AN INVESTIGATION OF AN UNDERGRADUATE COURSE MODULE ON THE ETHICAL ASPECTS OF INFORMATION SYSTEMS

by

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ABSTRACT

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An increased emphasis is being placed on ethics in Information Systems. An investigation of: the relevant literature which highlighted the growth of, and importance in understanding the moral philosophies which underlie Computer Ethics; and the official curricula recommendations that have increasingly and consistently recommended inclusion of courses describing the Social, Professional and Ethical responsibilities of Information Systems Professionals; and informed by the observations from two empirical Studies that showed the extent of unethical behaviour, and how this behaviour is diminished in those who have received formal tertiary level education resulted in a proposed new course module on Ethics in Information Systems. The module follows a sandwich-approach whereby two stand-alone modules are conducted on either side of integrated Computer Ethics content within the rest of the curriculum.

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NOTES

Computer Ethics and **Ethics in Information Systems** are used interchangeably throughout the thesis.

CS/IS is Computer Science / Information Systems

Part I

Preliminaries

Part I of this research introduces the research problem. This is accomplished by describing the research area, and showing how the research area relates to the research problem on a general level. This section also presents a summary of the results of the research, and explains the organisation of the thesis.

Chapter 1 Introduction to the Research

This Chapter introduces the research within the context of Ethics and Information Systems.

1.1 Introduction

This research investigates the problems within the Information Systems industry due to a lack of ethical awareness among its members and looks towards a means of increasing, or in some cases creating, this awareness. It aims to solve this problem by the addition of a course module on ethics into the Information Systems curriculum. The intention is to affect a change in the industry by ensuring that future graduates and professionals within the Industry are suitably educated and aware of the ethical dimensions that are involved in their work.

1.2 Research Context

Professor Martin Prozesky, the Director of the Unilever Centre for Comparative and Applied Ethics at the University of Natal, Pietermaritzburg is quoted as saying that

> *"nothing less than an ethical renaissance, a new surge of moral power, is now needed and that unless it happens there will be no general renaissance, least of all here in Africa. The reason is this: ethics, as the art of using power, freedom, information and above all conscience to live wisely and well, is to human life - and perhaps to all life on this planet - what the Nile is to Egypt: its very lifeblood. For just as the Nile gives life, beauty and value to the barren desert lands along its banks, so morality gives life and value to culture, to the worlds we make and remake."* (Prozesky 1999)

The author notes that Professor Prozesky specifically mentions that the use of "information" forms part of the art of ethics. This leads us to consider the ethics and

values that the people who purport to be the professionals in the Information discipline hold and aspire towards.

An ethical issue is said to arise whenever one party in pursuit of its goals, engages in behaviour that materially affects the ability of another party to pursue its goals. When the effect is helpful - good, right or just - we say the behaviour is praiseworthy or exemplary. When, however, the effect is harmful - bad, wrong or unjust - the behaviour is unethical (Mason 1995:55).

IS Professionals are involved in the effective analysis, design, construction, delivery, management and use of information and information technology in organisations and society. Consequently IS Professionals play an important role with regards to the information that is used to take decisions, and thus have a moral responsibility to ensure that the information for which they are responsible is accurate and is available to the appropriate people. IS Professionals may also hold highly responsible positions as developers of mission critical systems that probably involve human life and cost a fortune.

From an ethical perspective, developers have a professional duty to be honest in their representations about the capabilities of new information systems. Managing user expectation is a delicate balancing act, since there are dangers to both overselling and underselling technology. Overselling has negative ethical implications, but underselling can lead to immediate user rejection. The best approach is to strive for total honesty.

Information technology professionals should have a strong sense of professional responsibility and integrity. Management can encourage and support those instincts by adopting a professional code of ethics. (Johnson 1997 :60). Such a code can address issues of academic honesty, adherence to confidentiality agreements, data privacy, handling of human subjects, impartiality in data analysis and professional consulting, professional accountability, resolution of conflicts of interest and software piracy (Kock, Davison, Clarke, and Loch 2000:720). The negligent programming and design that resulted in the Y2K ‘bug’ has focused a spotlight on information technology professionals and their responsibility for technology products and services. Even more

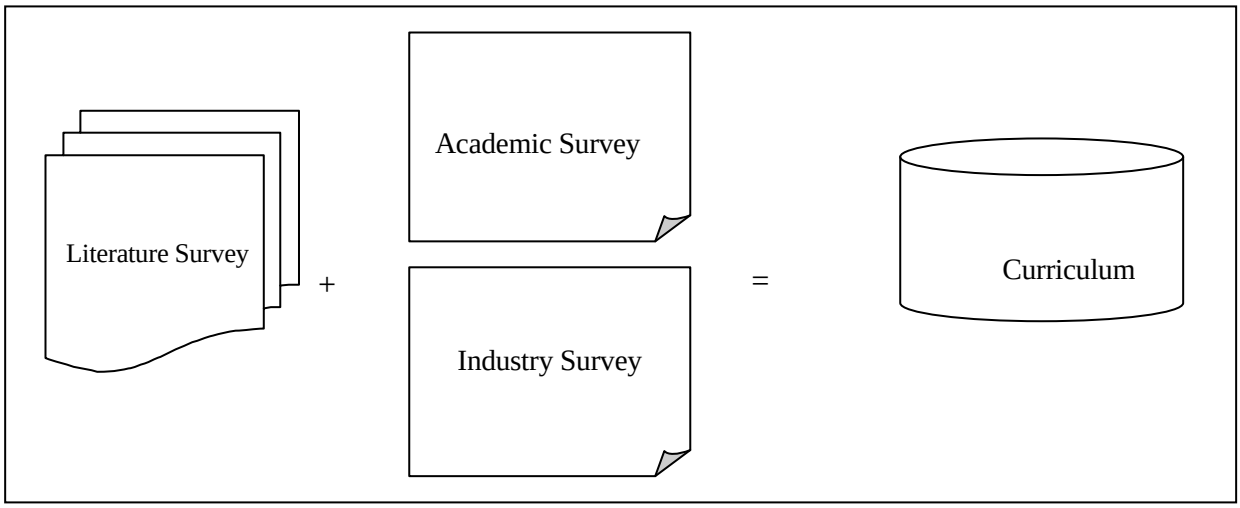
worrying is the lack of accountability that is forming part of the culture of the industry. Program errors are called “Computer Bugs”, essentially trying to shift the blame from the computer programmer to the computer itself.

In a global economy, corporate computer systems often interconnect across borders, introducing added complexity for local governments and legislatures. The explosion of the Internet into the workplace has created a global virtual morality unfettered by time and space. Globalisation forces companies to interconnect their computer systems to employees, suppliers, distributors and customers, creating an ethical chain that can reach around the world. As businesses become more dependent on this electronic lifeline, they encounter ethical moments of truth that will have a ripple effect - either positive or negative - throughout the chain. Advances in technologies such as the Internet create new spins on old issues such as privacy, intellectual property and standards of conduct. The geographically dispersed firms have the additional challenge of aligning corporate policies with accepted cultural practices in different parts of the world. These issues make it essential for today's businesses to view their information ethics policies from a global perspective. Business practices vary from country to country, which can create ethical conflicts for employees who possess differing attitudes towards privacy, property rights and general standards of conduct within this new technology-enabled world.

Technology affords numerous opportunities for acting unethically and, because of a lack of constraining parameters, unwittingly so. It is important therefore to make IS Professionals aware of the need to act ethically. Issues of piracy, systems failure, etc. indicate a prevalence of unethical behaviour within the industry. The author believes that one way to change the situation would be to find ways in which a course module in ethics in Information Systems can be included in the curricula for Information Systems.

It is imperative then, that students of Information Systems be exposed to the ethical issues within their discipline and be made aware of the various resources (such as the Code of Ethics of their Professional Bodies) available to them.

1.3 Research Methodology



The research is based on a literature survey, complemented by two separate but related empirical studies. The literature survey is aimed firstly at exploring Moral Philosophy and noting where the discipline of Ethics is placed, especially with regards to Computer Ethics. The literature review addresses the various ways in which a section on ethics can be included in a curriculum, drawing on official curricula and best practice, and determines which methods of teaching such a course module have proven to be successful.

The empirical studies take the form of a descriptive survey, during which information is gathered by means of structured interviews and questionnaires. Questionnaires were sent to, and returned by, the sample population. Please refer to Appendix C and Appendix D for a sample questionnaire outline. Heads of Departments of Information Systems and/or Computer Science, are asked what is currently being done by their department in terms of ethics and how it is included in the curriculum at present. The sample population for the questionnaire to Industry consists of members of the Computer Society of South Africa, and readers of ITWeb – a South African online IT magazine. The survey addresses whether their company has a policy on ethics and information technology and what kind of problems they have experienced in this area. It also specifically asks whether employers encounter problems with their new employees, specifically entry-level graduates in terms of their ethical behaviour. The results of the survey are used to inform the construction of a course module.

1.4 Summary of Results

Norman concludes his analysis of Moral Philosophy saying that "the main ethical traditions of previous centuries are still, in one incarnation or another, alive and well" (1995:591).

Computer Ethics has prompted a deeper philosophical debate and Information Ethics, as described by Floridi, offers the conceptual basis for further rigorous academic study, not only in Computer Ethics, but in Moral Philosophy as well. The future of Computer Ethics will be conjoined with Information Ethics, and Professionalism is no longer sufficient to justify or determine the solution to a Computer-Ethics problem. Therefore, grounding in Information Ethics will be essential as this will form the backbone of the future development of the discipline.

All of the official curricula recommendations are in agreement that between 16 and 35 hours of lecture time should be devoted to a 'Social and Professional issues course', which encompasses the ethical aspects associated with computers. Current work in South Africa was examined and issues of who should teach the course, and how the course is structured are examined. The de Ridder *et al* Algorithm was shown to be a useful tool in maximising coverage of Ethics in the curriculum whilst minimising overlap.

The survey to Industry concludes that if an individual received a high exposure to ethics, as it relates to IT, during their education, and works within an environment that promotes ethical behaviour and actively discourages unethical behaviour through the use of organisational policies or counselling, this combination will most likely result in limited future unethical behaviour from that individual.

The majority of institutions currently integrate Computer Ethics across the curriculum and across all years (but in varying degrees). Staff from their own computer science or information systems departments teach the course and do not require successful completion of the integrated or stand-alone course for degree purposes. It is felt that Computer Ethics should receive less attention than other topics in the curriculum. In terms of the 8 factors identified to be part of a Computer Ethics course, half of them are addressed by the majority of institutions at the first-year level and one of them is

addressed by the majority of institutions at the third-year level. At other levels all 8 are addressed by the minority of institutions except for two factors which are not addressed at all by any of the institutions at the second-year level. Just less than half the institutions are not doing any work in the area of Whistle-Blowing, whilst two-fifths are not looking at any of the issues related to Over/Under selling IT to internal/external clients. One third of institutions are not addressing the issue of misrepresentation of one's competence to one's employer, and one fifth are not looking at the issues of piracy, the necessity to declare conflicts of interest and the importance of producing the best possible work. Slightly less than 90% of the institutions are addressing Privacy. In terms of teaching methods, Readings and lectures appear to be popular, with case-studies favoured in the senior years. Surprisingly, Role-Playing and small-group Tutorials did not feature very much in the senior years. Lecturers reported that they did notice a change in at least one, two or more individuals during or after the course. The survey found that to give students an appreciation of the ethical issues, and to help them make decisions taking ethics into account were the major aims of the courses within the curriculum.

The need for a course module on the ethical issues involving Information Technology is clear and a solution which entails offering an integrated and a stand-alone option is proposed. The module follows a sandwich-approach whereby two stand-alone modules are conducted on either side of integrated Computer Ethics content within the rest of the curriculum.

1.5 Organisation of Thesis

Part I, Chapter 1 of this research introduces the research problem. This is accomplished by describing the research area, and showing how the research area relates to the research problem on a general level. This section also presents a summary of the results of the research, and explains the organisation of the thesis.

After having examined the research problem, attention is turned in Part II to the literature. The aim of this section is to introduce moral philosophy and the development of ethical theories before focusing on teaching ethics within the information systems profession. Chapter 2 examines the history of the field of Moral Philosophy within the broader discipline of Philosophy and highlights the position of Ethics within the field

over the centuries. In Chapter 3 what ethical theories that are available are explained and the development of Computer Ethics is presented. Finally, Chapter 4 shows how the Official curricula recommendations regard the inclusion of computer ethics into the curriculum as necessary.

Part III tells of two complementary empirical studies that were conducted. The first involved Industry and was conducted online in partnership with ITWeb and surveyed approximately 200 individuals asking questions about ethics. The second involved surveying academic departments of Universities and Technikons within South Africa asking about teaching ethics in IS. The design and results of the two surveys are discussed and presented. Detailed results can be found in Appendices E and F. Chapter 5 described the design of the Empirical Survey to Industry. It reported on how the survey was structured and delivered. A list of the hypotheses tested by the survey was also supplied. The summarised results of this Survey are reported in the Chapter 6. A detailed set of results can be found in Appendix E.

Chapter 6 presents the results of the Empirical Study to Industry. Results are in the form of frequency histograms and Chi-Squared analyses. Detailed results can be found in Appendix E.

Chapter 7 presents the design of the Empirical Study to Academic Institutions. The study was a structured questionnaire piloted to members of the Information Systems Department at Rhodes University and completed via email response by Heads and/or Lecturers from different Computer Science and Information Systems Departments from around South Africa. The purpose of the study was to survey the current state of affairs within Computer Science and Information Systems in terms of whether they teach, and if so, how they teach, computer ethics.

Chapter 8 presents the results of the Empirical Study to Academic Institutions. Results are in the form of frequency histograms. Detailed results can be found in Appendix F.

After having considered the context of Ethics in IS within South African curricula and assessing the need demonstrated by the empirical research, Part IV presents a model of

how to teach Ethics in IS. Chapter 9 presents the proposed new undergraduate course module on the ethical aspects of Information Systems.

Part V and Chapter 10 presents the contributions of the research and identifies areas for further research.

1.6 Conclusion

This chapter concluded that a formal research project was needed to understand whether an undergraduate course module would be necessary.

Part II

Review of the Literature

After having examined the research problem, our attention is turned to the literature. The aim of this section is to introduce moral philosophy and the development of ethical theories before focusing on teaching ethics within the information systems profession.

Chapter 2 The development of ethics within Moral Philosophy

This chapter examines the history of the field of Moral Philosophy within the broader discipline of Philosophy and highlights the position of Ethics within the field over the centuries.

"Some people believe that there cannot be progress in Ethics, since everything has already been said… I believe the opposite… Compared with the other sciences, Non-Religious Ethics is the youngest and least advanced…" (Derek Parfit, Reasons and Persons:1984)

2.1 Introduction

Moral dilemmas are encountered when decisions need to be made. The quality of the answer depends on the amount of information available. Systems therefore need to provide the relevant information to the relevant people. A brief sketch of ethical theories is provided so as to sensitise the reader to the varied and complex nature of ethical theory in general.

2.2 A History of Moral Philosophy

Dr Alan Lacey (1995:927) of King's College London, divides the discipline of Philosophy into five groups:

Group I. Contains the areas of study that examine "the conditions under which we can know something, the justifications that we can offer for claims to know it, and the methods that may help us to come to know it" (Lacey 1995:928).

a. Epistemology
b. Philosophy of Science

Group II. Contains the areas of study that examine the existence and nature of "what there is, either completely generally or in certain obviously important spheres such as that of beings as developed as ourselves or that of the ultimate power, if any, behind the universe" (Lacey 1995:929).

a. Metaphysics
b. Philosophy of mind
c. Philosophy of religion

Group III. Contains the areas of study that examine value in terms of "what sorts of value there are, what things are valuable in these various ways, and what connection there is between value and a duty to produce it, as well as the question what alternatives, if any, to value can e offered as a foundation for our duties" (Lacey 1995:929).

a. Aesthetics
b. Moral philosophy
c. Political philosophy

Group IV. Contains the areas of study that examine abstract structures, particularly the structure of coherent thinking and the tools or language that is essential for such thinking (Lacey 1995:929).

a. Logic
b. Philosophical logic
c. Philosophy of language
d. Philosophy of mathematics

Group V. Contains the areas of philosophical study directed at specific areas (Lacey 1995:929).

a. Philosophy of education
b. Philosophy of history
c. Philosophy of law
d. Social philosophy

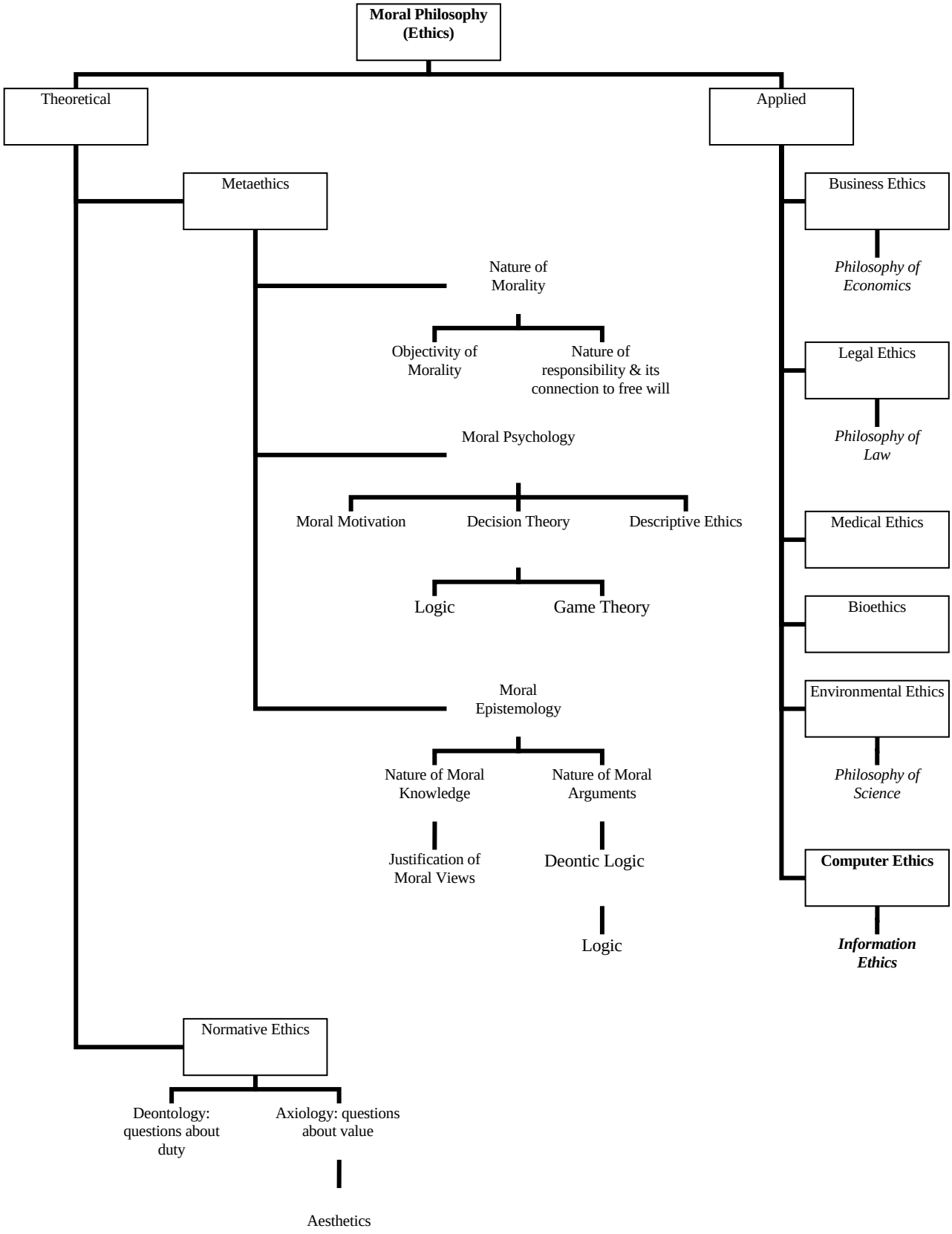


Figure 1: The components of Moral Philosophy

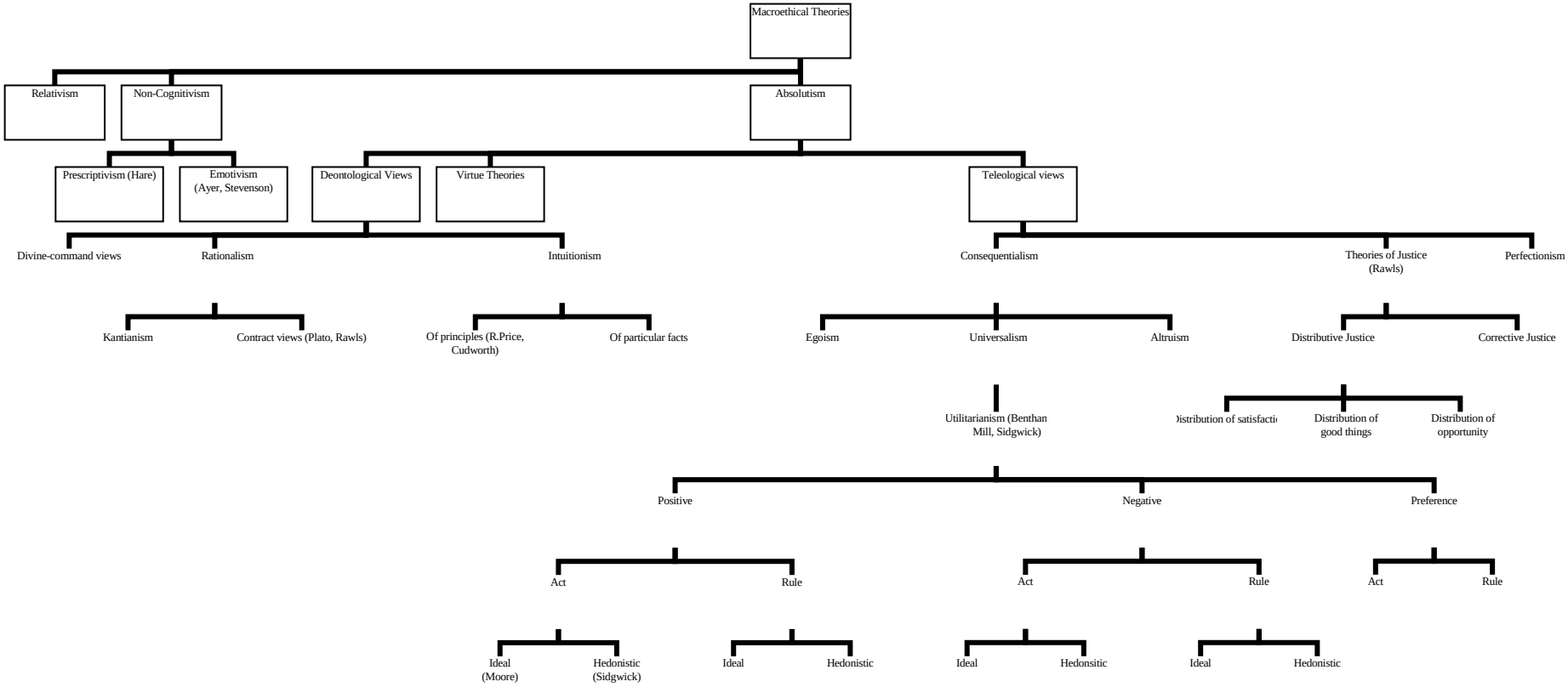


Figure 2: Macroethical Theories

Ethics and the study of Ethics forms part of a section of Philosophy called Moral Philosophy. Prof Richard Norman, of the University of Kent, outlines the History of Moral Philosophy (1995:586) and describes six areas: Greek Ethics; Christian Ethics; Ethical Naturalism; Utilitarianism; Kant and Post-Kantian Ethics and Twentieth-Century Ethics (including Contractarianism, Rights-based Theories and Virtue Ethics).

