner, R., Hunsberger, B., Pancer, S.M. & Savoy, K. (1991) "Four pathways in the analysis of adult development and aging: Comparing analyses of reasoning about personal-life dilemmas." *Psychology and Aging*, 6, 666-675.

Pratt, M.W., Pancer, M., Hunsberger, B. & Manchester, J. (1990). "Reasoning about the self and relationships in maturity: an integrative complexity analysis of individual differences." *Journal of Personality and Social Psychology*, 59, 575-581.

Rawls J. (1971) *A Theory of Justice*, London: Oxford University Press.

Rest, J.R. "Background: Theory and Research" In: *Moral Development in the Professions: Psychology and Applied Ethics* (Ed. Rest J.R., Narvaez D.), Lawrence Erlbaum Associates, UK, 1994.

Rest, J.R. (1986). *Moral Development. Advances in Research and Theory*. New York: Praeger.

Ross, D. (1930) *The Right and the Good*. Oxford, UK: Oxford University Press.

Schroder, H.M. (1971) Conceptual complexity and personality organization, In H.M. Schroder & P. Suedfeld (eds.) *Personality Theory and Information Processing*. New York: Ronal Press, pp. 240-273.

Schroder, H.M., Driver, M. & Streufert, S. (1967). *Human information processing*. New York: Holt, Rinehart & Winston.

Siponen, M.T. & Vartiainen, T., (2002): "Teaching End-User Ethics: Issues and a Solution Based on Universalizability", *Communications of the Association for Information Systems*, Volume 8, Article 29.

Skoe, E.E.A. & von der Lippe, A.L. (2002). "Ego development and the ethics of care and justice: The relation among them revisited." *Journal of Personality*, 70, 485-508.

Suedfeld, P., Tetlock, P.E. & Streufert, S. (1992) "Conceptual/integrative complexity" in C.P. Smith (ed) *Motivation and Personality: Handbook of Thematic Content Analyses*, New York: Cambridge University Press, pp. 393-400.

Tavani, H.T., (2001), "Curriculum issues and controversies in computer ethics instruction", *Proceedings of International Symposium on Technology and Society*, pp. 41-50.

Tetlock, P.E., Peterson, R.S. & Berry, J.M. (1993). "Flattering and unflattering personality portraits of integratively simple and complex managers." *Journal of Personality and Social Psychology*, 64, 500-511.

Valdesolo, P. & DeSteno, D. (2007). "Moral hypocrisy. Social groups and the flexibility of virtue." *Psychological Science*, 18(8), 689-690.

deVries, B. & Walker, L.J. (1986). "Moral reasoning and attitudes toward capital punishment." *Developmental Psychology*, 22, 509-513.

Vartiainen, T., Siponen, M. (2010) "On IS Students' Intentions to Use Theories of Ethics in Resolving Moral Conflicts." *Journal of Information Systems Education*. Volume 21, Number 1., 33-42.

Winter, D.G. (2007) "The Role of Motivation, Responsibility, and Integrative Complexity in Crisis Escalation: Comparative Studies of War and Peace Crises." *Journal of Personality & Social Psychology*

May2007, Vol. 92 Issue 5, 920-937.

AUTHOR BIOGRAPHIES

Tero Vartiainen is senior research fellow in the Department of Information Processing Science, University of Oulu, Finland. He is also adjunct professor in the Department of Computer Science and Information Systems, University of Jyväskylä, Finland, and lecturer (on leave) at the University of Turku, School of Economics, Finland. His research and teaching activities focus on computer ethics and project management. He has published articles in the *Journal of Information Systems Education*, *Communications of the Association for Information Systems*, and *The Information Systems Journal*. He is a member of an ethics work group with the Finnish Information Processing Association.

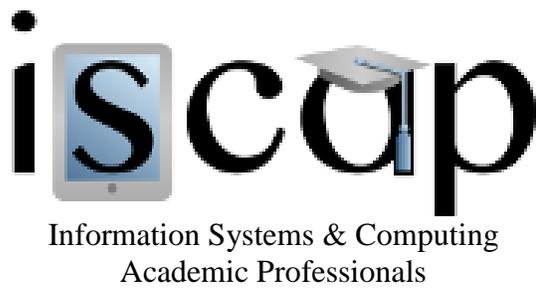


Mikko Siponen is a professor and director of the IS Security Research Centre in the Department of Information Processing Science at the University of Oulu, Finland. He is also vice-head of the department. He holds a PhD in philosophy from the University of Joensuu, Finland, and a PhD in Information Systems from the University of Oulu. His research interests include IS security, IS development, computer ethics, and philosophical aspects of IS. In addition to his over 60 conference and book articles, he has 38 published or forthcoming papers in journals such as *MIS Quarterly*, *Journal of the Association for Information Systems*, *European Journal of Information Systems*, *Information & Organization*, *Information Systems Journal*, *Information & Management*, *ACM Database*, *Communications of the ACM*, *IEEE Computer*, *IEEE IT Professional*, and *ACM Computers & Society*. He has received over \$6.4 million in research funding from corporations and numerous funding bodies. He has served as a senior and associate editor for *ICIS* and *ECIS*. He sits on the editorial boards of the *European Journal of Information Systems*, *Journal of Organizational and End User Computing*, and *Journal of Information Systems Security*.



Liisa Myyry is an adjunct professor in the Department of Social Research at the University of Helsinki, Finland. Her research interests include professional ethics, values, learning and ethical development. She has published articles in journals such as the *Journal of Moral Education*, *Scandinavian Journal of Psychology*, *European Journal of Information Systems*, *International Journal of Strategic Change Management*, and *Journal of Advanced Nursing*.





STATEMENT OF PEER REVIEW INTEGRITY

All papers published in the Journal of Information Systems Education have undergone rigorous peer review. This includes an initial editor screening and double-blind refereeing by three or more expert referees.

Copyright ©2011 by the Information Systems & Computing Academic Professionals, Inc. (ISCAP). Permission to make digital or hard copies of all or part of this journal for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial use. All copies must bear this notice and full citation. Permission from the Editor is required to post to servers, redistribute to lists, or utilize in a for-profit or commercial use. Permission requests should be sent to the Editor-in-Chief, Journal of Information Systems Education, editor@jise.org.

ISSN 1055-3096