Proceeding from Group III above, Figure 1 describes the vast and varied components of Moral Philosophy which are divided into Theoretical and Applied sections. Computer Ethics forms part of Applied Moral Philosophy, and as shall be explained later, is underpinned by the Philosophy of Information. Before, however, we can examine the Applied Moral Philosophy, and Computer Ethics in particular, it is necessary to familiarise[1] oneself with Theoretical Moral Philosophy.

Mankind has constantly sought to fashion codes of moral behaviour around which society functions since the beginning. Figure 2 summarises the ethical theories that have been proposed over time by mankind and what follows is a brief synopsis of the history of Moral Philosophy as it developed from the 5th century BC until today.

2.2.1 Greek Ethics

The Sophists were professional teachers who were known for their teaching of rhetoric and persuasion. Their first and their most famous, Protagoras[2] concluded that moral codes are a set of customs and conventions which make social life possible.

[1] This discussion has been annotated with biographical descriptions introducing the main figures to those who may be unfamiliar in case this work is used in presenting a course on ethics in the future.

[2] Protagoras (c.490-420 BC): "The most celebrated of the Sophists of the fifth century BC, he came from Abdera on the north coast of the Aegean" (Taylor 1995:725).

Others, such as Callicles and Thrasymachus (from Plato's dialogues) concluded that since traditional moral standards were merely conventions, they could have no binding force and that the rational way to live would be to pursue one's own interests and power. From these challenges the fundamental question "Why be moral?" arose, and was answered systematically in what is today known as the moral philosophies of Plato[3] and Aristotle (Norman 1995:587).

Plato's dialogues, reflecting the activity of Socrates, examine the searching for definitions of the traditional virtues – temperance, courage, justice and piety. Norman comments "that if these are good qualities, this must be because they make for a good life for those who possess them, and underlying all the virtues, must be the ability to know what constitutes the human good." Plato's formulation in the *Republic* is as follows: "…the good life consists in the harmony of the soul, with each part of the soul – reason, spirit, and appetite – performing its proper function. The traditional virtues can then all be defined as aspects of this underlying condition of psychic harmony. Since such a condition is one in which the person is happy and flourishing, the morally good life lived in accordance with the virtues is thereby shown to be the best life for human beings." (1995:587)

[3] Plato (c.428-347 BC): "The best known and most widely studied of all the ancient Greek philosophers. He was an Athenian, born into a noble family, and might have been expected to play a part in the politics of that city. But in fact he came under the influence of Socrates, who fired him with an enthusiasm for philosophy. When Socrates was condemned to death and executed in 399, Plato gave up all thought of a political career, and left Athens in disgust. After travelling extensively (including as far a field as Egypt, Italy and Sicily) he returned to Athens and founded his Academy just outside the city. This may be regarded as the first university" (Bostock 1995:683).

According to Norman (1995:587), Aristotle[4], in his *Nicomachean Ethics*, asserts that "the ultimate end of all human action is happiness." Aristotle suggests "that we must identify the distinctive function of human beings …. to be activity in accordance with reason". With regards to Plato's virtues, Aristotle says that "they are dispositions in which our feelings and emotions are guided by reason so that our behaviour is appropriate to the situation." Norman concludes his examination of Aristotle commenting that "in particular the guidance of reason requires the avoidance of excess or deficiency, and therefore each virtue is, in Aristotle's famous phrase, a 'mean' between these extremes" (Norman 1995:587).

It was also during this period that the concept of hedonism, as promoted by the Epicureans (founded by Epicurus[5]), and natural law, as introduced by the Stoics[6] originated.

[4] Aristotle (384-322 BC): "Aristotle was born at Stagira in Chalcidice in northern Greece. His father was a doctor whose patients included Amyntas, King of Macedonia. At the age of 17, Aristotle went to Athens to study under Plato, and remained at the Academy for nearly twenty years until Plato's death in 347. When Speusippus succeeded Plato as its head, Aristotle left Athens, lived for a while in Assos and Mytilene, and then was invited to return to Macedonia by Philip to tutor Alexander. Aristotle returned to Athens in 335 at the age of 49, and founded his own philosophical school. He worked there for twelve years until Alexander's death in 434, when the Athenians in strongly anti-Macedonian mood brought a formal charge of impiety against him. Aristotle escaped with his life to Chalcis, but died there in the following year at the age of 62. He married twice, and had a son, Nicomachus, by his second wife."(Charles 1995:53).

[5] Epicurenaism consisted of a way of life directed at worldly happiness and an atomistic account of the exclusively material nature of reality. Atomism, it was argued, was true. Hence the way pointed out by Epicurus (c.341-270 BC) could be presented as not merely psychologically satisfying, but in accord with the true nature of things. Epicurus established his school of philosophy in 306 BC just outside the walls of Athens where he purchased a house for accommodation and a garden in which teaching took place. He himself was the leader of the community 'the Garden' until his death in about 270 when he was succeeded first by Hermarchus and then, in about 250, by Polystratus. The Garden was still in existence 450 years later. But references to Epicureans at Tyre, Sidon, Alexandria, Gadara (in Syria), and elsewhere in the Hellenistic world before 30 BC indicate active dissemination of Epicureanism. " (Gaskin 1995:240).

[6] Stoicism: "A Philosophical tradition founded by Zeno of Citium (334-262 BC), developed by Cleanthes and Chrysippus, and named from the *Stoa poikilē* or 'Painted Porch' in Athens where they taught. The last major figure in antiquity to have Stoicism as his primary allegiance was the emperor Marcus Aurelius in the second century AD, but the influence of the school's ideas lived on, and 'stoical' has become a common expression to indicate acceptance of misfortune without complaint" (Sharples 1995:852).

2.2.2 Christian Ethics

In the world today there is a perception that when one speaks of ethics or morality – one is also talking about religion. It is interesting to note that whilst Plato and Aristotle were both theists, and spoke of a 'god' within their ethical theories – their understanding of 'god' was merely the "exemplar of the ideal life" (Norman 1995:587). Medieval Christendom's moral philosophy is most famously described by Thomas Aquinas[7] who attempted to synthesise Christian Morality with Greek philosophy. He did this by describing the "distinctive function" in human beings, which Aristotle spoke of, as the purpose from God that human beings possess. In the Thomistic sense, a correct understanding of human nature leads to the identification of the natural purposes proper to human beings, and to fulfil these purposes is to follow 'natural law'. Norman paraphrases Aquinas saying that "since this natural law reflects our participation in the eternal law by which the universe is governed, it is exhibited also in the divine law laid down for us by the divine creator, and the moral precepts of natural law will therefore coincide with the moral rules revealed by the Christian religion" (1995:587).

Aquinas' theory has been criticised by many philosophers before and since. The substance of this criticism has been elegantly captured in Plato's *Euthyphro* dilemma: Is the good good because God commands it, or does God command it because it is good? If the former is true, Norman explains, then "morality is the product of arbitrary will, and obedience to morality is mere obedience to authority" (1995:588). If this is not the case, then, Norman continues, "morality is independent of God's will, and

[7] Aquinas, St Thomas (1224/5-74): "The greatest of the medieval philosopher-theologians. After centuries of neglect by thinkers outside the Catholic Church, his writings are increasingly studied by members of the wider philosophical community and his insights put to work in present-day philosophical debates in the fields of philosophical logic, metaphysics, epistemology, philosophy of the mind, moral philosophy, and the philosophy of religion. He was born in Roccasecca in the Kingdom of Naples and sent at the age of 5 to the Abbey of Monte Cassino, from where in his mid-teens he progressed to the University of Naples. In 1242 or the following year he entered the Order of Preachers (the Dominican Order), and spent the rest of his life exemplifying the Order's commitment to study and preaching" (Broadie 1995:43).

knowledge of the divine will is at best redundant" (1995:588). Therefore, moral philosophy has either a very definite role to play in the development of morals, and religious belief has no distinctive role; or it has no role to play and 'religion', accepted on faith and trust, is the means by which morals are defined.

2.2.3 Ethical Naturalism

As the Sophists in the Greek Era were the catalysts for Plato and Aristotle, so were the Hobbesian egoistic view of human nature and morality the catalyst for the further development of Moral Philosophy. Hobbes[8] believed that morality can have no authority over our behaviour unless supported by the necessary political authority (1995:588). It was Hobbes' view that man desires good for himself. He believes that this pitted man against man in the fulfilment of their desires, in an almost war-like fashion. Hobbes believed that every man would endeavour to escape this condition of war and prescribed a fundamental law of nature that "every man ought to endeavour peace". Norman explains that "this law dictates that men should contract with one another to restrict their liberty for the sake of peace, provided others do likewise. Hobbes's egoistic theory entails, however, that in a state of nature there can be no moral obligation to abide by such a contract. Men therefore", he continues "have to establish a sovereign who will enforce the contract, for 'covenants without the sword

[8] Hobbes (1588-1679 AD): "English philosopher who is generally regarded as the founder of English moral and political philosophy. His most famous work is Leviathan, but he published widely on other works on topics such as logic, language, optics, human nature, law, religion, moral and political theory, aesthetics, free will and determinism. He even entered into some unfortunate mathematical controversies by claiming that he had squared the circle. He was a secretary to Francis Bacon, visited Galileo, and engaged in disputes with Descartes. Hobbes seems to have been proud of being fearful, proclaiming that he was the first of all who fled the Civil War; and he did leave England for France in 1640 and remained in Paris for eleven years. He explains his fearfulness by claiming that he was born prematurely because of his mother's fright over the coming of the Spanish Armada. However, his writings are very bold. He published views that he knew would be strongly disliked by both parties to the English Civil War. He supported the king over Parliament, which earned him the enmity of many royalists, though not of the king. He also put forward views concerning God and religion that he knew would make him extremely unpopular. The Roman Catholic Church put his books on the Index and Oxford University dismissed faculty for being Hobbists. Some people recommended burning not only his books but himself. He died on 4 December 1679 at the age of 91, and though he had gained great fame on the Continent as well as in England, he remained a controversial person throughout his entire professional life" (Gert 1995:367).

are but words'. Thus the constraints of morality, though they are in everyone's interests, are binding only in so far as they are backed by political authority." (1995:588).

Critics of Hobbes offered a 'rationalist' approach, or alternatively questioned Hobbes' view of human's nature, passions and affections. Norman examines the 'rationalist approach' noting that Samuel Clarke[9] postulated the 'rule of righteousness', that is "it is a requirement of reason that we should 'deal with every man as in like circumstances we could reasonably expect he should deal with us', and that we should 'endeavour, by a universal benevolence, to promote the welfare and happiness of all men'. (1995:588) " Norman continues, saying that Clarke went on to assert that "our certainty of its truth is comparable to our certainty of the truths of mathematics." and later to note that Ralph Cudworth[10], John Balguy and Richard Price[11] were also to make "similar claims about the capacity of reason to apprehend moral truths" (1995:588). This capacity was distinguished further by Shaftesbury[12] who coined the

[9] Clarke, Samuel (1675-1729 AD): "English rationalist philosopher and theologian; champion of Newton, admired by Voltaire, sacked as chaplain for unorthodoxy" (Downie 1995:136).

[10] Cudworth, Ralph (1617-1680 AD): "Belonged to the Cambridge Platonists, a school which drew on Plato to assert the primacy of mind as 'senior to the world, and the architect thereof'." (Downie 1995:172)

[11] Price, Richard (1723-1791 AD): "Welsh dissenting minister noted for his defence of a non-naturalist moral philosophy. His argument for the non-definability of goodness anticipates G.E. Moore. Price's defence of individual freedom and national independence figured prominently in his criticism of the British declaration of war against the American colonies, and his advice to the Americans after the war helped to shape their new Constitution" (Jones 1995:717).

[12] Shaftesbury, third Earl of (1671-1713): "Named Anthony Ashley Cooper, like his descendant, the nineteenth-century philanthropist, he is normally known simply as Shaftesbury. Partly educated under the politically radical Locke (though he later criticised Locke on both ethics and epistemology), he was an early, if not always consistent, representative, in his *Characteristics of Men, Manners, Opinions, Times*, of the 'moral sense' doctrine in ethics, inventing that phrase. For much of the time, though not all of it, he emphasized feeling rather than reason as the source of morality: we approve of, or take pleasure in the contemplation of, virtue. And this is because we are by nature altruistic and not just selfish. Morality with him becomes human-orientated rather than God-orientated, though religion can motivate us further towards it. He also foreshadowed to some extent Utilitarianism, which came to prominence later in the eighteenth century" (Lacey 1995:825).

phrase "a sense of right and wrong" liking it to our sense of the "sublime and the beautiful" (1995:588), which Hutcheson[13] eventually called a 'moral sense'.

The alternative anti-Hobesian criticism concerns human passions and affections. Philosophers such as Shaftesbury introduced the concept that human beings have a natural affection towards the public good, and not only the private, and that these are not in opposition with each other because the virtue inherent in the social affection, is advantageous to everybody (Norman 1995:588). The philosophers disagree, at this point, on the source of the moral virtues, with some, such as the 18th century Scots-Irish philosopher Francis Hutcheson, claiming that they are a function of our benevolence towards our fellow man.

Hume[14] introduced the concept of 'sympathy', which he called 'humanity' or 'fellow-feeling' and believed that we could share other people's feelings of happiness and misery.

2.2.4 Utilitarianism

In the previous section, the philosophy of the British Moralists, as told by Norman (1995:588) was examined. Their tradition revolved around two central questions:

[13] Hutcheson, Francis (1694-1747): "An academic philosopher of Irish origin who taught (and was criticised by) Adam Smith at Glasgow University and strongly influenced Hume, he was the main representative of the 'moral sense' doctrine in ethics, which he inherited from Shaftesbury. The main thrust of his philosophy was to emphasize feeling rather than reason or intuition as the source of what we think of as moral knowledge, though is it unclear whether this feeling detects special moral qualities in actions or situations, as we feel the warmth of fire, or whether we simply have feelings of approval or disapproval towards their non-moral properties. This latter interpretation would place Hutcheson as an ancestor of the twentieth century emotive theory of ethics, and similar theories, but the eighteenth century was less sensitive than the twentieth to precise semantic analyses of the meanings of words and phrases" (Lacey 1995:384).

[14] Hume, David (1711-1776): "Scottish philosopher, essayist, and historian. Perhaps the greatest of eighteenth-century philosophers, Hume aimed to place 'Logic, Morals, Criticism, and Politics' on a new foundation: the 'science of man' and the theory of human nature. Famous for his scepticism in metaphysics, he also insisted on the reality of moral distinctions, though our judgements are ultimately founded only in human sentiment. In all areas, Hume's concern is to expose the limitations of reason, and to explain how we make the judgements we do, in the absence of the illusory support of reason" (Broackes 1995:377).

whether morality is "ultimately grounded in 'self-love' or 'benevolence'?" and whether "moral judgements are the product of 'reason' or 'sentiment'?" Norman introduced us into the argument of Hobbes, and proceeded to explain the counter-arguments, ending with Hume who argued that the 'self-love' hypothesis was false and that whilst reason has a part to play, sentiment would be "decisive in the forming of moral conclusions".

Hume highlighted the utility (usefulness) of the virtues, joining Cicero[15] in his belief that they were a fundamental part of ethics (Harrison 1995:892). Norman recalls Hutcheson suggesting, in a statement that led to the development of a theory of philosophy that was to succeed the British Moralists and their Ethical Naturalism, namely Utilitarianism, saying that: "since benevolence is the foundation of all moral virtue, 'that action is best which procures the greatest happiness for the greatest numbers' (Norman 1995:589).

Jeremy Bentham[16] built upon that statement, and is credited with the classic formulation of modern Utilitarianism that "the general happiness is thus envisaged as a sum of pleasures, minus the pains, and these pleasures and pains differ from one another only in quantitative respects such as their duration and intensity" (Norman

[15] Cicero, Marcus Tullius (106-43 BC): "Roman statesman, orator, and prolific writer, over-annotated by classical scholars and underestimated by recent philosophers. Educated at Athens, his Latin expositions of Hellenistic philosophy, mostly written between February 45 and November 44 BC,, are the source for otherwise lost Stoic, Epicurean, and Academic arguments. Often in dialogue form, always clearly and fairly presented, his philosophical writings cover topics such as ethics, the philosophy of religion, and sceptical epistemology. Cicero's influence on European thought from natural-law theorists down to and beyond Hume is incalculably great" (Gaskin 1995:135).

[16] Bentham, Jeremy (1748-1832 AD): "English philosopher who dreamed at a young age of founding a sect of philosophers called utilitarians and who lived to see his dream fulfilled. Bentham was the son and grandson of lawyers working in the City of London and was intended by his father to follow and surpass them as a practising lawyer. However, while following his legal studies, Bentham became disgusted with the current state of English law and so, rather than making money by the practice of the law as it is, he turned instead to a study of what the law might be. This study formed the centre of his long life, during which he wrote an enormous amount of manuscript material on law, economics, politics, and the philosophy which naturally arises from these subjects. Bentham's grand project was for legislation: the exploration and theoretical foundations of a perfect system of law and government. For this he needed a measure of perfection, or of value; and this for Bentham was the principle of utility, otherwise known as the greatest happiness principle." (Harrison 1995:85).

1995:589). This theory, elegantly simple, is criticised for being overly simple, and "how limited a view of the good life this appeared to be" (Norman 1995:589). John Stuart Mill[17] adapted Bentham's version of the theory, allowing for differences not only in quantitative respects, but also in quality. He believed that a good life was predominated by the 'higher pleasures' of the intellect, feelings and imagination.

The theory of Utilitarianism, as refined by Mill and others, is still a dominant moral philosophy of the nineteenth and twentieth centuries.

2.2.5 Kant and Post-Kantian Ethics

The Philosophy of Kant stands in contrast against both Utilitarianism and Ethical Naturalism. Kant[18] believed that the 'good will' (good, because of its character as will), is the motivation to perform one's duty simply for its own sake. Norman explains that duty is understood against the contrast between our natural inclinations (a desire for our own happiness and our benevolent inclinations towards others) (1995:589). Hence, a deeper understanding of our natural inclinations is not sufficient to provide a deeper understanding of morality. Kant believes that reason, "without any reference to the inclinations, can determine the form of our moral duty" (Norman

[17] Mill, John Stuart (1806-1873 AD): "Son of James Mill (a Scottish thinker who after being educated at Edinburgh University, came to London and worked for a considerable time as assistant and publicist for Bentham. Most famous for the strenuously intellectual education to which he subjected his more famous son). He was the greatest British philosopher of the nineteenth century, bringing Britain's traditions of empiricism and liberalism to their Victorian apogee. The leading element in Mill's thought is his lifelong effort to weave together the insights of enlightenment and romanticism. He subscribed unwaveringly to what he called the 'school of experience and association'. He denied that there is knowledge independent of experience and held that attitudes and beliefs are the products of psychological laws of association. His view of human beings is naturalistic and his ethics is utilitarian" (Skorupski 1995:566).

[18] Kant, Immanuel (1724-1804 AD): "Perhaps the most important European philosopher of modern times, Kant was born, spent his entire life, and died in Königsberg in East Prussia. After studying at the University of Königsberg from 1740 to 1746, he worked for a time as a private tutor. In 1755 he returned to the University, received his master's degree, and began lecturing. In 1770 he was appointed professor and he continued to lecture on a wide variety of subjects, including mathematics, physics, anthropology, pedagogy, and physical geography, as well as the central fields in philosophy, until his retirement in 1796. Although he never married or travelled outside of East Prussia and led a highly regimented existence, he was no recluse. On the contrary, he was known as a

1995:589). Duty requires one to act in accordance with the 'moral law', which leads Kant to articulate his categorical imperative: "One must therefore act in such a way that one can will the maxim of one's action to be a universal law".

Using this maxim, Kant believes we can arrive "at concrete judgements about the morality of particular actions" (Norman 1995:589). Norman illustrates the categorical imperative in two ways, the first using the classic formulation of the imperative: "It would be wrong", according to Kant, "to make a false promise, one which one does not intend to keep, for if it were a universal law that people made false promises, promises would themselves become impossible, and this is therefore not something which I can consistently will" (Norman 1995:589). The second illustration uses an alternative formulation of Kant's categorical imperative, namely that there is a universality of reason which is shared by all moral agents. Morality requires that one should respect this capacity for rational agency, and therefore one should treat all persons never merely as a means to an end but always also as ends in themselves (Norman 1995:589). Norman explains that "this idea of 'respect for persons' may again conflict with Utilitarian morality" (1995:589) and elaborates that "utilitarianism can set no absolute limit to the evils which I might, in certain circumstances, be justified in inflicting on others, provided that the overall sum of human happiness is maximised by my so doing" (1995:589). In explaining the major influence of Kant, he says: "In contrast, 'respect for persons' implies that I may not use others simply as instruments for however worthy an aim. It thus reflects the common idea that morality imposes certain constraints on the permissible treatment of others, that all human beings have certain basic moral rights which may not be overridden" (Norman 1995:590).

brilliant lecturer and conversationalist, had a wide circle of friends, and was keenly interested in the intellectual and political issues of the day" (Allison 1995:435).

In the 19th century, Schopenhauer[19], Hegel[20] and Nietzsche[21] oppose Kantian ethics and offer alternative theories.

Schopenhauer rejects the separation of morality from the natural human feeling of compassion, emphasising the natural benevolence stressed by the British Moralists, but for a different reason. His thesis is summed up in asserting that the 'principle of individuation' (the determining of what constitutes an individual) is an illusion. Norman explains that "the essential being of all persons is literally one and the same, and that our moral concern for the suffering of others is a recognition of this" (Norman 1995:590).

[19] Schopenhauer, Arthur (1788-1860 AD): "German philosopher of inherited independent means, who gained distinction only towards the end of his life as a result, partly, of the notice taken of him in the British utilitarian journal the *Westminster Review*. Schopenhauer arrived at his general philosophical position very early and all his works are developments of the same basic initial ideas. His chief inspirations were Plato, Kant, and the Upanishads. He is, in fact, the first (and remains among the few) Western philosophers to have related his thought to Hindu and Buddhist ideas." (Sprigge 1995:802).

[20] Hegel, Georg Wilhelm Friedrich (1770-1831 AD): Of all the major Western philosophers, Hegel has gained the reputation of being the most impenetrable. He was a formidable critic of his predecessor Immanuel Kant and a formative influence on Karl Marx. Through his influence on Marx, Hegel's thought has changed the course of nineteenth- and twentieth-century history. Hegel lived and work in what we now know as Germany, although in his time the many independent states of the region had not been united into one nation. He came of age at the time of the French Revolution, sharing what he later called 'the jubilation epoch'. His career included periods as a private tutor, and nine years as the headmaster of a secondary school, before his growing reputation gained him a university chair. He ended his days as Professor of Philosophy at the University of Berlin, which under the reformed Prussian monarchy was becoming the intellectual centre of the German states" (Singer 1995:339).

[21] Nietzche, Friedrich Wilhelm (1844-1900): "German philosopher and critic *par excellence*. A classical philologist by training and academic profession, Nietzsche's philosophical efforts – deriving chiefly form the last dozen years of his short productive life – were little heeded until long after his physical and mental collapse in 1889 (at the age of only 44). He subsequently emerged as one of the most controversial,, unconventional, and important figures in the history of modern philosophy. His influence upon European philosophy in the twentieth century has been profound; and he has belatedly come to receive considerable attention in the English-speaking world as well, as the shadow cast by the travesty of his appropriation by the Nazis and Fascists has receded, along with the sway of philosophical fashions inhospitable to his kind of thinking and writing. Nietzsche's philosophical enterprise grew out of his background as a philologist schooled in the study of classical languages and literatures, his deep concern with issues relating to the quality of life in the culture and society of his time, his conviction that the interpretative and evaluative underpinnings of Western civilisation are fundamentally flawed, and his determination to come to grips with the profound crisis he believed to be impending as this comes to be recognised. He sought both to comprehend this situation and to help provide humanity with a new lease on life, beyond what he called 'the death of God' and 'the advent of nihilism' following in its wake. He deemed traditional forms of religious and philosophical thought to be inadequate to the task and indeed to be part of the

Hegel believes that ethics is essentially a social phenomenon since any maxim can be willed to be a universal law. Should there be a resulting contradiction, he believes that it is due to a contradicting "moral content which is already presupposed by the institutions and practices of society" (Norman 1995:590). Hegel counters Kant's classic example of his imperative (that is what prevents us from willing the making of false promises as a universal law) by saying that 'the social institution of promising is already presupposed by the moral dilemma'. Hegel thus sees "different historical societies as stages in the evolving self-consciousness of reason." (Norman 1995:590).

Nietzsche also opposed Kantian Ethics, because he denied the existence of morality. For him, there were only different moralities. His work is well-known for his analysis of two such types of morality, "'Master Morality' (in which ideas of nobility, courage, and honesty have a central place), and 'Slave Morality' (which he tends to identify with Christian morality and ideas of duty and self-sacrifice)." (Norman 1995:590).

2.2.6 Twentieth-Century Ethics

The philosophers of the twentieth-century have been preoccupied with questions of 'meta-ethics' which is "the philosophical study of the nature of moral judgement. So, instead of being concerned with questions of what actually is right or wrong (or good or bad), it is concerned with the meaning or significance of calling something right or wrong (or good or bad)." (Harrison 1995:555)

problem; and so he attempted to develop a radical alternative to them that might point the way to a solution. " (Schacht 1995:619).

GE Moore[22], in his 1903 book *Principa Ethica*, criticised the 'naturalistic fallacy'. According to Moore, "no argument can be offered to show that something is good as an end in itself". The question 'Is pleasure good?' is always an open question. Norman notes that, "Moore's rejection of naturalism as fallacious seems to rule out any attempt to base ethics on an understanding of human nature or human psychology" (Norman 1995:590). Moore believes that "once the question is properly understood, people can recognise that the most important things which are good in themselves are the pleasures of human intercourse and the enjoyment of beautiful objects. No argument, however, can be provided in support of these truths. They are simply self-evident" (Norman 1995:590).

Many philosophers took issue with Moore's "self-evident" theory, suggesting that "if such supposed truths cannot be supported by any argument, then they cannot be called 'truths' at all, they are merely expressions of personal feeling" (Norman 1995:590). Bertrand Russell maintains instead that if "two people disagree over whether, say the enjoyment of beautiful objects is good in itself, and if neither can offer any argument, then they are not disagreeing about facts which can be true or false, but simply expressing their differing feelings and desires" (Norman 1995:590).

[22] Moore, George Edward (1873-1958): "Moore was a philosopher of immense, even revolutionary, influence by reason – most unusually – of the extreme simplicity and directness, even seeming naivety, of his approach to philosophy. He was moved in his early days, as he recorded in 1942, not by any perplexities about 'the world or the sciences', but by the baffling things said about the world and the sciences by other philosophers. In the tradition prevailing at that time he found it usually taken for granted that ordinary language was probably defective, that commonly held beliefs were probably false or at any rate inadequate, and that the task of philosophy was to work its way towards deeper, perhaps odd-looking truths set out in purer, probably novel and unfamiliar terms. Moore's working life was spent mainly in Cambridge, though he taught for some years in America during the Second World War. He was a university lecturer from 1911 and Professor of Philosophy and Fellow of Trinity College from 1925 to 1938. He was editor of the periodical *Mind* from 1921 to 1947, and was appointed to the Order of Merit in 1951." (Warnock 1995:585).

A.J. Ayer[23] and Charles Stevenson[24], two proponents of Logical Positivism, clarified the argument for the absence of moral facts. Ayer stated in his emotive theory of ethics that "the only meaningful statements are either empirically verifiable propositions or analytic truths, value-judgements do not fall into either category and are therefore not meaningful statements at all; they are merely expressions of feelings and emotions." In Stevenson's formulation of emotive ethical theory moral utterances are not meaningless, rather, he proposes "they have a distinctive kind of meaning, an 'emotive meaning', to be distinguished from a 'descriptive meaning'." For Stevenson, Norman (1995:590) notes that "the emotive meaning of ethical terms consists in their lending themselves to us, not only to express the speaker's own feelings, but also to arouse or affect the feelings and attitudes of others. Moral discourse is thus seen by Stevenson as a kind of behaviour modification".

Norman notes quickly however that "critics of Stevenson retorted how this approach would make moral discourse indistinguishable from emotionally manipulative practices such as advertising and propaganda." (Norman 1995:591). What future Moral Philosopher's found useful with Stevenson's theory, however, was the distinction between 'prescriptive' and 'descriptive' meaning, especially that the "distinctive feature of moral terms is their prescriptive meaning, their use to guide actions and tell people what to do" (Norman 1995:591). Moral philosophers, especially those writing in the 1950's and 1960's, concentrated their writing on the meta-ethical questions examining the distinction between values and facts. This 'fact-

[23] Ayer, Alfred Jules (1910-1989): "British philosopher, published his first book *Language, Truth and Logic* in 1936. It remains the classic statement in English of Logical Positivism" (Sprigge 1995:72).

[24] Stevenson, Charles L. (1908-1979): "Stevenson is the best known, and arguably the most compelling, exponent of what is known as the emotive theory of ethics. In two papers written in the 1930's Stevenson presented this theory, that moral judgements do not describe properties of people or actions but express approval or disapproval and seek also to influence the feelings of approval and disapproval of others. The emotive theory of ethics is sometimes taken to encourage, or to imply, immorality, and because of this (wholly unwarranted) idea Stevenson was discharged from a university post in 1945. However, he subsequently worked at the University of Michigan until his retirement in 1977. He is certainly one of the most influential ethical theorists of this century, for all that the emotive theory continues to be widely criticised" (Dent 1995:851).

value distinction' spurred debate on the relationships between 'is' and 'ought' statements, and whether 'is' statements (facts) can ever logically entail an 'ought' conclusion (values).

This analysis of meta-ethics led some to re-examine substantive moral theory. R.M. Hare[25] extended the prescriptive nature of moral terms, claiming that they were also 'universalizable', and that "when properly understood the universalizability of moral language commits us to some form of utilitarianism" (Norman 1995:591). Norman notes that the revival of utilitarian thinking has been particularly apparent in work on applied ethics (1995:591), of which Computer Ethics forms part.

However, with the revival of a substantive moral theory, must also come the revival of the criticisms of that theory and in the 1970's and 1980's a principal criticism that was levelled against the revived Utilitarianism is that, as Norman explains, it is "an 'aggregative theory', allowing the interests of some to be outweighed by the interests of others, and can therefore justify the infliction of terrible atrocities on some persons for the sake of the greater good" (1995:591). Norman succinctly explains the criticism when he says "by aggregating interests into a single 'general good'… [Utilitarianism] … fails to recognise the separateness of individuals" (1995:591). Consequently, two further theories have emerged in recent years that seek to incorporate the recognition of individuals. The first is contractarian theories, and the second rights-based theories.

[25] Hare, Richard M. (1919-): "Probably the most influential moral philosopher of his generation, Hare's ideas very largely shaped Anglo-American moral theory for upwards of twenty years, from the mid-1950's. He explores fundamental questions regarding the meaning of value and moral words such as 'good' and 'ought', and regarding the foundations of moral reasoning." (Dent 1995:333).

Contractarianism was first popularised by John Rawls's theory of justice[26], the idea being that if one could base principles of justice on a hypothetical contract founded on mutually agreeable principles, then no one's basic interests will be sacrificed to anyone else's. Contractarianism, Norman notes, "attempts to develop a general moral theory including those of Russell Grice[27] and David Gauthier[28], whose theory is very much in the spirit of Hobbes as an attempt to show how morality can be generated by agreement between self-interested individuals" (1995:591). Thus Contractarianism recognises that individuals interests cannot be aggregated as Utilitarianism, classic or revived, would advocate.

Similar to Contractarianism, rights-based theories also developed from political philosophy, where Robert Nozick[29] and Ronald Dworkin[30] have, in contrasting ways,

[26] Rawls, John (1921-): "Major social and political philosopher. Educated at Princeton, he taught at Cornell and Harvard, and in 1971 published *A Theory of Justice*, whose leading idea is that of justice as fairness – the hope for social institutions that do not confer morally arbitrary lifelong advantages on some persons at the expense of others. This condemns as unjust not only racial, sexual, and religious discrimination, but also many forms of social and economic inequality; the view is a strongly egalitarian form of liberalism. It is based on a new form of social contract theory – not an actual social contract but a hypothetical one. Rawls opposes utilitarianism, holding that the maximum total good may not be pursued by means which impose unfair disadvantages on minorities, including the unskilled. More generally, he claims that the right is prior to and independent of the good, and cannot be defined as that which will promote or maximise the good. Certain conditions on the social relations between people and the way they may be treated take precedence over the production of desirable results. This is opposed to the idea that rights are just human conventions justified instrumentally buy their usefulness in promoting the general welfare." (Nagel 1995:745).

[27] Grice, H. Paul (1913-1988): "English philosopher best known for his work on meaning, especially the relation between speaker meaning and linguistic meaning. Grice, who was at Oxford until 1967 and at Berkeley thereafter, introduced several notions commonly employed by philosophers today" (Bach 1995:327).

[28] Gauthier, David (1932-): "Canadian moral philosopher who has specialised in the study of the relationship between reason and morality. He is a leading contemporary proponent of the view, descending from Hobbes, that morality is based on the long-term self-interest of each individual, rather than on any inherent concern or respect for the interests or moral standing of others." (Kymlicka 1995:305).

[29] Nozick, Robert (1938-): "A philosopher of remarkably varied interests, whose most influential work presents an articulate defence of a barebones libertarianism. Nozick argues that the state cannot have a very large role in the economy and society if the libertarian rights of individuals are to prevail. In general, he argues against end-state theories, such as utilitarianism or John Rawls's theory of justice, and in favour of process theories that focus on the rightness of piecemeal actions independently of their contribution to a final state of affairs. Nozick has a gift for finding memorable cases to represent his problems and an energetic style that pulls readers in debate. He has done further work on decision theory, epistemology, theory of value, and the good life." (Hardin 1995:629).

emphasized the importance of rights as a counter to utilitarian social theory, thus showing that if one bases morality on rights, the criticism's requirement that no one's basic interests should be sacrificed is met (Norman 1995:591). Norman notes that Alan Gewirth[31] and John Mackie[32] are credited with having proposed a comprehensive moral theory based on the concept of rights (1995:591).

Norman notes that "by focusing exclusively on outcomes it [Utilitarianism] gives insufficient importance to the significance of moral agency" (1995:591). Norman concludes his analysis of the criticisms to Utilitarianism by citing Bernard Williams[33]' suggestion that "a person's moral identity is constituted by his or her 'ground projects'

[30] Dworkin, Ronald (1931 -): "American Professor of Jurisprudence at Oxford since 1969, his explicitly liberal theory of law radically extends Hart's 'internal viewpoint' by treating philosophy of law as a primarily normative contribution to political, particular judicial, deliberation. Moral, political, and legal theory should be not goal- or duty-based but rights-based, upholding principles (rights) over policies (collective goals), so as to respect everyone's right to equality of concern and respect." (Finnis 1995:209).

[31] Gewirth, Alan (1912 -): "Gewirth has done important work on Descarte's theory of knowledge and medieval political philosophy, especially Marsilius of Padua, but he is best known for his attempt to develop a stringently rational foundation for morality in *Reason and Morality*. The central argument of this book begins with a claim that every rational agent must accept, which is that he or she must have freedom and well-being. Gewirth claims that when the implications of this claim are fully worked out, it follows that every rational agent must also accept the claim that all prospective purposive agents have a *moral* right to freedom and well-being. Professor Gewirth has spent most of his career at the University of Chicago and is past President of the American Philosophical Association."(Sterba 1995:312).

[32] Mackie, John L. (1917-1981): "Born in Australia, lived and taught in Australia and New Zealand before moving to England, teaching finally at Oxford University. He was the author of six books and numerous papers on a wide range of topics especially in metaphysics, ethics, philosophy of religion, and the history of philosophy. Mackie was influential for his 'error theory' of moral values – the view that there are no objective moral values, yet ordinary moral judgements include an implicit claim to objectivity, and hence are all false. The objectivity-claim is at least partly prescriptive in pointing to reasons for performing certain actions regardless of one's wants" (Latham 1995:516).

[33] Williams, Bernard A. O. (1929-): "Williams is best known for his work in the metaphysics of mind, especially in connection with issues of personal identity, and for his work in moral philosophy, where his more recent study has tended to concentrate. In moral philosophy, Williams has argued against both Kantian and utilitarian approaches. In both cases, he objects that these views require agents to view themselves unrealistically as simply one person among others, which neglects to acknowledge the special significance that a person's own projects must have for them. In particular, he gives emphasis to the role of emotions in moral responsiveness. Williams is also sceptical that many of the claims morality makes for itself (that it is universal, absolutely binding, and so on) can cogently be justified. Williams chaired the government Committee on Obscenity and Film Censorship in the late 1970's. He has taught in London, Cambridge (where he was Provost of King's College, 1979-1987), and Berkeley, California, and is at present White's Professor of Moral Philosophy in Oxford" (Dent 1995:911).

and 'commitments' and that utilitarianism, in so far as it would require one to abandon these whenever the actions of others so order the consequences as to make it necessary, can give no adequate account of concepts such as 'moral integrity'," (1995:591); furthermore he cites from Philippa Foot[34]'s work on virtue ethics saying that "whereas utilitarianism assesses actions by their production of good consequences, virtue ethics aims rather to identify those ways of acting which go to make up a good human life" (1995:591).

2.3 Conclusion

This chapter examined Moral Philosophy from the earliest of times until today. Norman concludes his analysis of Moral Philosophy saying that "contemporary virtue ethics traces its ancestry back to Aristotle, and rights-based theories look to Kant. Considering also the continuing vitality of utilitarianism, and of contractarian ethics in the Hobbesian mode, we may fairly conclude that the main ethical traditions of previous centuries are still, in one incarnation or another, alive and well" (1995:591).

[34] Foot, Phillipa R. (1920-): "Best known for her work in moral philosophy, Professor Foot wrote two highly influential articles in the 1950's arguing against prescriptivism, the analysis of ethical belief and judgement propounded by R. M. Hare. In these papers she argues that moral beliefs must concern traits and behaviour that are demonstrably beneficial or harmful to humans, and that what shall be regarded as beneficial orharmful is not a matter for human decision. Moral beliefs cannot, therefore, be depdnet on human decision. For the better part of a decade, the controversy between her brand of naturalistic ethics and Hare's views was at the forefront of Anglo-Saxon moral philosophy. More recently her work has been concentrated on virtue theory and on the limits of utilitarianism. For many years a Fellow of Somerville College, Oxford, she has also held many posts in America" (Dent 1995:283).

Chapter 3 Theoretical and Applied Ethical Theories

This chapter examines the ethical theories that are available and explains where Computer Ethics is positioned.

3.1 Introduction

The previous chapter provided a detailed historical overview of Moral Philosophy covering the development of ethical theories by Plato, Aristotle, Aquinas, Hobbes, Hume, Bentham, Mill, Kant, Schopenhauer, Hegel, Nietzsche, Moore, Russell, Ayer, Stevenson, Hare, Rawls, Nozick, Dworkin, and Williams. In this chapter a succinct summary of the major ethical theories that are used today is presented.

3.2 Ethical Theories in brief

"Often we have to make decisions when all the facts cannot be known with certainty. In such cases we have no choice but to rely on the best information we have, and when we are not experts ourselves, this means deciding which experts to trust."

(The elements of Moral Philosophy pg 9)

Lawrence Hinman, Director of the Values Institute and Professor of Philosophy at the University of San Diego provides nine bases upon which moral or ethical decisions are made (Hinman 2002)[35].

[35] The case of deciding to pirate or not pirate computer software as a Computer Ethics issue is illustrated for each theory.

1. **Divine Command Theories**

   Divine Command Theory is an ethical theory that states that to be good one must do what God commands you to do. Teachings from the Bible or the Qur'an and other sacred texts are considered to be what is right. With regards to the issue of piracy, one might say that in terms of the Judaeo-Christian commandment that 'thou shalt not steal' piracy is proscribed.

2. **The Ethics of Conscience**

   In this theory, what is good is defined by one's 'inner voice'. Whilst this can often have a religious source, it may be founded on human nature, however, in both cases the conscience must be properly formed. It is often negative in character, telling us what is not right and makes individuals feel guilty, facilitating atonement. With regards to piracy, our conscience would compel us to feel guilty for doing something that is illegal, provided we recognised that piracy is illegal.

3. **Ethical Egoism**

   In this theory, each person ought to do whatever will best promote his or her own interests. Ethical egoism is often argued to be self-defeating in that, a society of egoists do worse for themselves than a society of altruists. Another fundamental objection is that it is inconsistent with the nature of trust and friendship that each party should be motivated solely by self-interest. With regards to piracy, an ethical egoist might pirate software because it would be in their own interests to acquire the software in the most expedient and efficient way to themselves (that is without paying for it). However, it could be argued that in the long-term, should one be caught, the consequences of pirating software are not in an individual's own interests.

4. **The Ethics of Duty**

   The ethics of duty begin with the conviction that ethics is about doing what is right, about doing one's duty. Duty can be defined by Reason (for example Kant - our duty is to follow rules that we could consistently will be to

universal laws – that is, rules that we would be willing to have followed by all people in all circumstances), Professional Role (A physician's duty to care for the sick), or Social Role (A parent's duty to care for their child). In this example, the software is seen as an item which has been created, and in terms of one's duty to the producer, and the greater economy, it would behove the consumer to purchase it. In terms of Kant's categorical imperative, if all computer users were to pirate software, there would be no incentive to create software. This argument, the author holds, would not be different if one were to consider Open Source software (since it is 'free'), because in that case the copyright (for example GPL) is still upheld. At the end of the day, one copyright has a price attached that is greater than zero, and the other a price that is zero. It is one's duty as a consumer to honour the conditions attached to the use of the product, which includes purchasing the necessary licenses.

5. The Ethics of Respect

This theory grounds itself in the doing of what is respectful, for example the golden rule "do unto others what you would have them to unto you." The difficulty lies in knowing what is respectful – as cultural factors can affect the judgement. In terms of this theory, if an individual A had produced a good that another individual B wished to use, and A expected payment, it would be in B's interests to pay A so that when B had a product A wanted, B would be paid.

6. The Ethics of Rights

This theory is one of the most influential and prevailing ethical theories in our time. It has established a minimal condition of human decency and is often legislated for example "…all Men are created… with certain inalienable Rights". Piracy is proscribed by legislation and one of the rights in force in the world today is that individuals (or corporations) have the right to not be the victim of theft.

7. Utilitarianism

This theory seeks to reduce suffering and increase pleasure or happiness. What is done should promote the greatest happiness for the greatest number. It demands a high degree of self-sacrifice, in contrast to Ethical Egoism, and demands that every consequence for each individual is considered. Utilitarians claim the purpose of morality is to make the world a better place. In light of monopolies making abnormal super-profits on software that have become necessities for individuals to transact in the modern world, it could be argued that it is in the interests of the 'greater good' for software to be priced differently, if at all. Conversely it could also be argued that the marginal loss of utility felt by the company or software author from the individual pirating is so negligible to be discounted in favour of the marginal gain in utility for the individual. This argument is subject to the same criticism that Utilitarianism is subject to, namely if one were to universalize this behaviour (that is software piracy) the situation (in this case the commercial software industry) would collapse due to a lack of incentive for software developers to create software and an inflated cost to the consumer to cover the losses made within the industry.

8. The Ethics of Justice

What is fair for one should be fair for all – this theory begins early in the family with fairness to all family members. Fairness in the sense of software piracy is best explained that if one producer is rewarded for one's work, and another not, then that is not fair. Thus, if it is fair that an appreciation towards the creator of goods is based on market value for example computer hardware creators, the creators of computer software cannot be treated any differently. Since it is plainly obvious that theft of computer hardware is theft, it must also be the same for the theft of computer software. This distinction goes to the heart of Computer Ethics – namely the incorporeal nature of computer software and the ability to perfectly duplicate material without any degradation to the original. This will be discussed later.

9. Virtue Ethics

This theory seeks to develop individual character and assumes that good persons will make good decisions. A virtue is "the mean by reference to two vices: the one of excess and the other of deficiency". Thus "Courage" is the mean between the extremes of cowardice and foolhardiness. Some virtues can conflict – for example when dealing with friends, Justice can conflict with Loyalty (this conflict is recognised by the law, for example in some countries a wife cannot be compelled to testify in court against her husband, and vice versa). In terms of virtue ethics, a good person will make a good decision. The essence of this question goes to what does one mean when one talks of 'good'. In terms of the slippery slope, where if an individual hurts animals as a child, it is probable that the individual will continue to be violent later on in life; similarly if one pirates software and breaks the law (even in such a 'small' way) it does not go towards creating a good character since the individual may be inclined to break other laws later on.

After examining the above it becomes apparent that when making decisions about computers one cannot rely entirely on any of the above categories as each theory addresses only part of the issues involved in Computer Ethics. Discussion around whether or not Computer Ethics can adequately rely on previously conceived Ethical Theories, or whether it points to a need for its very own theory will now be discussed.

3.3 Applied Ethics

Before one examines Computer Ethics though, a brief comment must be made about Applied Ethics. Singer notes that Applied Ethics has been a subject of discussion since the earliest of times, with the Greeks and Romans discussing in quite concrete terms how one is to live and die; how Medieval ethicists were concerned with such practical issues as abortion, war and whether or not it is always wrong to kill; even Hume wrote an essay defending suicide and Kant tried to pursue a means to perpetual peace; and the Utilitarians in the 19th century were very much focused on applied ethics. In fact, as Singer points out, the first half of the 20th century is unique in their

avoidance of addressing such applied ethics – though he believes this is due to the legacy of Logical Positivism that sought to merely perform meta-ethical study into the meanings of moral terms. Singer explains that this approach evoked little support during the 1960's when Philosophy students demanded courses that were "more relevant to the day" (that is to say courses which helped students deal with the Civil Rights Movement, Vietnam and other such 'hot-topics' such as racial/sexual equality, the justifiability of war and environmental ethics). Until recently, Bioethics has been one of the most prominent forms of Applied Ethics; with investigations into a more holistic approach that takes the entire environment (including man and the supporting ecological sytems) into account. Another featured area of specialisation has been Business Ethics. In all cases the study of Applied Ethics has led to lively debate and to questions which challenge the traditional bounds of ethical discourse (1995:42). One new such challenge is Computer Ethics which, some argue, has led to a new underlying macroethic, the Philosophy of Information or 'Information Ethics', however before we can examine Information Ethics, we must see how it developed from Computer Ethics.

3.4 Computer Ethics

Bynum explains that Computer Ethics had its nascent origins in the USA through the work of the MIT Professor Norbert Wiener who, in the 1940s, developed cybernetics[36] which was to become the science of information systems (2003). Bynum cites Wiener noting how, upon considering together both the concepts of cybernetics and the digital computers of the day, he commented that:

[36] "The term itself originated in 1947 when Norbert Wiener used it to name a discipline apart from, but touching upon, such established disciplines as electrical engineering, mathematics, biology, neurophysiology, anthropology, and psychology. Wiener, Arturo Rosenblueth and Julian Bigelow needed a new word to refer to their new concept, and they adapted a Greek word meaning "steersman" to invoke the rich interaction of goals, predictions, actions, feedback and response in systems of all kinds. Early applications in the control of physical systems (aiming artillery, designing electrical circuits and maneuvering simple robots) clarified the fundamental roles of these concepts in engineering; but the relevance to social systems and the softer sciences was also clear

> *"It has long been clear to me that the modern ultra-rapid computing machine was in principle an ideal central nervous system to an apparatus for automatic control; and that its input and output need not be in the form of numbers or diagrams. It might very well be, respectively, the readings of artificial sense organs, such as photoelectric cells or thermometers, and the performance of motors or solenoids ... we are already in a position to construct artificial machines of almost any degree of elaborateness of performance. Long before Nagasaki and the public awareness of the atomic bomb, it had occurred to me that we were here in the presence of another social potentiality of unheard-of importance for good and for evil." (Wiener 1948:27)*

Wiener continued to think about these social potentialities of integrating technology into society and a few years later in 1950 he perceptively laid the foundation for computer ethics that is still applicable today. He wrote a book, which many today consider to be monumental for its time, entitled *The Human Use of Human Beings,* in which he provided an account of the purpose of human life, explained four "great principles of justice" and conceived of a powerful method for doing applied ethics. His book also included discussions of the fundamental questions of computer ethics and some examples of key computer ethics topics (Wiener 1954:57). Bynum summarises Wiener's methodology as follows:

1. Identify an ethical question or case regarding the integration of ICT into society.

2. Clarify any ambiguous concepts or rules that may apply to the case in question.

3. If possible, apply existing policies (principles, laws, rules, practices) that govern human behaviour in the given society. Use precedent and traditional interpretation in such a way as to assimilate the new case or policy into the existing set of social policies and practices.

from the start. Many researchers from the 1940s through 1960 worked solidly within the tradition of cybernetics without necessarily using the term" (Pangaro 1991).

4. If precedent and existing traditions are insufficient to settle the question or deal with the case, revise the old policies or create new ones, using "the great principles of justice[37]" and the purpose of a human life[38] to guide the effort.

5. Answer the question or deal with the case using the revised or enriched policies.

(Bynum 2003)

Bynum believes Wiener's position (which was ahead of its time) would "require a multi-faceted process taking decades of effort." He noted that this integration would involve the work place undergoing severe and radical change; government would need to adopt new laws and regulations whilst industry and business would find it necessary to draft new policies and practices. Codes of conduct would have to be (re-)developed within professional organisations and sociologists and psychologists would have to examine and interpret the new arising social and psychological phenomena. Philosophers would also be required to rethink and redefine old social and ethical concepts. Bynum believes that "the defining goal of computer ethics, then, is to advance and facilitate the good consequences of ICT while preventing or minimizing the harmful ones" (Bynum 2003).

Wiener's important and complex work on applied ethics was not developed further until the 1960's when Donn Parker of SRI International in Menlo Park, California

[37] "The Principle of Freedom – Justice requires 'the liberty of each human being to develop in his freedom the full measure of the human possibilities embodied in him.'; The Principle of Equality – Justice requires 'the equality by which what is just for A and B remains just when the positions of A and B are interchanged.'; The Principle of Benevolence – Justice requires 'a good will between man and man that knows no limits short of those of humanity itself.' The Principle of Minimum Infringement of Freedom – 'What compulsion the very existence of the community and the state may demand must be exercised in such a way as to produce no unnecessary infringement of freedom'" (Wiener 1954:106).

[38] "A good human life, according to Wiener, is one in which 'great human values' are realized – one in which the creative and flexible information-processing potential of 'the human sensorium' enables humans to reach their full promise in variety and possibility of action. Different people, of course, have various levels of talent and possibility, so one person's achievements will differ from another's. It is possible to lead a good human life in an indefinitely large number of ways: as a public servant or statesman, a teacher or scholar, a scientist or engineer, a musician, an artist, a tradesman, an artisan, and so on" (Bynum 2003).

took stock of, as Wiener had foretold, the important social and ethical consequences that computer technology had wrought. Prompted by an increasing number of computer-aided bank robberies and other crimes Parker published his concerns about computer crime and proposed to the Association for Computing Machinery (see Parker 1968:198) that they adopt a code of ethics for their members. The ACM appointed Parker to head a committee to create such a code, which was subsequently adopted in 1973 and later revised first in the early 1980s and most recently in the early 1990s. (Bynum 2001).

Concern over computer-crime soon changed to concern over privacy as individuals in the mid 1960s began to discuss and propose new privacy legislation to legislatures in America as a result of privacy invasions by 'big-brother' government agencies. By the mid 1970s, Bynum notes that "new privacy laws and computer crime laws had been enacted in America and in Europe, and organizations of computer professionals were adopting codes of conduct for their members" (Bynum 2001).

Bynum notes further that during this period, "MIT computer scientist Joseph Weizenbaum created a computer program called ELIZA, intended to crudely simulate 'a Rogerian psychotherapist engaged in an initial interview with a patient.' Weizenbaum was appalled by the reaction that people had to his simple computer program. Some psychiatrists, for example, viewed his results as evidence that computers will soon provide automated psychotherapy; and certain students and staff at MIT even became emotionally involved with the computer and shared their intimate thoughts with it! Concerned by the ethical implications of such a response, Weizenbaum wrote the book *Computer Power and Human Reason* (1976), which is now considered a classic in computer ethics" (Bynum 2001).

It was Walter Maner (then of Old Dominion University in Virginia; now at Bowling Green State University in Ohio) who, whilst teaching a medical ethics course noticed that whenever computers were involved new ethically important considerations arose, and in the mid 1970s began to use the phrase 'computer ethics' to refer to "field of inquiry dealing with ethical problems aggravated, transformed or created by computer

technology." He attempted to, in a manner similar to medical ethics, focus attention upon the 'traditional' utilitarian ethics of Bentham and Mill, or the rationalist ethics of Kant (Bynum 2001).

Bynum explains that in 1978 Maner "self-published and disseminated his *Starter Kit in Computer Ethics*, which contained curriculum materials and pedagogical advice for university teachers to develop computer ethics courses. The *Starter Kit* included suggested course descriptions for university catalogs, a rationale for offering such a course in the university curriculum, a list of course objectives, some teaching tips and discussions of topics like privacy and confidentiality, computer crime, computer decisions, technological dependence and professional codes of ethics. Maner's trailblazing course, plus his *Starter Kit* and the many conference workshops he conducted," which Bynum notes "had a significant impact upon the teaching of computer ethics across America." (Bynum 2001).

Parker, Weizenbaum, Maner and others (though sadly still not Wiener) had established the foundations of computer ethics and it was during the 1980s that these were extended and the discipline allowed to develop. The 1980s saw an increase in attention being paid to issues such as computer-enabled crime, disasters caused by computer failures, invasions of privacy via computer databases, and major law suits regarding software ownership. In 1985 Deborah Johnson wrote the first textbook on Computer Ethics and James Moor of Dartmouth College (in a special edition of *Metaphilosophy* entitled *Computers and Ethics* edited by Bynum) published his influential article (Moor 1985:266) and defined Computer Ethics in terms of policy vacuums (recall the discussion about Wiener's policy and precedents):

> *A typical problem in computer ethics arises because there is a policy vacuum about how computer technology should be used. Computers provide us with new capabilities and these in turn give us new choices for action. Often, either no policies for conduct in these situations exist or existing policies seem inadequate. A central task of computer ethics is to determine what we should do in such cases, that is, to formulate policies to guide our actions. Of course, some ethical situations confront us as individuals and some as a society. Computer ethics includes consideration of both personal and social policies for the ethical use of computer technology.*

Terrell Bynum notes that during the 1990s universities around the world mounted new courses; specialised research centres were established; and an increasing number of conferences, journals, articles and textbooks dedicated to the subject appeared. In explaining the rising popularity he says that:

> *"a wide diversity of additional scholars and topics became involved. For example, figures such as Donald Gotterbarn, Keith Miller, Simon Rogerson, and Dianne Martin – as well as organizations like Computer Professionals for Social Responsibility, the Electronic Frontier Foundation, ACM-SIGCAS – spearheaded projects relevant to computing and professional responsibility. Developments in Europe and Australia were especially noteworthy, including new research centres in England, Poland, Holland, and Italy; the ETHICOMP series of conferences led by Simon Rogerson and the present author [Terrell Bynum]; the CEPE conferences founded by Jeroen van den Hoven; and the Australian Institute of Computer Ethics headed by Chris Simpson and John Weckert."* (Bynum 2001)

Early in the new millennium, a critical analysis of the debate on the foundations of Computer Ethics took place. Researchers at the University of Oxford contended that the focus of Computer Ethics has "moved from problem analysis – primarily aimed at sensitising public opinion, professionals and politicians – to tactical solutions resulting, for example, in the evolution of professional codes of conduct, technical standards, usage regulations, and new legislation" (Floridi and Sanders 2003:4). The same researchers noted that the "constant risk" of Computer Ethics' development thus far has been the "spreading of ad hoc or casuistic approaches to ethical problems" and that this "bottom-up procedure" should be balanced by a "foundationalist debate" which in contrast is a "top-down development…characterised by a metatheoretical

reflection on the nature and justification of computer ethics and the discussion of computer ethics' relations with the broader context of metaethical theories" (Floridi *et al* 2003:4).

Floridi *et al* asks the questions: "Can Computer Ethics amount to a coherent and cohesive discipline, rather than a more or less heterogeneous and random collection of ICT-related ethical problems, applied analyses and practical solutions? If so, what is its conceptual rationale? And how does it compare with other ethical theories?" (Floridi *et al* 2003:4) They have identified five approaches (Floridi *et al* 2003:5) to the foundation of Computer Ethics which have different answers to that question, and conclude with an affirmative position on the state of Computer Ethics as a coherent and cohesive discipline, grounded firmly with its very own conceptual rationale, Information Ethics.

3.4.1 The "no resolution" Approach: Computer-ethics is not a real discipline

Floridi describes this approach as the "ideal lowest bound for the foundationalist debate, comparable to the role played by relativisim in metaethics." He draws from Parker (1977), when he defines the approach to involve Computer Ethics problems representing unsolvable dilemmas and considers Computer Ethics a pointless exercise because there is no conceptual foundation. Floridi notes that Gotterbarn (1991:26; 1992:1) criticises the work of Parker (1981; 1982 ;1990). Floridi comments that "empirically, the evolution of Computer Ethics has proved the no resolution approach to be unnecessarily pessimistic" since "problems are successfully solved, computer-ethics related legislation is approved and enacted" and "professional standards and codes have been promoted" (Floridi *et al* 2003:5).

Floridi continues the discussion of this approach by recalling a phenomenon common amongst early proponents of Computer Ethics known as 'pop ethics' (Bynum 1992) which involved the discussion of a variety of case studies that highlight problems and has been characterised by "usually unsystematic and heterogeneous collections of dramatic stories" (Floridi *et al* 2003:6) collected together to "raise questions of

unethicality rather than ethicality" (Parker 1981). Floridi notes (2003:1) the usefulness of pop ethics in the early years as it was able to "sensitise people to the fact that computer technology had social and ethical consequences" (Bynum 1992). A criticism of pop ethics is that it is merely a collection of examples and leads one to believe that there is no solution, though as Floridi *et al* say "there is little point in providing a solution to someone unaware of the problem, particularly when the solution is not simple" (Floridi *et al* 2003:6). An advantage of pop ethics though is its ability to explain the variety of concerns (for example the professional, legal, moral, social and political concerns) through the use of case studies (see Epstein 1997).

3.4.2 The Professional Approach: Computer-Ethics is a Pedagogical Methodology

Gotterbarn's view on Computer Ethics differed with Parker who held that there is no resolution (see above). For Gotterbarn the answer lay in developing a 'professional-ethics' approach. He says that faculty should "introduce the students to the responsibilities of their profession, articulate the standards and methods used to resolve non-technical ethics questions about their profession, develop some proactive skills to reduce the likelihood of future ethical problems,… indoctrinate the students to particular set of values… and teach the laws related to a particular profession to avoid malpractice suits." (Gotterbarn 1992:1).

Gotterbarn argues the 'professional-ethics approach' from a position where there is "no deep theoretical difference between computer ethics and other professional ethics like business ethics, medical ethics or engineering ethics" (Gotterbarn 1991:26; 1992:1). For Gotterbarn, the goal of Computer Ethics courses would be to create "ethically minded professionals not ethicists", and therefore, Floridi notes, it "may actually be better not to have philosophers teaching them" (Floridi *et al* 2003:7) since as Gotterbarn says "in applied professional ethics courses, our aim is not the acquaintance with complex ethical theories, rather it is recognising the role responsibility and awareness of the nature of the profession" (1992:1).

Floridi notes that the advantages of the 'professional-ethics approach' have been the emphasis on computer-ethics education, looking at "technical standards and requirements, professional guidelines, specific legislation or regulations, [and] levels of excellence". He concludes that the 'professional-ethics approach' "exposes the risky and untenable nature of the 'no-resolution approach'" whilst at the same time defending the "value and importance of a constructive 'pop-ethics', by developing a 'proactive' professional ethics (standards, obligations, responsibilities, expectations etc.)" (Floridi *et al* 2003:8). This approach has been largely responsible for the "elaboration and adoption of usage regulations and codes of conduct in ICT contexts (libraries, universities, offices etc.), within industry and in professional associations and organisations, as well as the promotion of certification of computer professionals" (Floridi *et al* 2003:8). Floridi notes that this approach focuses mainly on "ICT practitioners, especially those in software development, where technical standards and specific legislation provide a reliable, if minimal, frame of reference" (Floridi *et al* 2003:8). This is in keeping with the goals of the approach, which are stated by Gotterbarn to be pedagogical and not metaethical:

> *"The only way to make sense of "Computer Ethics" is to narrow its focus to those actions that are within the horizon of control of the individual moral computer professional."* (Gotterbarn 1991:26; 1992:1; and 2001 presents a less radical view)

Floridi disagrees with this strong view of professional-ethics noting that it falls short in three areas:

1. Firstly, the problems associated with computer ethics (for example privacy, accuracy, security, reliability, intellectual property and access) permeate contemporary life unlike other purely professional issues (Floridi *et al* 2003:9).

2. Secondly, Floridi notes that to interpret professional ethics as offering a foundation for computer ethics is to "commit a mistake of levels, similar to attempting to define arithmetic on the basis only of what is taught in an

introductory course." Floridi believes that without a theoretical approach, the professional-ethics approach is but only a "middle level" between pop-Computer Ethics and theoretical Computer Ethics. (Floridi *et al* 2003:9).

3. Thirdly, Floridi *et al* believe that to accept that computer ethics are merely professional ethics, without any further need for conceptual foundation runs the risk of "being at best critical but naïve, and at worst dogmatic and conservative". Floridi *et al* continue, saying that to focus on "case-based analyses and analogical reasoning, a *critical* professional-ethics approach will painfully and slowly attempt to re-discover inductively ethical distinctions, clarifications, theories and so forth already available and discussed in specialised literature; … whilst an *uncritical* professional-ethics approach will tend to treat ethical problems and solutions as misleadingly simple, non-conflicting, self-evident and uncontroversial, a matter of mere indoctrination, as exemplified in 'The 10 Commandments of Computer Ethics[39]' approach." (though he admits that a methodologically coherent system of ethics can be expressed in a list of negative prescriptions ("thou shalt not…"), he does not believe computer ethics has matured enough to be able to do so and sees the 'professional-ethics approach' as the pragmatic "historical first step towards a more mature Computer Ethics" (Floridi *et al* 2003:10).

One of the literature's further criticism's with the 'professional-ethics approach' (following on from the 'no-resolution approach' and 'pop-ethics') has been its failure to answer the following questions (Floridi *et al* 2003:10):

[39] "1. Thou shalt not use a computer to harm other people; 2. Thou shalt not interfere with other people's computer work; 3. Thou shalt not snoop around in other people's computer files; 4. Thou shalt not use a computer to steal; 5. Thou shalt not use a computer to bear false witness; 6. Thou shalt not copy or use proprietary software for which you have not paid; 7. Thou shalt not use other people's computer resources without authorization or proper compensation; 8. Thou shalt not appropriate other people's intellectual output; 9. Thou shalt think about the social consequences of the program you are writing or the system you are designing; 10. Thou shalt always use a computer in ways that insure consideration and respect for your fellow humans" (Computer Ethics Institute (CEI) 1992).

1. Why does ICT raise moral issues?

2. Are Computer Ethics issues unique (in the sense of requiring their own theoretical investigations, not entirely derived from standard ethics)?

3. Or are they simply moral issues that happen to involve ICT? What kind of ethics is Computer Ethics?

4. What justifies a certain methodology in Computer Ethics (for example, analogy and case-based analysis?)

5. What is Computer Ethics' rationale?

6. What is the contribution of Computer Ethics to the ethical discourse?

It is at this point in the literature that a 'Theoretical Computer-Ethics' emerged – albeit along two lines, arguing for the 'uniqueness' of Computer-Ethics.

3.4.3 The Radical Approach: Computer Ethics as a Unique Discipline

The Radical Approach says that "the presence of a policy and conceptual vacuum (Moor 1985:266) indicates that Computer Ethics deals with absolutely unique ideas, in need of a completely new approach. Maner argues that:

> *"[computer ethics] must exist as a field worthy of study in its own right and not because it can provide a useful means to certain socially noble ends. To exist and to endure as a separate field, there must be a unique domain for computer ethics distinct from the domain for moral education, distinct even from the domains of other kinds of professional and applied ethics. Like James Moor, I believe computers are special technology and raise special ethical issues, hence that computer ethics deserves special status"* (Maner 1999).

Floridi believes, that the Radical Approach offers several advantages over the previously considered approaches. It does not under-estimate the "gravity and novelty" of Computer Ethics and it stresses the methodological necessity of providing the field with a robust and autonomous theoretical rationale" (Floridi *et al* 2003:11). Yet Floridi *et al* find four problems with the Radical Approach:

1. Given Maner's argument above, the Radical Approach would need, according to Floridi, the "explicit and uncontroversial identification of some unique area of study" (2003:11), and Floridi declares that none of the cases mentioned by Maner are uncontroversially unique. Yet this does not surprise Floridi since he notes that neither in business ethics, medical ethics or environmental ethics (for example) are there any significant moral issues that do not interact with the rest of the ethical context.

2. Floridi *et al* argue that to hold onto the Radical Approach because maybe, sometime in the future computer ethics problems "could be made, or become, or discovered to be increasingly specific, until they justify the position defended by the Radical Approach … keeps the burden of proof on the Radical Approach side" (Floridi *et al* 2003:12), a situation they dismiss as "safe but uninteresting" (Floridi *et al* 2003:12). Rather, they believe that if it is possible in principle to have a domain of unique ethical issues (and they believe in practice it is not) – they state that "the uniqueness of a certain topic is not simply inherited as a property by the discipline that studies it" (Floridi *et al* 2003:12).

3. Ethical issues are inter-related and cannot by reduced to the equation "unique topic = unique discipline" (Floridi *et al* 2003:12).

4. Finally, Floridi notes that to focus too much on the uniqueness of computer ethics "runs the risk of isolating [computer ethics] from the more general context of metaethical theories." Floridi concludes saying that "this would mean missing the opportunity to enrich the ethical discourse" (Floridi *et al* 2003:12).

3.4.4 The Conservative Approach: Computer-ethics as Applied Ethics

The Conservative Approach holds that the classic macroethical theories – for example Consequentialism, Deontologism, Virtue Ethics, and Contractualism – are capable of

handling Moor's policy vacuum. Floridi *et al* note that these theories "might need to be adapted, enriched and extended, but they have all the conceptual resources required to deal with computer ethics questions successfully and satisfactorily" (2003:13). The Conservative Approach also holds that "certain ethical issues are transformed by the use of ICT, but they represent only new species of traditional moral issues, to which already available metaethical theories need to, and can successfully, be applied. They are not and cannot be a source of a new, macroethical theory" (Floridi *et al* 2003:13). One of the major proponents of this approach is Deborah Johnson who introduced the genus-species argument[40] and believes that "the ethical issues surrounding computer technology are first and foremost ethical" (Johnson 2000:1). Floridi *et al* believe that because this approach positions itself as "an interface between ICT-related moral problems and standard macroethics" it enjoys the advantages "associated with a strong theoretical position" (2003:14). Aside from rejecting the No Resolution Approach, it extends the Professional Approach by saying that Computer-Ethics is "an ethics for the citizen of the information society, not just for the ICT professional" (Floridi *et al* 2003:14) and because of its grounding in standard macroethics, allows a constructive attitude (similar to that of the Professional Approach) and at the same time refraining from a "naïve or uncritical reliance on some contingent normal ethics" (2003:14). Finally Floridi *et al* believe that the *evolutionary* development of this approach enables the Conservative Approach to avoid the 'unique topic = unique discipline' pitfalls of the revolutionary Radical Approach and to "integrate them well

[40] "Extending the idea that computer technology creates new possibilities, in a seminal article, Moor (1985:266) suggested that we think of the ethical questions surrounding computer and information technology as policy vacuums. Computer and information technology creates innumerable opportunities. This means that we are confronted with choices about whether and how to pursue these opportunities, and we find a vacuum of policies on how to make these choices. […] I propose that we think of the ethical issues surrounding computer and information technology as new species of traditional moral issues. On this account, the idea is that computer-ethical issues can be classified into traditional ethical categories. They always involve familiar moral ideas such as personal privacy, harm, taking responsibility for the consequences of one's action, putting people at risk, and so on. On the other hand, the presence of computer technology often means that the issues arise with a new twist, a new feature, a new possibility. The new feature makes it difficult to draw on traditional moral concepts and norms. […] The genus-species account emphasizes the idea that the ethical issues surrounding computer technology are first and foremost ethical. This is the best way to understand computer-ethical issues because ethical issues are always about human beings" (Johnson 2000:1).

within the broader context of the ethical discourse" (2003:14).

Floridi *et al* finds four problems with the Conservative Approach, namely:

1. Firstly, that the position that classic macroethics has all the conceptual resources required to deal successfully and satisfactorily with computer-ethics is questionable given the perception that computer-ethics problems are radically new and unpredictable.

2. Secondly, whilst the evolutionary approach finds an acceptable position between the extremist radical and traditional approaches, it does not adequately describe the degree of evolution that could occur in the genus-species argument (that is at some point it could be a radical or a minor change) and the Conservative Approach errs, by definition, on the conservative side (that is, that the change is minor) without being able to suggest which standard macroethic to apply. Floridi *et al* note this forms the "logical regress" inherent to the Conservative Approach. If one accepts the Conservative Approach to computer-ethics saying that computer-ethics is a 'microethics' one still "needs a metatheoretical analysis to evaluate which macroethics is most suitable to deal with computer-ethics problems" (2003:15). In Floridi *et al's* view, users of this approach are left trying to apply some 'normal' ethics acceptable to society or to fall back upon an arbitrary choice of macro-ethics which would invite philosophy into an area of professionalism unnecessarily (as Floridi *et al* say, "Software Engineers should not be required to read the *Nicomachean Ethics*" (2003:15)

3. Thirdly, and as a consequence of point 1 above, Floridi *et al* note that this approach is "methodologically poor" because is lacks a "clear macroethical commitment" resulting in a reliance upon "common-sense, case-based analysis and analogical reasoning, … insufficient means to understand what the Conservative Approach itself acknowledges to be new and complex issues in Computer-Ethics" (2003:16).

4. Floridi *et al* concede that this approach answers the question "what can ethics do for computer-ethics", but laments the avoidance of what they consider "the more philosophically interesting question", namely "is there anything that computer-ethics can do for ethics?" (2003:16) Floridi *et al* introduces Krystyna Górniak-Kocikowska, a colleague of Terrel Bynum, who believes that "computer ethics is the most important theoretical development in ethics since the Enlightenment" (2003:16), clearly supporting his view that "computer-ethics problems might enrich the ethical discourse by promoting a new macroethical perspective" (2003:16).

3.4.5 The Innovative Approach: Information Ethics as the Foundation of Computer-Ethics

Thus far, two theoretical approaches (the Conservative and Radical) have been examined. Bynum argues that an innovative approach to computer-ethics is required (2001). Floridi *et al* explain that the innovative approach including the "Computer-Ethics problems, the corresponding policy and conceptual vacuum, the uniqueness debate and the difficulties encountered by the radical and conservative approaches in developing a cohesive metaethical approach strongly suggest that the monopoly exercised by standard macroethics in theoretical Computer-Ethics is unjustified" (2003:16). They contend that ICT "by transforming in a profound way the context in which moral issues arise, not only adds interesting new dimensions to old problems, but leads us to rethink, methodologically, the very grounds on which our ethical positions are based. Although the novelty of Computer-Ethics is not so dramatic as to require the development of an utterly new, separate, and unrelated discipline, it certainly shows the limits of traditional approaches to the ethical discourse, and encourages a fruitful modification in the metatheoretical perspective." (2003:17).

The product of this 'fruitful modification' is Information Ethics, defined by Floridi 1998; 1999:37; and Floridi and Sanders 1999; 2001:55 to be "the theoretical foundation of applied computer-ethics is a non-standard, environmental macroethics, patient-oriented and ontocentric, based on the concepts of data-

entity/infosphere/entropy rather than life/ecosystem/pain." This definition requires some explanation.

Floridi *et al* explain that macroethical positions can focus on the moral nature and development of the agent (for example Virtue Ethics) or the agent's actions (for example, Consequentialism, Contractualism and Deontologism). The former macroethic is 'agent-oriented, subjective and often individualistic', whilst the latter is a macroethic that is 'action-oriented, relational and intrinsically social in nature'. Both are known as standard or classic macroethics and tend to be anthropocentric. Non-standard ethics on the other hand (such as Medical Ethics, Bioethics and Environmental Ethics) attempts to develop a patient-oriented ethics in which the 'patient' may be not only a human being, but also any form of life (see Rowlands 2000 cited in Floridi *et al* 2003:18). Floridi *et al* explain "that it [Non-standard ethics] places the 'receiver' of the action at the centre of the ethical discourse" and that the previously described problems with computer-ethics within the various approaches can be explained because in Floridi's view computer ethics "is primarily an ethics of *being* rather than *conduct* or becoming" (emphasis mine) (2003:19). The difference between Information Ethics and other Non-standard forms of ethics (such as Medical Ethics, Bioethics and Environmental Ethics) is that "information as such, rather than just life in general, is raised to the role of the universal patient of any action" (2003:19). Floridi *et al* note that their position, unlike biocentric ethics that "ground their analyses of the moral standing of bio-entities and ecological systems on the intrinsic worthiness of life and the intrinsically negative value of suffering", is unique in that it suggests "that there is something even more elemental than life, namely being, understood as information; and something more fundamental than pain, namely entropy" (2003:19). According to the theory, one should "evaluate the duty of any rational being in terms of contribution to the growth of the infosphere, and any process, action or event that negatively affects the whole infosphere – not just an information entity – as an increase in its level of entropy and hence an instance of evil" (2003:19).

Floridi *et al* identify the crucial contribution of Information Ethics, that is the move of information from "being a necessary prerequisite for any morally responsible action to being its primary object" (2003:19) enabling an expansion within theoretical ethics of what can be considered to be the centre of minimal moral concern. In the past only living entities were capable of being the centre of some form of moral concern, and now, with Information Ethics, the limitation of the bio-centric theories to be biased towards 'living' entities is overcome and an entity's state of being (its information state) is now capable of becoming the centre of moral concern and thus Information Ethics can rightly be described as non-standard (not agent-oriented or action-oriented but) patient-oriented ontocentric (concerned with the metaphysical study of being) macro-ethic (2003:20). Floridi *et al* conclude by saying that the "foundationalist debate in computer ethics has lead to the shaping of a new ethical view", Information Ethics (2003:20). Floridi *et al* admit that Information Ethics places Computer Ethics "at a level of abstraction too philosophical" to make it useful, yet they respond saying that "this is the inevitable price to be paid for any attempt to provide computer ethics with an autonomous rationale. One must polarise theory and practice to strengthen both" so that whilst "information ethics is not immediately useful to solve specific computer ethics problems" they note that "it provides the conceptual grounds that can guide problem-solving procedures in computer ethics" (2003:20).

To return to our analysis of Piracy then, in terms of Information Ethics, piracy could be seen to be a threat that would impede the development of future computer software and therefore, in the long-term, contribute negatively to the growth of the infosphere.

3.5 Conclusion

This chapter examined the development of Computer Ethics and has shown Floridi's Innovative Approach is more complete than the previous approaches and that it proposes that existence is more fundamental than being alive (that is things exist without necessarily being alive) and that the only proof we have of an object's existence is that we have information about it. It has been shown that Computer Ethics

has prompted a deeper philosophical debate and that Information Ethics, as described by Floridi, offers the conceptual basis for further rigorous academic study.

Chapter 4 A focus on the Curricula

This chapter shows how the Official curricula recommendations regard the inclusion of computer ethics into the curriculum as necessary. Academics in South Africa have risen to this challenge and the useful algorithm proposed by de Ridder et al (2001:105) is explained.

4.1 Introduction

The previous chapter discussed the history and development of ethics, applied ethics, and finally Computer Ethics. Reference to Computer Ethics is almost always accompanied by reference to the teaching of Computer Ethics. Computer Ethics gained popularity with Walter Maner producing in 1978 his 'Starter Kit' and Deborah Johnson in 1985 the first textbook and Donald Gotterbarn, Keith Miller, Simon Rogerson, and Dianne Martin researching the professional issues associated with Computer Ethics. This prompted Computer Professionals and their associated professional organisations to begin to demand that Computer Ethics be included first within Codes of Conduct for their members, and later prescribing it in their official curricula. This chapter describes the development of the official curricula and examines the introduction of Computer Ethics into computer courses, specifically in South Africa.

4.2 The Official Curricula

The placement of Ethics within the curriculum has been the subject of much debate and discussion over the years. One of the Track Reports at the National Conference on Computing and Values focused on this issue (Miller 1991). The delegates felt that the ideal would be to integrate ethics across the curriculum; however they noted that

"practical considerations may force a separate course in some institutions". There was a strong feeling to "convince students that values are universal". The case study method among peers was felt to be the most successful and exposure to ethical dilemmas would increase one's sensitivity to the subject (Miller 1991). For a discussion on Case Studies please see Appendix I. This work arose from the numerous Official Curricula recommendations over the years that have, increasingly in recent times, included sections on Ethics and Professional Responsibility.

4.2.1 Historical Development of Official Curricula

Table 1 outlines the various Curricula recommendations made within the Computer Science and Information Systems domains that included a recommendation on ethics

	Name	**AIS**	**AITP / DPMA**	**ACM**	**BCS**	**IFIP**	**IEEE**	**CS-IEEE**	**OTHER**
1965	ACM 1965:543			✓					
1967	COSINE Committee 1967								✓
1968	ACM Curriculum Committee on Computer Science 1968:151			✓					
1975	Mulder 1975:28								✓
1977	Education Committee of the IEEE Computer Society 1977						✓		
1978	ACM Curriculum Committee on Computer Science 1979:147			✓					
1981	DPMA 1981		✓						
1983	Educational Activities Board 1983						✓		
1986	Computing Sciences Accreditation Board 1986								✓
1986	Educational Activities Board 1986						✓		
1986	Gibbs and Tucker 1986:202			✓					
1986	DPMA 1986		✓						
1989	British Computer Society and The Institution of Electrical Engineers 1989b				✓				
1989	British Computer Society and The Institution of Electrical Engineers 1989a				✓				

	Name	AIS	AITP / DPMA	ACM	BCS	IFIP	IEEE	CS-IEEE	OTHER
1991	Tucker, Barnes, Aiken, Barker, Bruce, Cain, Conry, Epstein, Lidtke, Mulder, Rogers, Spafford, and Turner 1991			✓				✓	
1991	Longenecker, Jr. and Feinstein 1991		✓						
1994	Smith 1994:175								✓
1995	Couger, Davis, Dologite, Feinstein, Gorgone, Jenkins, Kasper, Little, Longenecker, Jr., and Valacich 1995:341								✓
1995	Longenecker, Jr., Feinstein, Couger, Davis, and Gorgone 1995:174	✓	✓	✓					
1996	Walker and Schneider 1996:85			✓					
1997	Davis, Gorgone, Couger, Feinstein, and Longenecker, Jr. 1997:1--94		✓	✓					
1998	Mulder and van Weert 1998					✓			
1999	ACM Two-Year College Education Committee 1999			✓					
1999	Kelemen, Astrachan, Baldwin, Bruce, Henderson, Skrien, Tucker, and Loan 1999								✓
2000	Computing Sciences Accreditation Board 2000								✓
2000	Gorgone, Gray, Feinstein, Kasper, Luftman, Stohr, Valacich, and Wigand 2000	✓		✓					
2001	Software Engineering Coordinating Committee 2001						✓		
2001	Roberts and Engel 2001:1			✓				✓	
2002	Gorgone, Davis, Valacich, Topi, Feinstein, and Longenecker, Jr. 2002	✓	✓	✓					

Table 1: Historical Timeline of Curricula Recommendations

It is interesting to note the increased collaboration between official bodies, representing a broad consensus between the different Professional Bodies.

4.2.2 Official Curricula

The latest set of official curricula recommendations is from the Joint IEEE Computer Society/ACM Task Force on the "Model Curricula for Computing" (CC) which was formed to review the 1991 curricula and develop a revised and enhanced version that would address developments in computing technologies in the past decade and would sustain them through the next decade.

The effort involved the creation of several volumes reflecting the diversity of the computing field:

- Overview Volume
  - General principles and commonalities among all of the specific discipline volumes
- Specific discipline volumes
  - Computer Science Volume
  - Computer Engineering Volume
  - Software Engineering Volume
  - Information Systems Volume

4.2.2.1 Computer Science

Please see section *Annexure A: Computer Science* in *Appendix A* for an outline of the Social and Professional Issues course recommended in the Computing Curricula 2001, Computer Science Volume (Roberts *et al* 2001:141).

The authors of CC2001 identified “natural boundaries” for the selection of curricula implementation strategies by classifying courses as introductory, intermediate, or advanced. They defined six instantiations of the introductory curriculum and four thematic approaches to the intermediate courses, which are listed in Table 2.

Introductory Courses	Imperative First	Objects First	Functional First	Breadth First	Algorithms First	Hardware First
Intermediate Courses	Topic-based approach	Compressed approach		Systems-based approach	Web-based approach	
Advanced	Additional courses used to complete the undergraduate program					

Courses	

Table 2: Course levels and implementation strategies (Roberts *et al* 2001:18)

The Computer Science Body of Knowledge is divided into:

- DS. Discrete Structures (43 core hours)
- PF. Programming Fundamentals (38 core hours)
- AL. Algorithms and Complexity (31 core hours)
- AR. Architecture and Organization (36 core hours)
- OS. Operating Systems (18 core hours)
- NC. Net-Centric Computing (15 core hours)
- PL. Programming Languages (21 core hours)
- HC. Human-Computer Interaction (8 core hours)
- GV. Graphics and Visual Computing (3 core hours)
- IS. Intelligent Systems (10 core hours)
- IM. Information Management (10 core hours)
- SP. Social and Professional Issues (16 core hours)
- SE. Software Engineering (31 core hours)
- CN. Computational Science (no core hours)

There are 280 hours of 'core content' of which the Social and Professional issues take up 16 hours or 6% of the core curriculum.

The Social and Professional Issues course ($CS280_T$) is an intermediate course that follows a Topic-based approach covering the following topics:

SP. Social and Professional Issues (16 core hours with core topics underlined)
SP1. History of computing (1 hour)
SP2. Social context of computing (3 hours)
SP3. Methods and tools of analysis (2 hours)
SP4. Professional and ethical responsibilities (3 hours)
SP5. Risks and liabilities of computer-based systems (2 hours)
SP6. Intellectual property (3 hours)
SP7. Privacy and civil liberties (2 hours)
SP8. Computer crime (3 hours)
SP9. Economic issues in computing (2 hours)
SP10. Philosophical frameworks (2 hours)

The Social and Professional Issues course is not included in the other recommended approaches (that is the Compressed, Systems-based or Web-based approaches) as a

stand-alone course, but rather it is integrated in such a way that all core topics are covered:

> "*[T]he issues of ethics and professionalism have not been relegated to a single course independent of and unrelated to the rest of the curriculum. This important material has instead been incorporated into many intermediate courses. For example, CS262C treats the ownership of intellectual property, while CS292C (Software Development and Professional Practice) includes modules on the social context of computing, ethical and professional responsibilities, and risks and liabilities in software development.*" (Roberts *et al* 2001:52).

4.2.2.2 Computer Engineering

Section *1.A Computer Engineering* in *Appendix A* contains an outline of the Social and Professional Issues course recommended in the Computing Curricula 2001, Computer Science Volume (Roberts *et al* 2001:141).

The Computer Engineering Body of Knowledge consists of

- CE-ALG Algorithms and Complexity [30 core hours]
- CE-CAO Computer Architecture and Organization [63 core hours]
- CE-CSE Computer Systems Engineering [18 core hours]
- CE-CSG Circuits and Signals [43 core hours]
- CE-DBS Database Systems [5 core hours]
- CE-DIG Digital Logic [57 core hours]
- CE-DSP Digital Signal Processing [17 core hours]
- CE-ELE Electronics [40 core hours]
- CE-ESY Embedded Systems [20 core hours]
- CE-HCI Human-Computer Interaction [8 core hours]
- CE-NWK Computer Networks [21 core hours]
- CE-OPS Operating Systems [20 core hours]
- CE-PRF Programming Fundamentals [39 core hours]
- CE-SPR Social and Professional Issues [16 core hours]
- CE-SWE Software Engineering [13 core hours]
- CE-VLS VLSI Design and Fabrication [10 core hours]

There are 420 hours of 'core content' of which the Social and Professional issues take up 16 hours or 3.8% of the core curriculum. The Computer Engineering Volume of the Computer Curriculum Project is yet to be completed and is still in very early draft

stages. Despite this, the inclusion of ethics and professional issues is strongly stated in these early drafts. The report describes the nature of Computer Engineering as follows:

> "*An important initial aspect of the engineering ethos relates to acquiring the background necessary to understand and to reason about engineering concepts and artefacts. This background stems from fundamental ideas in areas such as computing, electronics, mathematics and physics and students need to acquire familiarity and facility with these concepts. An important role of the body of knowledge for computer engineering is to expose and develop these fundamental notions. In many ways the core of the body of knowledge reflects a careful set of decisions about selection of material that fulfils this role.*
>
> *This basic material then provides underpinning for additional material whose ultimate expression is the building of better as well as novel computing systems. A blend of theory and practice, with theory guiding practice, is viewed as the best approach to the discipline.* This needs to be accompanied by attention to a set of professional, legal and ethical concerns that guide the activities and attitudes of the well-educated computer engineer *[emphasis added], as well as familiarity with a considerable range of diverse applications."* (Soldan 2004:25).

The report goes on to describe the elements of a Computer Engineer's Ethos and concludes by advocating that one should recognise the importance of understanding the relevant professional, ethical and legal issues and the framework within which engineers needs to operate

The report is not complete and therefore what course recommendations it does provide are not articulated fully – however, it seems clear that there will be a course on ethical and professional issues in the future.

4.2.2.3 Software Engineering

Section *1.B Software Engineering* in *Appendix A* contains an outline of the Social and Professional Issues course recommended in Software Engineering 2004: Curriculum Guidelines for Undergraduate Degree Programs in Software Engineering, a volume of the Computing Curricula Series (LeBlanc and Sobel 2004:1).

The Software Engineering Education Knowledge Area (SEEK) is divided into:

- CMP Computing Essentials (172 core hours)
- Mathematical & Engineering Fundamentals (89 core hours)
- Professional Practice (35 core hours)
- Software Modelling & Analysis (53 core hours)
- Software Design (45 core hours)
- Software V & V (42 core hours)
- Software Evolution (10 core hours)
- Software Process (13 core hours)
- Software Quality (16 core hours)
- Software Management (19 core hours)

There are 494 hours of 'core content' of which the Professional Practice issues take up 35 hours or 7% of the core curriculum. The Professional Practice course apportions 5 hours to group dynamics / psychology, 10 hours to communication skills (specific to Software Engineering) and 20 hours to Professionalism where the subject of ethics and professional conduct is considered.

The Curriculum Guidelines state that:

> *"Software Engineering as a profession has obligations to society. The products produced by software engineers affect the lives and livelihoods of the clients and users of those products. Hence, software engineers need to act in an ethical and professional manner. The preamble to the Software Engineering Code of Ethics and Professional Practice [ACM 1998] states "Because of their roles in developing software systems, software engineers have significant opportunities to do good or cause harm, to enable others to do good or cause harm, or to influence others to do good or cause harm. To ensure, as much as possible, that their efforts will be used for good, software engineers must commit themselves to making software engineering a beneficial and respected profession. In accordance with that commitment,*

> *software engineers shall adhere to the following Code of Ethics and Professional Practice."*
>
> *"To help insure ethical and professional behaviour, software engineering educators have an obligation to not only make their students familiar with the Code, but to also find ways for students to engage in discussion and activities that illustrate and illuminate the Code's eight principles, including common dilemmas facing professional engineers in typical employment situations." (LeBlanc et al 2004:10).*

The Computing Curriculum – Software Engineering (CCSE) volume has as a principle:

> *"CCSE must include exposure to aspects of professional practice as an integral component of the undergraduate curriculum. The professional practice of software engineering encompasses a wide range of issues and activities, including problem solving, management, ethical and legal concerns, written and oral communication, working as part of a team, and remaining current in a rapidly changing discipline." (LeBlanc et al 2004:11).*

Thus within the Professional Practice section of the curriculum, CCSE advises that it is essential that students must be able to comprehend professional codes of conduct.

One of the student outcomes is to "design appropriate solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal, and economic concerns" (LeBlanc *et al* 2004:1).

LeBlanc reports that in 2003, employers were asked to rate the importance of candidate qualities and skills on a five-point scale, with five being "extremely important" and one being "not important." Communication skills (4.7 average), honesty/integrity (4.7), teamwork skills (4.6), interpersonal skills (4.5), motivation/initiative (4.5), and strong work ethic (4.5) were the most desired characteristics" (LeBlanc *et al* 2004:17).

CCSE makes a valid point when it notes that "[a] curriculum can have an important direct effect on some professional practice factors (for example teamwork, communication, and analytic skills), while others (for example strong work ethic,

self-confidence) are subject to the more subtle influence of a college education on individual's character, personality and maturity" (LeBlanc *et al* 2004:18).

One of the outcomes for their course in Ethics and Professional Practice is for the student to be able to "make ethical decisions when faced with ethical dilemmas, with reference to general principles of ethics as well as codes of ethics for engineering, computing, and software engineering" (LeBlanc *et al* 2004:100), furthermore "it suggests that this course be taught in part using presentations by guest speakers. For example, there could be talks by an expert on ethics, a representative of a professional society, an intellectual property expert, etc." and "students should be asked to debate various ethical issues".

4.2.2.4 Information Systems

Section *1.B.i Information Systems* in *Appendix A* contains an outline of the Social and Professional Issues course recommended in the Computing Curricula 2001, IS 2002 (Gorgone *et al* 2002).

In the executive summary of IS 2002 (Gorgone *et al* 2002), the latest official curriculum guideline from the various international professional associations of Information Systems, it is recommended that "IS Professionals must have interpersonal, communication and team skills and *have strong ethical principles*" (emphasis added).

The report continues to list the following analytical and critical thinking skills under the heading of ethics and professionalism:

- Codes of conduct
- Ethical theory
- Leadership
- Legal and regulatory standards
- Professionalism - self directed, leadership, time management
- Professionalism - commitment to and completion of work

Depth of Knowledge Level	Year 1	Year 2	Year 3	Year 4
Courses offered	IS'96.P0 Knowledge Work Software Tool Kit IS'96.1 Fundamentals of IS	IS'96.2 Personal Productivity IS IS'96.3 IS Theory/Practice IS'96.6 Networking and Telecommunications	IS'96.5 Programming IS'96.4 IT hardware/Software IS'96.7 Analysis/Logical Design IS'96.8 Physical Design with DB	IS'96.9 Physical Design/Programming IS'96.10 Project Management/Practice
4 Application Knowledge				
3 Use / Comprehensive Knowledge		0119 Ethics and Legal Issues		
2 Literacy / Differential Knowledge		0031 IS, Society & Ethics 0085 IS Professional Code of Ethics		
1 Awareness / Recognition Knowledge	0012 Ethics and the IS Professional			

Table 3: Example of where Ethics is included in the IS2002 curriculum

These topics are reviewed in *IS 2002.1 – Fundamentals of Information Systems* by presenting and discussing the professional and ethical responsibilities of the IS practitioner and examined in greater detail in *IS 2002.2 – Electronic Business Strategy, Architecture and Design* through presenting and explaining ethical, contractual, and regulatory issues involving domestic and trans-border interactions involving interorganizational business relationships. The "societal and ethical issues related to information systems design and use" are also recommended to be integrated into *IS 2002.3 – Information Systems Theory and Practice* through:

- introducing the societal implications of IS and related ethical issues
- introducing and exploring ethical concepts and issues relating to personal and professional behaviour
- introducing, comparing, and contrasting ethical models and approaches

In *IS 2002.7 – Analysis and Logical Design* the use of a professional code of ethics to evaluate specific IS actions is explained.

IS2002 does not specifically list the recommended hours that should be attributed to the core sections of the curriculum, or to the sections that relate to Ethics. However, a specialised project, known as ImpactCS, was conducted after CC1991 in order to further define the emerging area of Computer Ethics. One of the outcomes of the ImpactCS Project were these five baseline knowledge units (contained in Table 4), expressed in terms of learning outcomes, that could be incorporated into existing courses or used to define a stand-alone course. These learning outcomes are accompanied by a recommended number of hours.

Ethical and Social Impact of Computing	Lecture Hours	Laboratory Hours
ES1: *Responsibility of the Computer Professional* 1.a) history, development, and impact of computer technology, 1.b) why be ethical, 1.c) major ethical models, 1.d) definition of computing as a profession, and 1.e) codes of ethics and professional responsibility for computer professionals	3	6
ES2 - *Basic elements of ethical analysis* 2.a) ethical claims can and should be discussed rationally, 2.b) ethical choices cannot be avoided, and 2.c) easy ethical approaches and solutions are questionable, that is it is hard.	3	4
ES3 - *Basic skills of ethical analysis* 3.a) arguing from example, analogy, and counter-example, 3.b) identification of stakeholders in concrete situations, 3.c) identification of ethical issues in concrete situations, 3.d) application of ethical codes to concrete situations, and 3.e) identification and evaluation of possible courses of action.	3	6
ES4 - *Basic elements of social analysis* 4.a) social context influences the development and use of technology, 4.b) power relations are central in all social interactions, 4.c) technology embodies the values of the developers, 4.d) populations are diverse, and 4.e) empirical data are crucial to the design and development processes.	3	4

Ethical and Social Impact of Computing	Lecture Hours	Laboratory Hours
ES5 - *Basic skills of social analysis* 5.a) identification and interpretation of the social contexts of a particular implementation, 5.b) identification of assumptions and values embedded in a particular system, and 5.c) evaluation by means of empirical data of a particular implementation of a technology."	3	5
In-depth topics	10	5-10 (optional)
Total Hours	25	25-35

Table 4: Ethical and Social Impact of Computing (Martin 1997:115)

4.2.2.5 Summary

Table 5 summarises the Official Curricula's recommendation on the number of hours that should be spent on ethics. It was not possible to calculate what the recommendation for Information Systems was against the total number of core hours, but it can be seen that the amount of time is similar, ranging from 16 hours (in the case of Computer Science and Computer Engineering) to 35 hours (in the case of Software Engineering), with Information Systems occupying 25 hours (of lecture time).

Curriculum	**Recommended Hours**
Computer Science	16 hours (6% of core)
Computer Engineering	16 hours (3.8% of core)
Software Engineering	35 hours (7% of core)
Information Systems	25 hours (plus 25-35 laboratory hours)

Table 5: Summary of the recommended hours that should be spent

4.3 Codes of Ethics

Much mention has been made of the need for Computer Science / Information Systems graduates to be 'professional' and aware of their 'ethical responsibilities'.

The various Professional Organisations have produced Codes of Ethics or Good Conduct which would be referred to, where relevant, in the various Ethics and Professional Practice courses. Appendix B contains a selection of current Codes of Ethics/Conduct.

- Association of Compter Machinery (ACM): Code of Ethics and Professional Conduct (contained in section C in Appendix B)
- Association of Information Technology Professionals (AITP): Code of Ethics (contained in section D in Appendix B)
- Australian Computer Society (ACS) Code of Ethics (contained in section E in Appendix B)
- British Computer Society (BCS): Code of Conduct (contained in section F in Appendix B)
- Canadian Information Processing Society (CIPS): Code of Ethics (contained in section G in Appendix B)
- Computer Society of South Africa (CSSA): Code of Conduct (contained in section H in Appendix B)

After looking at the above Codes it, is evident that there is some agreement between the various Professional Societies as to what constitutes 'Good conduct', or 'Ethical Behaviour'. Whilst this list is not exhaustive, nor is it completely in common with all the codes that were considered, it does represent a majority view of the various areas that can be examined to decide upon whether one is 'ethical' in terms of IT or not. During the course of this work, advice was sought from senior IT Professionals and has been incorporated into the final outcome.

Recurring Theme

A	Piracy
B	Misrepresentation of competence
C	Work-ethic
D	Abuse of information and/or privacy
E	Conflicts of interest
F	Over selling a product's capability and misleading stakeholders; or under selling a product in terms of price in order to obtain a contract and later require a price increase.
G	Awareness and adherence to a Profession's Code
H	Whistle-blowing

Table 6: Recurring themes from various Professional Society's Codes of Ethics or Codes of Conduct.

4.4 Experiences of teaching Computer Ethics

The inclusion of ethics within the official curricula recommendations spurred educationalists around the world to revise their curricula and to experiment in ways best to include it within their curricula. South Africa was not unaffected by this. In a recent paper presented at the InSITE conference, Pretorius and Barnard (2004:140) report that:

> *"In the period 1992 to September 11 2001, the only local publication regarding the teaching of computer ethics in South African University CS/IS departments that we are aware of, is (Clarke, 1992). Since 2001, the different CS/IS departments have included computer ethics topics in their curricula. Various computer ethics topics have also been addressed by local researchers, for example (Britz; Boekhorst & Bothma, 2002; Charlesworth & Sewry, 2002; Lipinski, Buchanen & Britz, 2002; Pretorius, Barnard & de Ridder, 2002; Barnard, de Ridder, Pretorius & Cohen, 2003; Cloete, Pretorius & Barnard, 2003)"*

The earlier works cited above (1992-2002) focused on specific aspects of the Computer Ethics debate (for example privacy, professionalism, social responsibility)

and the more recent works (2002-2004) addressed the issue of teaching computer ethics. This is in line with the broader debate that was outlined in the previous chapter, where in the literature the debate on the issue of computer ethics was first proposed, justified and acknowledged. The debate then turned toward examining the issue of teaching computer ethics.

De Ridder, Pretorius and Barnard (2001:103) believe that "ideally students should be equipped with theories of philosophy and ethics" as well as "the skills to analyse, evaluate, and react appropriately to ethical dilemmas which may arise during their careers as IT professionals". They also believe that the course should be taught by a member of the department's staff, and that it should not be outsourced to, for example, a philosopher. The literature is divided when it comes to this issue, with Johnson (2004:6) maintaining that it should be someone schooled primarily in Philosophy, and Gotterbarn (in Johnson 2004:12) advocating that it should be someone schooled primarily in Computer Science/Information Systems. Johnson argues that since the teaching of computer ethics is new, those teaching it (that is Computer Science/Information Systems staff) have never been trained in this area – and that it requires someone with this training. She concludes that since philosophers have received training in ethical theory, and application, they would be best suited to the task. Gotterbarn counters Johnson's argument, concluding that "computer ethics should be taught primarily by the computer scientist who has at least as much training in ethics as the philosopher has in computer science." He proposes that such training can be achieved through books and other supplemental resources but that the presence of a computer scientist would lend an importance that might be absent should an external lecturer be responsible for the course. At this point it is worth noting that in order to integrate ethics into the curriculum, it would be preferable to have a member of staff who is familiar with the rest of the curriculum, and this view, in part, explains why Gotterbarn's proposal is more widely accepted. Dunlop (in Johnson 2004:10) suggests that a 'team approach' to teaching Computer Ethics should be considered.

Having resolved who is going to teach the course, the debate now focuses on whether it should be taught in an integrated or stand-alone way. The literature is again divided on this point, but it seems that the most recent literature advocated an approach that integrates as far as possible, but includes a 'capstone' course, which would be a 'stand-alone' course (though it would be designed to supplement the topics that are already integrated into the curriculum).

De Ridder, Pretorius and Barnard (2001:103) have developed an algorithm which they have successfully used to construct a course module on Computer Ethics at their institution.

4.4.1 The De Ridder *et al* Algorithm

De Ridder, Pretorius and Barnard (2001:105) proposed a generic algorithm that maps topics from Table 4 "to undergraduate modules in a co-ordinated way", and "aims at achieving maximum coverage with minimum overlap". They say that it "can be applied at any institution regardless of the medium of instruction". Their algorithm consists of the following steps:

1. Identify suitable core modules from the existing curriculum
2. Identify the Computer Ethics and ImpactCS topics that can be addressed by the existing study material or textbook information.
3. Minimise Overlap
4. Compile the remaining topics into a stand-alone, capstone module

This can be expressed, algorithmically as follows:

Step 1: Identify suitable first and second level core modules. Let *m* denote the number of such modules.

Step 2: Let *T* represent the contents of Table 4. Match applicable topics from *T* to existing module outcomes. Let these topics be the set *A*.

Step 3: Identify the topics not represented thus far as $N = T - A$.

Step 4: For each core module i, $1 \leq i \leq m$, identify those topics from N which may be covered, and can be integrated into the core module. Call this set C_i.

Step 5: The pair-wise set-theoretic intersection of the sets C_i will determine overlap of topics identified in step 4:

For $i = 1, \text{K}, m$
  For $k = 1+1, \text{K}, m$
    Determine $C_i \cap C_k$
    Do until $C_i \cap C_k = \Theta$
      For each $x \in C_i \cap C_k$ determine the pair-wise best match and modify C_i and C_k accordingly. that is if best match dictates $x \in C_p$, then let $C_q = C_q - \{x\}$ where $p, q \in \{i, k\}$ and $p \neq q$.
    End do,
  End for k,
End for i.

Step 6: Indicate the union of these modified sets C_i by C.

Step 7: The remaining topics, $T - (A \cup C)$, should constitute the basis of the stand-alone module.

This algorithm was used in reporting how Computer Ethics can be taught by a team at UNISA (de Ridder, Pretorius, and Barnard 2001:107), and how it would be integrated into the existing courses and what would form part of the stand-alone module.

4.5 Conclusion

All of the official curricula recommendations are in agreement that between 16 and 35 hours of lecture time should be devoted to a 'Social and Professional issues course', which encompasses the ethical aspects associated with computers.

Current work in South Africa was examined and the issue of who should teach the course was discussed. There are arguments on both sides, but it was shown that the

favoured view at present is for a member of the Computer Science / Information Systems department to teach the course.

In terms of whether to integrate ethics into the curricula or to offer a stand-alone course, the official curricula recommended that computer ethics should be integrated across the curriculum. For practical reasons this may not always be possible and so a capstone course (containing all that could not be integrated) was proposed as a way forward. The de Ridder *et al* Algorithm was shown to be a useful tool to do this.

Part III The Empirical Studies

Two complementary empirical studies were conducted. The first involved Industry and was conducted online in partnership with ITWeb and surveyed approximately 200 individuals asking questions about ethics. The second involved surveying academic departments of Universities and Technikons within South Africa asking about teaching ethics in IS. The design and results of the two surveys are discussed and presented. Detailed results can be found in Appendix E and Appendix F.

Chapter 5 Design of Empirical Study to Industry

This chapter described the design of the Empirical Survey to Industry. It reported on how the survey was structured and delivered. A list of the hypotheses tested by the survey was also supplied. The summarised results of this Survey are reported in the following chapter. For a detailed set of results please see Appendix E.

5.1 Introduction

Empirical work, professionally conducted and meaningfully analysed requires a thorough conception and design of the questionnaire. This chapter describes the method and structure of the questionnaire and identifies the hypotheses that analysis, that will be described later, will report on.

After reviewing the literature and curriculum recommendations it appears that Industry favours a focus on professional codes that prescribe Behaviour or Conduct (what is the right thing to do) as opposed to prescribing Virtues (what makes one a good person). Therefore any of the post-renaissance approaches (Ethical Egoism, Utilitarianism, Kant's Theory and Social Contract Theory) could be a theoretical basis for such codes. The paradox is though that the ideal employee is still described in terms of virtues. Also, all employees are expected to share the ethical view of the company, which in turn contributes towards that of the Society… therefore there might not be any specific problems within the industry that are unique to the industry – however, some (such as respect for property) may be more common.

An analysis of these Codes shows that piracy, misrepresentation of competence, work ethic, abuse of confidentiality and privacy, 'unprofessional' behaviour and conflicts of interest are the major issues addressed. The author therefore examined these seven issues in the survey through the use of multi-item scales.

5.2 Details of Survey

The full survey can be found in *Appendix B*. It consists of nine questions about the respondent's demographics (Gender, Home Province and Home Language, Age, Highest level of Education, Number of people who report to you and Job Title, and the Nature and Size of Business) and fifteen structured questions about Ethics with one free-form question at the end.

5.3 Structure of Questionnaire

The questionnaire was divided into four sections.

1. The first section includes questions 2.1 to 2.9 which investigate the respondents' attitudes towards Ethics as it relates to IT and what degree of education they have received. These questions are answered using a five-point Likert scale of Never, Hardly Ever, Sometimes, Quite Often, and Always.

2. The second section, question 2.10, investigates the frequency of the problems respondents experience with Ethics as it relates to IT within their organisation on a five-point Likert scale (Never, Hardly Ever, Sometimes, Quite Often, and Always) with a 'Do not know' option.

3. The third section, question 2.11, asks what behaviour the respondent has personally exhibited on a five-point Likert scale, Never, Hardly Ever, Sometimes, Quite Often, and Always.

4. The fourth section concludes the questionnaire, asking what level of confidence respondents' have with their entry-level graduate employees' awareness of their ethical and professional responsibilities and how much emphasis they would like to be seen accorded to ethical issues within a graduates' Information System's education. Finally, it polls respondents asking how their organisation deals with ethical problems within their organisations.

5.4 Delivery Mode

The questionnaire was distributed via the Internet with the help of online industry newspaper *ITWeb* and promoted through email adverts from the Computer Society of South Africa (CSSA) and articles posted on *ITWeb*. The survey was completed during January and February of 2003.

5.5 Hypotheses

Five broad hypotheses were investigated:

1. Education in ethics (amongst other factors) leads to ethical behaviour.
2. The size of an organisation affects the way the ethical behaviour of that organisation is perceived.
3. The perception of an organisation's behaviour as ethical leads to ethical behaviour in individuals.
4. The level of responsibility an individual has, affects his or her ethical behaviour.
    a. The more people who report to an individual, affects his or her ethical behaviour.
    b. The higher the level of education an individual has received, the more ethical his or her behaviour.
    c. The more responsible a Job Title an individual possesses. The more ethical his or her behaviour.
5. The choice of approach to educate and manage ethical behaviour within an organisation leads to ethical behaviour within that organisation.
    a. The use of policies within an organisation leads to ethical behaviour.
    b. The use of contractual agreements within an organisation leads to ethical behaviour.
    c. The use of penalties within an organisation leads to ethical behaviour.
    d. The use of appropriate counselling within an organisation leads to ethical behaviour.
    e. The use of disciplinary procedures within an organisation leads to ethical behaviour.

The questionnaire used the following two sets of eleven factors (adapted from Table 6), which examined the state of Ethical Behaviour of individuals and of organizations, to correlate against the hypotheses:

	Individual	Organization
1	I have pirated software for work purposes	Piracy by employees at/for work
2	I have pirated software for personal purposes	Piracy by employees at/for home
3	I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients	Misrepresentation of competence to internal/external clients
4	I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment	Misrepresentation of competence to employer
5	I do "half-a-job", producing work that is not my best	Producing "half-jobs" or work that is not the best possible
6	I have abused confidential information entrusted to me	Abuse of confidential information
7	I have, in the past, failed to disclose a conflict of interest	Failure to disclose conflicts of interest
8	I have intentionally over/under sold IT to internal/external clients	Intentionally over/under selling IT to internal/external clients in order to obtain contracts
9	I have violated employees privacy	Abuse of employees privacy
10	I have violated customers privacy	Abuse of customers privacy
11	I am unaware of the ethical issues involving IT	Employees are unaware of ethical issues involving IT

Table 7: Industry Survey Factors

This analysis was based upon the question as to whether there was a correlation between P_i and O_j, where P_i represents the respondent's personal behaviour for facet *i* and O_j the respondent's perception of behaviour in his or her organisation regarding facet *j*. 121 hypotheses were analysed for their correlation with Ethical Behaviour. Detailed lists of the hypotheses tested are listed below:

5.5.1 Set 1: Education in ethics (amongst other factors) leads to ethical behaviour.

Sub-Set	Hypothesis	Hypothesis Text
1	H_0	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual pirates software for work purposes.
	H_1	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual pirates software for work purposes.

Sub-Set	Hypothesis	Hypothesis Text
2	H_2	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual pirates software for personal purposes.
	H_3	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual pirates software for personal purposes.
3	H_4	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual claims expertise in an area they are not competent / qualified in when dealing with internal / external clients.
	H_5	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual claims expertise in an area they are not competent / qualified in when dealing with internal / external clients
4	H_6	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual claims expertise in an area they are not competent / qualified in order to gain employment.
	H_7	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual claims expertise in an area they are not competent / qualified in order to gain employment.
5	H_8	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual does 'half-a-job', producing work that is not their best.
	H_9	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual does 'half-a-job', producing work that is not their best.
6	H_{10}	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual abuses confidential information entrusted to him / her.
	H_{11}	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual abuses confidential information entrusted to him / her.
7	H_{12}	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual fails to disclose a conflict of interest.
	H_{13}	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual fails to disclose a conflict of interest.
8	H_{14}	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual has intentionally over/under sold IT to internal / external clients.
	H_{15}	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual has intentionally over/under sold IT to internal / external clients.
9	H_{16}	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual has violated another employees' privacy.
	H_{17}	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual has violated another employees' privacy.
10	H_{18}	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual has violated a customers' privacy.

Sub-Set	Hypothesis	Hypothesis Text
	H_{19}	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual has violated a customers' privacy.
11	H_{20}	There is no correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual is unaware of the ethics issues involving IT.
	H_{21}	There is a significant correlation between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual is unaware of the ethics issues involving IT.

Table 8: Hypothesis Set 1 - Education in ethics (amongst other factors) leads to ethical behaviour.

5.5.2 Set 2: The size of an organization affects the way the ethical behaviour of that organisation is perceived.

Sub-Set	Hypothesis	Hypothesis Text
12	H_{22}	There is no correlation between the size of an organisation and the frequency of piracy by employees at/for work.
	H_{23}	There is a significant correlation between the size of an organisation and the frequency of piracy by employees at/for work.
13	H_{24}	There is no correlation between the size of an organisation and the frequency of piracy by employees at/for home.
	H_{25}	There is a significant correlation between the size of an organisation and the frequency of piracy by employees at/for home.
14	H_{26}	There is no correlation between the size of an organisation and the frequency of misrepresentation of competence to internal/external clients.
	H_{27}	There is a significant correlation between the size of an organisation and the frequency of misrepresentation of competence to internal/external clients.
15	H_{28}	There is no correlation between the size of an organisation and the frequency of misrepresentation of competence to employer.
	H_{29}	There is a significant correlation between the size of an organisation and the frequency of misrepresentation of competence to employer.
16	H_{30}	There is no correlation between the size of an organisation and the frequency of producing "half-jobs" or work that is not the best possible.
	H_{31}	There is a significant correlation between the size of an organisation and the frequency of producing "half-jobs" or work that is not the best possible.
17	H_{32}	There is no correlation between the size of an organisation and the frequency of the abuse of confidential information.
	H_{33}	There is a significant correlation between the size of an organisation and the frequency of the abuse of confidential information.
18	H_{34}	There is no correlation between the size of an organisation and the frequency of failing to disclose conflicts of interest.
	H_{35}	There is a significant correlation between the size of an organisation and the frequency of failing to disclose conflicts of interest.
19	H_{36}	There is no correlation between the size of an organisation and the frequency of intentionally over/under selling IT to internal/external clients in order to obtain contracts.
	H_{37}	There is a significant correlation between the size of an organisation and the frequency of intentionally over/under selling IT to internal/external clients in order to obtain contracts.

Sub-Set	Hypothesis	Hypothesis Text
20	H_{38}	There is no correlation between the size of an organisation and the frequency of the abuse of an employee's privacy.
	H_{39}	There is a significant correlation between the size of an organisation and the frequency of the abuse of an employee's privacy.
21	H_{40}	There is no correlation between the size of an organisation and the frequency of the abuse of a customer's privacy.
	H_{41}	There is a significant correlation between the size of an organisation and the frequency of the abuse of a customer's privacy.
22	H_{42}	There is no correlation between the size of an organisation and the frequency of employees being unaware of ethical issues involving IT.
	H_{43}	There is a significant correlation between the size of an organisation and the frequency of employees being unaware of ethical issues involving IT.

Table 9: Hypothesis Set 2 - The size of an organisation affects the way the ethical behaviour of that organisation is perceived.

5.5.3 Set 3: The perception of an organisation's behaviour as ethical leads to ethical behaviour in individuals.

Sub-Set	Hypothesis	Hypothesis Text
23	H_{44}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to pirating software for work purposes.
	H_{45}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to pirating software for work purposes.
24	H_{46}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to pirating software for personal purposes.
	H_{47}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to pirating software for personal purposes.
25	H_{48}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to claiming expertise in an area where one is not competent/qualified in whilst dealing internal/external clients.
	H_{49}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to claiming expertise in an area where one is not competent/qualified in whilst dealing internal/external clients.
26	H_{50}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to claiming expertise in an area where one is not competent/qualified in order to gain employment.
	H_{51}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to claiming expertise in an area where one is not competent/qualified in order to gain employment.
27	H_{52}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to doing "half-a-job", producing work that is not one's best.

Sub-Set	Hypothesis	Hypothesis Text
	H_{53}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to doing "half-a-job", producing work that is not one's best.
28	H_{54}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to abusing confidential information entrusted to one.
	H_{55}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to abusing confidential information entrusted to one.
29	H_{56}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to failing to disclose a conflict of interest.
	H_{57}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to failing to disclose a conflict of interest.
30	H_{58}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to intentionally over/under selling IT to internal/external clients in order to get a contract.
	H_{59}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to intentionally over/under selling IT to internal/external clients in order to get a contract.
31	H_{60}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes violating employees privacy.
	H_{61}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes violating employees privacy.
32	H_{62}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes violating customers privacy.
	H_{63}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes violating customers privacy.
33	H_{64}	There is no correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to being aware of the ethics issues involving IT.
	H_{65}	There is a significant correlation between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to being aware of the ethics issues involving IT.

Table 10: Hypothesis Set 3 - The perception of an organisation's behaviour as ethical leads to ethical behaviour in individuals.

5.5.4 Set 4: The level of responsibility an individual has, affects his or her ethical behaviour.

Sub-Set	Hypothesis	Hypothesis Text

Sub-Set	Hypothesis	Hypothesis Text
34	H_{66}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual pirates software for work purposes.
	H_{67}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual pirates software for work purposes.
35	H_{68}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual pirates software for personal purposes.
	H_{69}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual pirates software for personal purposes.
36	H_{70}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual claims expertise in an area they are not competent / qualified in when dealing with internal / external clients.
	H_{71}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual claims expertise in an area they are not competent / qualified in when dealing with internal / external clients.
37	H_{72}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual claims expertise in an area they are not competent / qualified in order to gain employment.
	H_{73}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual claims expertise in an area they are not competent / qualified in order to gain employment.
38	H_{74}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual does ‘half-a-job’, producing work that is not their best.
	H_{75}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual does ‘half-a-job’, producing work that is not their best.
39	H_{76}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual abuses confidential information entrusted to him / her.
	H_{77}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual abuses confidential information entrusted to him / her.
40	H_{78}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual fails to disclose a conflict of interest.
	H_{79}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual fails to disclose a conflict of interest.
41	H_{80}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual has intentionally over/under sold IT to internal / external clients.
	H_{81}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual has intentionally over/under sold IT to internal / external clients.
42	H_{82}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual has violated another employees’ privacy.

Sub-Set	Hypothesis	Hypothesis Text
	H_{83}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual has violated another employees' privacy.
43	H_{84}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual has violated a customers' privacy.
	H_{85}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual has violated a customers' privacy.
44	H_{86}	There is no correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual is unaware of the ethics issues involving IT.
	H_{87}	There is a significant correlation between the level of responsibility (as gauged by the number of people who report to an individual) and whether an individual is unaware of the ethics issues involving IT.

Table 11: Hypothesis Set 4 - The level of responsibility an individual has, affects his or her ethical behaviour.

5.5.5 Set 5: Level of Education received as a factor of Ethical Behaviour

Sub-Set	Hypothesis	Hypothesis Text
45	H_{88}	There is no correlation between the highest level of education received and whether an individual pirates software for work purposes.
	H_{89}	There is a significant correlation between the highest level of education received and whether an individual pirates software for work purposes.
46	H_{90}	There is no correlation between the highest level of education received and whether an individual pirates software for personal purposes.
	H_{91}	There is a significant correlation between the highest level of education received and whether an individual pirates software for personal purposes.
47	H_{92}	There is no correlation between the highest level of education received and whether an individual claims expertise in an area they are not competent / qualified in when dealing with internal / external clients.
	H_{93}	There is a significant correlation between the highest level of education received and whether an individual claims expertise in an area they are not competent / qualified in when dealing with internal / external clients.
48	H_{94}	There is no correlation between the highest level of education received and whether an individual claims expertise in an area they are not competent / qualified in order to gain employment.
	H_{95}	There is a significant correlation between the highest level of education received and whether an individual claims expertise in an area they are not competent / qualified in order to gain employment.
49	H_{96}	There is no correlation between the highest level of education received and whether an individual does 'half-a-job', producing work that is not their best.
	H_{97}	There is a significant correlation between the highest level of education received and whether an individual does 'half-a-job', producing work that is not their best.
50	H_{98}	There is no correlation between the highest level of education received and whether an individual abuses confidential information entrusted to him / her.
	H_{99}	There is a significant correlation between the highest level of education received and whether an individual abuses confidential information entrusted to him / her.

Sub-Set	Hypothesis	Hypothesis Text
51	H_{100}	There is no correlation between the highest level of education received and whether an individual fails to disclose a conflict of interest.
	H_{101}	There is a significant correlation between the highest level of education received and whether an individual fails to disclose a conflict of interest.
52	H_{102}	There is no correlation between the highest level of education received and whether an individual has intentionally over/under sold IT to internal / external clients.
	H_{103}	There is a significant correlation between the highest level of education received and whether an individual has intentionally over/under sold IT to internal / external clients.
53	H_{104}	There is no correlation between the highest level of education received and whether an individual has violated another employees' privacy.
	H_{105}	There is a significant correlation between the highest level of education received and whether an individual has violated another employees' privacy.
54	H_{106}	There is no correlation between the highest level of education received and whether an individual has violated a customers' privacy.
	H_{107}	There is a significant correlation between the highest level of education received and whether an individual has violated a customers' privacy.
55	H_{108}	There is no correlation between the highest level of education received and whether an individual is unaware of the ethics issues involving IT.
	H_{109}	There is a significant correlation between the highest level of education received and whether an individual is unaware of the ethics issues involving IT.

Table 12: Hypothesis Set 5 - Level of Education received as a factor of Ethical Behaviour

5.5.6 Set 6: Job Title as a factor of Ethical Behaviour

Sub-Set	Hypothesis	Hypothesis Text
56	H_{110}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual pirates software for work purposes.
	H_{111}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual pirates software for work purposes.
57	H_{112}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual pirates software for personal purposes.
	H_{113}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual pirates software for personal purposes.
58	H_{114}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual claims expertise in an area they are not competent / qualified in when dealing with internal / external clients.
	H_{115}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual claims expertise in an area they are not competent / qualified in when dealing with internal / external clients.
59	H_{116}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual claims expertise in an area they are not competent / qualified in order to gain employment.
	H_{117}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual claims expertise in an area they are not competent / qualified in order to gain employment.
60	H_{118}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual does 'half-a-job', producing work that is not their best.

Sub-Set	Hypothesis	Hypothesis Text
	H_{119}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual does 'half-a-job', producing work that is not their best.
61	H_{120}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual abuses confidential information entrusted to him / her.
	H_{121}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual abuses confidential information entrusted to him / her.
62	H_{122}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual fails to disclose a conflict of interest.
	H_{123}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual fails to disclose a conflict of interest.
63	H_{124}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual has intentionally over/under sold IT to internal / external clients.
	H_{125}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual has intentionally over/under sold IT to internal / external clients.
64	H_{126}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual has violated another employees' privacy.
	H_{127}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual has violated another employees' privacy.
65	H_{128}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual has violated a customers' privacy.
	H_{129}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual has violated a customers' privacy.
66	H_{130}	There is no correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual is unaware of the ethics issues involving IT.
	H_{131}	There is a significant correlation between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual is unaware of the ethics issues involving IT.

Table 13: Hypothesis Set 6 - Job Title as a factor of Ethical Behaviour

5.5.7 Set 7: The effect of Policies on Ethical Behaviour

Sub-Set	Hypothesis	Hypothesis Text
67	H_{132}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of piracy by employees at/for work.
	H_{133}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of piracy by employees at/for work.
68	H_{134}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of piracy by employees at/for home.
	H_{135}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of piracy by employees at/for home.
69	H_{136}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
	H_{137}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of misrepresentation of competence to internal/external clients by employees.

Sub-Set	Hypothesis	Hypothesis Text
70	H_{138}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of misrepresentation of competence to the employer by the employee.
	H_{139}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of misrepresentation of competence to the employer by the employee.
71	H_{140}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
	H_{141}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
72	H_{142}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of employees abusing confidential information.
	H_{143}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of employees abusing confidential information.
73	H_{144}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of employees failing to disclose a conflict of interest.
	H_{145}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of employees failing to disclose a conflict of interest.
74	H_{146}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
	H_{147}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
75	H_{148}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of employees abusing another employee's privacy.
	H_{149}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of employees abusing another employee's privacy.
76	H_{150}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of employees abusing a customer's privacy.
	H_{151}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of employees abusing a customer's privacy.
77	H_{152}	There is no correlation between the presence of a relevant Policy within an Organisation and the incidence of employees being unaware of ethical issues involving IT.
	H_{153}	There is a significant correlation between the presence of a relevant Policy within an Organisation and the incidence of employees being unaware of ethical issues involving IT.

Table 14: Hypothesis Set 7 - The effect of Policies on Ethical Behaviour

5.5.8 Set 8: The effect of Contractual Agreements on Ethical Behaviour

Sub-Set	Hypothesis	Hypothesis Text
78	H_{154}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of piracy by employees at/for work.
	H_{155}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of piracy by employees at/for work.
79	H_{156}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of piracy by employees at/for home.
	H_{157}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of piracy by employees at/for home.

Sub-Set	Hypothesis	Hypothesis Text
80	H_{158}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
	H_{159}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
81	H_{160}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of misrepresentation of competence to the employer by the employee.
	H_{161}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of misrepresentation of competence to the employer by the employee.
82	H_{162}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
	H_{163}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
83	H_{164}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees abusing confidential information.
	H_{165}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees abusing confidential information.
84	H_{166}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees failing to disclose a conflict of interest.
	H_{167}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees failing to disclose a conflict of interest.
85	H_{168}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
	H_{169}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
86	H_{170}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees abusing another employee's privacy.
	H_{171}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees abusing another employee's privacy.
87	H_{172}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees abusing a customer's privacy.
	H_{173}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees abusing a customer's privacy.
88	H_{174}	There is no correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees being unaware of ethical issues involving IT.
	H_{175}	There is a significant correlation between the presence of Contractual Agreements within an Organisation and the incidence of employees being unaware of ethical issues involving IT.

Table 15: Hypothesis Set 8 - The effect of Contractual Agreements on Ethical Behaviour

5.5.9 Set 9: The effect of Penalties on Ethical Behaviour

Sub-Set	Hypothesis	Hypothesis Text

Sub-Set	Hypothesis	Hypothesis Text
89	H_{176}	There is no correlation between the presence of Penalties within an Organisation and the incidence of piracy by employees at/for work.
	H_{177}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of piracy by employees at/for work.
90	H_{178}	There is no correlation between the presence of Penalties within an Organisation and the incidence of piracy by employees at/for home.
	H_{179}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of piracy by employees at/for home.
91	H_{180}	There is no correlation between the presence of Penalties within an Organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
	H_{181}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
92	H_{182}	There is no correlation between the presence of Penalties within an Organisation and the incidence of misrepresentation of competence to the employer by the employee.
	H_{183}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of misrepresentation of competence to the employer by the employee.
93	H_{184}	There is no correlation between the presence of Penalties within an Organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
	H_{185}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
94	H_{186}	There is no correlation between the presence of Penalties within an Organisation and the incidence of employees abusing confidential information.
	H_{187}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of employees abusing confidential information.
95	H_{188}	There is no correlation between the presence of Penalties within an Organisation and the incidence of employees failing to disclose a conflict of interest.
	H_{189}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of employees failing to disclose a conflict of interest.
96	H_{190}	There is no correlation between the presence of Penalties within an Organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
	H_{191}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
97	H_{192}	There is no correlation between the presence of Penalties within an Organisation and the incidence of employees abusing another employee's privacy.
	H_{193}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of employees abusing another employee's privacy.
98	H_{194}	There is no correlation between the presence of Penalties within an Organisation and the incidence of employees abusing a customer's privacy.
	H_{195}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of employees abusing a customer's privacy.
99	H_{196}	There is no correlation between the presence of Penalties within an Organisation and the incidence of employees being unaware of ethical issues involving IT.
	H_{197}	There is a significant correlation between the presence of Penalties within an Organisation and the incidence of employees being unaware of ethical issues involving IT.

Table 16: Hypothesis Set 9 - The effect of Penalties on Ethical Behaviour

5.5.10 Set 10: The effect of appropriate Counselling on Ethical Behaviour

Sub-Set	Hypothesis	Hypothesis Text
100	H_{198}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of piracy by employees at/for work.
	H_{199}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of piracy by employees at/for work.
101	H_{200}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of piracy by employees at/for home.
	H_{201}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of piracy by employees at/for home.
102	H_{202}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
	H_{203}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
103	H_{204}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of misrepresentation of competence to the employer by the employee.
	H_{205}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of misrepresentation of competence to the employer by the employee.
104	H_{206}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
	H_{207}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
105	H_{208}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of employees abusing confidential information.
	H_{209}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of employees abusing confidential information.
106	H_{210}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of employees failing to disclose a conflict of interest.
	H_{211}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of employees failing to disclose a conflict of interest.
107	H_{212}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
	H_{213}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
108	H_{214}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of employees abusing another employee's privacy.
	H_{215}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of employees abusing another employee's privacy.
109	H_{216}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of employees abusing a customer's privacy.
	H_{217}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of employees abusing a customer's privacy.
110	H_{218}	There is no correlation between the presence of appropriate counselling within an organisation and the incidence of employees being unaware of ethical issues involving IT.

Sub-Set	Hypothesis	Hypothesis Text
	H_{219}	There is a significant correlation between the presence of appropriate counselling within an organisation and the incidence of employees being unaware of ethical issues involving IT.

Table 17: Hypothesis Set 10 - The effect of appropriate Counselling on Ethical Behaviour

5.5.11 Set 11: The effect of Disciplinary Procedures on Ethical Behaviour

Sub-Set	Hypothesis	Hypothesis Text
111	H_{220}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of piracy by employees at/for work.
	H_{221}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of piracy by employees at/for work.
112	H_{222}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of piracy by employees at/for home.
	H_{223}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of piracy by employees at/for home.
113	H_{224}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
	H_{225}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of misrepresentation of competence to internal/external clients by employees.
114	H_{226}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of misrepresentation of competence to the employer by the employee.
	H_{227}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of misrepresentation of competence to the employer by the employee.
115	H_{228}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
	H_{229}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of employees producing "half-jobs" or work that is not their best possible.
116	H_{230}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of employees abusing confidential information.
	H_{231}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of employees abusing confidential information.
117	H_{232}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of employees failing to disclose a conflict of interest.
	H_{233}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of employees failing to disclose a conflict of interest.
118	H_{234}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
	H_{235}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of employees intentionally over/under selling IT to internal/external clients in order to obtain contracts.
119	H_{236}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of employees abusing another employee's privacy.

Sub-Set	Hypothesis	Hypothesis Text
	H_{237}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of employees abusing another employee's privacy.
120	H_{238}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of employees abusing a customer's privacy.
	H_{239}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of employees abusing a customer's privacy.
121	H_{240}	There is no correlation between the presence of disciplinary procedures within an organisation and the incidence of employees being unaware of ethical issues involving IT.
	H_{241}	There is a significant correlation between the presence of disciplinary procedures within an organisation and the incidence of employees being unaware of ethical issues involving IT.

Table 18: Hypothesis Set 11 - The effect of Disciplinary Procedures on Ethical Behaviour

5.6 Questions used within the Survey

A sample of the questionnaire can be found in *Appendix B.*

5.7 Process of Analysis

The data was received and entered into the computer program *Statistica version 7* (Statsoft, Inc) and *R* (R Development Core Team). Statistical analyses included calculating Frequencies for the different variables, as well as performing Chi-Squared tests and Fisher's Exact Test for Count Data in order to determine the p-values.

5.8 Summary

This chapter described the design of the Empirical Survey to Industry. It reported on how the survey was structured and delivered. A list of the hypotheses tested by the survey was also supplied. The summarised results of this Survey are reported in the following chapter. For a detailed set of results please see Appendix E.

Chapter 6 Results of Empirical Study to Industry

This chapter presents the results of the Empirical Study to Industry. Results are in the form of frequency histograms and Chi-Squared analyses. Detailed results are available in Appendix E.

6.1 Introduction

This section confines itself to the presentation of the results from the general frequency histogram analysis as well as the cross-tabulations of the hypotheses. Further analysis is available in *Appendix E*.

6.2 Response Rate

233 usable responses were received over the period that the survey was available for completion.

6.3 Results

The demographic profile; the frequencies from each response to every question in the survey; and the hypothesis cross-tabulations are presented.

6.3.1 Demographic Profile

Table 19 contains the demographic profile of the individuals who responded to the survey.

	Count	%
Gender		
Male	188	*80.69*
Female	44	*18.88*
Missing	1	*0.43*

	Count	%
Education		
High School	3	*1.29*
Matric	16	*6.87*
Professional	25	*10.73*
FET	22	*9.44*

	Count	%
Province		
Eastern Cape	10	*4.29*
Free State	9	*3.86*
Gauteng	123	*52.79*
Kwazulu-Natal	29	*12.45*
Limpopo	3	*1.29*
Mpumalanga	1	*0.43*
North-West Province	1	*0.43*
Northern Cape	4	*1.72*
Western Cape	41	*17.60*
Outside South Africa	10	*4.29*
Missing	2	*0.86*

Home Language		
English	159	*68.24*
Afrikaans	53	*22.75*
Setswana	1	*0.43*
Sepedi	1	*0.43*
Sesotho	1	*0.43*
isiXhosa	2	*0.86*
Xitsonga	1	*0.43*
siSwati	1	*0.43*
isiZulu	1	*0.43*
English and Afrikaans	5	*2.15*
Setswana and IsiZulu	1	*0.43*
German	1	*0.43*
English and Greek	1	*0.43*
English and isiXhosa	1	*0.43*
Polish	1	*0.43*
English and Gujarati	1	*0.43*
Missing	2	*0.86*

Age		
20 – 24	22	*9.44*
25 – 29	35	*15.02*
30 – 39	64	*27.47*
40 – 49	54	*23.18*
50 – 59	40	*17.17*
60 – 64	13	*5.58*
> 65	3	*1.29*
Missing	2	*0.86*

	Count	%
HEI	161	*69.10*
Missing	6	*2.58*

Number of people who report to you		
0	82	*35.19*
1-10	97	*41.63*
11-20	20	*8.58*
> 20	25	*10.73*
Missing	9	*3.86*

Job		
Top Management	45	*19.31*
Management	48	*20.60*
Lower Management	16	*6.87*
IT Personnel	105	*45.06*
Academic	11	*4.72*
Missing	8	*3.43*

Nature of Business		
Banking / accounting / finance	30	*12.88*
Construction / mining / agric./ eng.	16	*6.87*
Consulting	28	*12.02*
Education	21	*9.01*
Entertainment / mrkting / advertising	5	*2.15*
Government	4	*1.72*
Healthcare / pharmaceutical	4	*1.72*
Information technology	85	*36.48*
Manufacturing (non-computer)	15	*6.44*
Non-profit	1	*0.43*
Parastatal utilities	8	*3.43*
Retail / wholesale	4	*1.72*
Telecommunications	6	*2.58*
Transportation	3	*1.29*
Missing	3	*1.29*

Organisation Size		
0 - 50 employees	66	*28.33*
51 - 100 employees	17	*7.30*
101 - 500 employees	30	*12.88*
> 500 employees	107	*45.92*
Missing	13	*5.58*

Table 19: Demographic Profile

The individuals were mostly males (90.69%) from Gauteng (52.79%) who spoke English (68.24%) or Afrikaans (22.75%) and were currently employed in small business or corporate Information Technology, Banking/Finance or Consulting fields. They had received formal tertiary education and generally work for somebody else or have up to 10 people reporting to them.

When the author compared the above findings with other research (Moleke, Paterson and Roodt 2003), differences were found. These differences and the ramifications thereof, shall be discussed in section 6.6 at the end of this chapter.

6.3.2 Frequencies

6.3.2.1 Ethics in industry, profit making and education

Table 20 contains the frequency of responses relating to how ethics is viewed by and in the IT industry, and whether behaving ethically has an effect on an organisation's profit-making ability.

	Never		**Hardly Ever**		**Sometimes**		**Quite often**		**Always**		**Missing**	
	Count	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***
1	1	*0.43*	43	*18.45*	124	*53.22*	63	*27.04*	0	*0*	2	*0.86*
2	1	*0.43*	0	*0*	3	*1.29*	31	*13.3*	197	*84.55*	1	*0.43*
3	5	*2.15*	42	*18.03*	135	*57.94*	49	*21.03*	0	*0.00*	2	*0.86*
4	0	*0.00*	1	*0.43*	5	*2.15*	30	*12.88*	195	*83.69*	2	*0.86*
5	1	*0.43*	36	*15.45*	120	*51.50*	71	*30.47*	2	*0.86*	3	*1.29*
6	0	*0.00*	0	*0.00*	7	*3.00*	31	*13.30*	194	*83.26*	1	*0.43*
7	33	*14.16*	47	*20.17*	74	*31.76*	56	*24.03*	20	*8.58*	3	*1.29*
8	66	*28.33*	84	*36.05*	47	*20.17*	27	*11.59*	7	*3.00*	2	*0.86*

1	I believe that the IT industry worldwide behaves in an ethical manner.
2	I believe that the IT industry worldwide should behave in an ethical manner.
3	I believe that the IT Industry in South Africa behaves in an ethical manner?
4	I believe that the IT Industry in South Africa should behave in an ethical manner?
5	I believe that internal / external clients for whom the IT Industry work behave in an ethical manner?
6	I believe that internal / external clients for whom the IT Industry work should behave in an ethical manner?
7	I believe that by being ethical, it becomes more difficult to earn a profit, in the short term?
8	I believe that by being ethical, it becomes more difficult to earn a profit, in the long term?

Table 20: Ethics in industry, profit making and education

Table 20 shows that for the most part the industry is ethical, but that there is broad agreement for the industry, both locally and internationally always to behave in an ethical manner. There is stronger agreement that, in the short-term rather than the long-term, profits may be affected if one behaves ethically.

Table 21 shows that the majority (82.84%) of the respondents reported to having had no (54.51%) or only low (28.33%) exposure to Ethics in IT during their Education.

	None		Low		Moderate		High		Missing	
	Count	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***
9	127	*54.51*	66	*28.33*	28	*12.02*	12	*5.15*	0	*0.00*
9	Extent of Ethics in IT in Education									

Table 21: Extent of Ethics in IT in Education

6.3.2.2 Perception of an organisation's ethical behaviour

Table 22 contains responses relating to an individual's perception of their organisation's ethical behaviour.

Perception of an organisation's ethical behaviour														
	Do not Know		**Never**		**Hardly ever**		**Sometimes**		**Quite often**		**Always**		**Missing**	
	Count	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***
10.1	4	*1.72*	38	*16.31*	55	*23.61*	58	*24.89*	64	*27.47*	14	*6.01*	0	*0.00*
10.2	18	*7.73*	18	*7.73*	23	*9.87*	56	*24.03*	90	*38.63*	28	*12.02*	0	*0.00*
10.3	9	*3.86*	38	*16.31*	51	*21.89*	64	*27.47*	56	*24.03*	15	*6.44*	0	*0.00*
10.4	9	*3.86*	40	*17.17*	56	*24.03*	61	*26.18*	59	*25.32*	8	*3.43*	0	*0.00*
10.5	4	*1.72*	28	*12.02*	35	*15.02*	81	*34.76*	73	*31.33*	12	*5.15*	0	*0.00*
10.6	7	*3.00*	65	*27.90*	76	*32.62*	58	*24.89*	24	*10.30*	3	*1.29*	0	*0.00*
10.7	9	*3.86*	55	*23.61*	53	*22.75*	51	*21.89*	54	*23.18*	11	*4.72*	0	*0.00*
10.8	12	*5.15*	51	*21.89*	40	*17.17*	58	*24.89*	57	*24.46*	15	*6.44*	0	*0.00*
10.9	8	*3.43*	83	*35.62*	52	*22.32*	46	*19.74*	28	*12.02*	16	*6.87*	0	*0.00*
10.10	14	*6.01*	95	*40.77*	57	*24.46*	38	*16.31*	22	*9.44*	7	*3.00*	0	*0.00*
10.11	13	*5.58*	37	*15.88*	36	*15.45*	47	*20.17*	77	*33.05*	23	*9.87*	0	*0.00*

10.1	Piracy by employees at/for work
10.2	Piracy by employees at/for home
10.3	Misrepresentation of competence to internal/external clients
10.4	Misrepresentation of competence to employer
10.5	Producing "half-jobs" or work that is not the best possible
10.6	Abuse of confidential information
10.7	Failure to disclose conflicts of interest
10.8	Intentionally over/under selling IT to internal/external clients in order to obtain contracts
10.9	Abuse of employees privacy
10.10	Abuse of customers privacy
10.11	Employees are unaware of ethical issues involving IT

Table 22: Perception of an organisation's ethical behaviour

The majority of respondents responded that they were 'Sometimes' or 'Quite often' aware of unethical behaviour within their organisation.

6.3.2.3 The ethical behaviour of individuals in practice

Table 23 contains results relating to individuals' ethical behaviour.

The ethical behaviour of individuals in practice												
	Never		**Hardly ever**		**Sometimes**		**Quite often**		**Always**		**Missing**	
	Count	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***	**Count**	***%***	***Count***	***%***
11.1	127	*54.51*	62	*26.61*	29	*12.45*	13	*5.58*	2	*0.86*	0	*0.00*
11.2	62	*26.61*	74	*31.76*	60	*25.75*	29	*12.45*	8	*3.43*	0	*0.00*
11.3	178	*76.39*	36	*15.45*	14	*6.01*	5	*2.15*	0	*0.00*	0	*0.00*
11.4	201	*86.27*	20	*8.58*	7	*3.00*	5	*2.15*	0	*0.00*	0	*0.00*
11.5	121	*51.93*	83	*35.62*	28	*12.02*	1	*0.43*	0	*0.00*	0	*0.00*
11.6	197	*84.55*	28	*12.02*	7	*3.00*	1	*0.43*	0	*0.00*	0	*0.00*
11.7	195	*83.69*	25	*10.73*	9	*3.86*	4	*1.72*	0	*0.00*	0	*0.00*
11.8	161	*69.10*	49	*21.03*	16	*6.87*	4	*1.72*	0	*0.00*	3	*1.29*
11.9	196	*84.12*	26	*11.16*	8	*3.43*	2	*0.86*	0	*0.00*	1	*0.43*
11.10	209	*89.70*	17	*7.30*	5	*2.15*	1	*0.43*	0	*0.00*	1	*0.43*
11.11	166	*71.24*	29	*12.45*	19	*8.15*	7	*3.00*	9	*3.86*	3	*1.29*
11.1	I have pirated software for work purposes											
11.2	I have pirated software for personal purposes											
11.3	I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients											
11.4	I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment											
11.5	I do "half-a-job", producing work that is not my best											
11.6	I have abused confidential information entrusted to me											
11.7	I have, in the past, failed to disclose a conflict of interest											
11.8	I have intentionally over/under sold IT to internal/external clients											
11.9	I have violated employees privacy											
11.10	I have violated customers privacy											
11.11	I am unaware of the ethical issues involving IT											

Table 23: The ethical behaviour of individuals in practice

It can be seen that respondents generally answered that they 'Never' or 'Hardly Ever' engage in unethical conduct.

6.3.2.4 The level of confidence in entry-level graduate employees

Table 24 contains the frequency of responses relating to the level of confidence employer's have in their entry-level graduate employees being sufficiently aware of their ethical and professional responsibilities as they undertake their work.

	Count	Percent
Not certain:	73	31.33
Slightly confident	89	38.20
Confident	33	14.16
Highly confident	15	6.44
Certain	6	2.58
N/A:	17	7.30

Table 24: Level of confidence in entry-level graduate employees being sufficiently aware of their ethical and professional responsibilities as they undertake their work.

The majority of the respondents reported that they were not certain or slightly confident.

6.3.2.5 The desired emphasis that should be given to ethical issues in a graduates' education

Table 25 contains the frequency of responses relating to the desired degree of emphasis respondents would like being given to ethical issues within an Information Systems Professional's curriculum.

	None		Introductory		Intermediate		Advanced		Expert		Missing	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
1	16	6.87	7	3.00	27	11.59	44	18.88	138	59.23	1	0.43
2	10	4.29	5	2.15	10	4.29	32	13.73	174	74.68	2	0.86
3	15	6.44	8	3.43	20	8.58	50	21.46	138	59.23	2	0.86
4	15	6.44	2	0.86	21	9.01	49	21.03	146	62.66	0	0.00
5	15	6.44	2	0.86	2	0.86	25	10.73	189	81.12	0	0.00
6	7	3.00	2	0.86	5	2.15	37	15.88	181	77.68	1	0.43
7	11	4.72	3	1.29	11	4.72	50	21.46	158	67.81	0	0.00
1	Piracy											
2	Privacy											

3	Over / under selling IT to internal / external clients
4	Conflicts of interest
5	Abuse of confidential information
6	Importance of producing the best possible work
7	Misrepresentation of competence

Table 25: The degree of emphasis that respondents would like being given to ethical issues within the Information Systems Profession in a graduate's education.

The majority of respondents desire advanced or expert treatment of these topics. Approximately 6% of respondents consistently believe that no emphasis should be placed on ethical issues within IT.

6.3.2.6 Level of confidence in an organisation's Code of Conduct/ethics being able to address concerns

Table 26 contains the frequency of responses indicating respondent's confidence in their organisation's Code of Conduct/Ethics being able to address the ethical issues within IT.

	Count	Percent
Not certain:	29	12.45
Slightly confident	48	20.60
Confident	61	26.18
Highly confident	44	18.88
Certain	41	17.60
Don`t have a code	10	4.29

Table 26: The degree of emphasis that respondents would like

The majority of respondents were confident, highly confident or certain that their organisation's Code of Conduct/Ethics addressed the ethical issues within IT.

6.3.2.7 Ways in which the organisation deals with the problem of Ethics within organisation

Table 27 shows the number and percentage of respondents who make use of policies, contractual agreements, employment penalties, counselling or disciplinary procedures in dealing with Ethics.

	Yes		No	
	Count	%	Count	%
Policies	177	75.97	56	24.03
Contractual agreements	139	59.66	94	40.34
Penalties	55	23.61	178	76.39
Counselling	62	26.61	171	73.39
Discipline	140	60.09	93	39.91

Table 27: Ways in which the organisation deals with the problems of Ethics within the organisation.

The majority of organisations make use of Policies, Disciplinary procedures and Contractual Agreements. Employment Penalties and Counselling are not used by the majority of respondents.

6.3.3 Cross-Tabulations

Cross-tabulations for each hypothesis mentioned in section 5.5 were compiled using the software product Statistica 7 (Statsoft, Inc) and are contained in *Appendix E*. Statistical tests were then conducted on these cross-tabulations to calculate the corresponding p-value.

In order for the tests to be valid, the expected frequencies have to be greater than 5. When this is not the case the expected frequencies can be combined or modifications need to be applied to the tests. Where the Likert scale responses were below 5 they were combined in logical groupings (for example Never and Hardly Ever or Quite Often and Always).

The Pearson's Chi-squared test with Yates' continuity correction and the Fisher's Exact Test for Count Data were conducted using the software package R (R Development Core Team 2004). It was necessary to combine some of the Likert-scale responses in order to eliminate values and these combined tables can be found in *Appendix E*.

Tests were performed on all the Hypotheses mentioned in Section 5.5. Working from a 95% confidence level, where $p \leq 0.05$, the analysis showed that the following hypothesis sets were significant:

- Set 1, Sub-Set 6;
- Set 2, Sub-Sets 16 and 22;
- Set 3, Sub-Sets 23, 24, 28, 29, 30, 31, 32 and 33;
- Set 5, Sub-Set 49;
- Set 6, Sub-Set 62;
- Set 7, Sub-Set 67;
- Set 10, Sub-Set 100.

The following hypothesis sets were not found to be significant:

- Set 1, Sub-Sets 1-5 and 7-11;
- Set 2, Sub-Sets 12-15 and 17-21;
- Set 3, Sub-Sets 23 and 25-27;
- Set 4, Sub-Sets 34-44;
- Set 5, Sub-Sets 45-48 and 50-55;
- Set 6, Sub-Sets 56-61 and 63-66;
- Set 7, Sub-Sets 68-77;
- Set 8, Sub-Sets 78-88;
- Set 9, Sub-Sets 89-99;
- Set 10, Sub-Sets 101-110;
- Set 11, Sub-Sets 111-121.

Table 28 shows the Cross-Tabulation, and Table 29 the Combined Frequency Count for Hypothesis Sub-Set 6:

Extent of Ethics in IT in Education	I have abused confidential information entrusted to me					
	Never	**Hardly ever**	**Some times**	**Quite often**	**Always**	Totals
None	108	16	2	1	0	127
Low	58	7	1	0	0	66
Moderate	22	2	4	0	0	28
High	9	3	0	0	0	12
All Groups	197	28	7	1	0	233

Table 28: Cross-Tabulation for Hypothesis Sub-Set 6

Extent of Ethics in IT in Education	I have abused confidential information entrusted to me					
	Never / Hardly ever		**Some times / Quite often / Always**		Totals	
	Count	**Percent**	**Count**	**Percent**	**Count**	Percent
None / Low	189	84%	4	50%	193	83%
Moderate / High	36	16%	4	50%	40	17%
All Groups	225	96.57%	8	3.43%	233	100%

Table 29: Combined Frequency Count of the Cross-Tabulation for Hypothesis Sub-Set 6

Fisher's Exact Test for Count Data yielded a p-value of 0.0313, which is borderline statistically significant. We can thus reject H_{10}, and accept:

- H_{11} = There is a borderline statistically significant correlation (p=0.0313) between the extent that the topic Ethics and Information Technology was contained in an individual's curriculum and whether an individual abuses confidential information entrusted to him / her.

Table 30 shows the Cross-Tabulation, and Table 31 the Combined Frequency Count for Hypothesis Sub-Set 16:

Size of Organisation	Producing "half-jobs" or work that is not the best possible						
	Do not Know	**Never**	**Hardly ever**	**Some times**	**Quite often**	**Always**	Totals
0 - 50 employees	3	12	14	19	15	3	66
51 - 100 employees	0	1	3	5	7	1	17
101 - 500 employees	0	4	5	13	7	1	30
> 500 employees	1	8	11	40	40	7	107
Totals	4	25	33	77	69	12	220

Table 30: Cross Tabulation for Hypothesis Sub-Set 16

Size of Organisation	Producing "half-jobs" or work that is not the best possible			
	Do not Know	**Never / Hardly ever**	**Some times / Quite often / Always**	Totals

	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	Percent
0 - 100 employees	3	75%	30	51.72%	50	31.65%	83	38%
> 100 employees	1	25%	28	48.28%	108	68.35%	137	62%
Totals	4	1.82%	58	26.36%	158	71.82%	220	

Table 31: Combined Frequency Count of Cross Tabulation for Hypothesis Sub-Set 16

Fisher's Exact Test for Count Data yielded a p-value of 0.00574, which is statistically significant. We can thus reject H_{30}, and accept:

- H_{31} = There is a statistically significant correlation (p=0.00574) between the size of an organisation and the frequency of producing "half-jobs" or work that is not the best possible.

Table 32 shows the Cross-Tabulation, and Table 33 the Combined Frequency Count for Hypothesis Sub-Set 22:

Size of Organisation	Employees are unaware of ethical issues involving IT						
	Do not Know	**Never**	**Hardly ever**	**Some times**	**Quite often**	**Always**	Totals
0 - 50 employees	4	15	17	14	12	4	66
51 - 100 employees	0	3	2	3	7	2	17
101 - 500 employees	1	4	4	5	12	4	30
> 500 employees	7	13	10	24	42	11	107
Totals	12	35	33	46	73	21	220

Table 32: Cross Tabulation for Hypothesis Sub-Set 22

Size of Organisation	Employees are unaware of ethical issues involving IT							
	Do not Know		**Never / Hardly ever**		**Some times / Quite often / Always**		Totals	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	Percent
0 - 100 employees	4	33.33%	37	54.41%	42	30%	**83**	37.7%
> 100 employees	8	66.67%	31	45.59%	98	70%	**137**	62.3%
Totals	12	5.45%	68	30.91%	140	63.64%	220	100%

Table 33: Combined Frequency Count of the Cross Tabulation for Hypothesis Sub-Set 22

Fisher's Exact Test for Count Data yielded a p-value of 0.002506, which is statistically significant. We can thus reject H_{42}, and accept:

- H_{43} = There is a statistically significant correlation (p=0.002506) between the size of an organisation and the frequency of employees being unaware of ethical issues involving IT.

Table 34 shows the Cross-Tabulation, and Table 35 the Combined Frequency Count for Hypothesis Sub-Set 23:

Piracy by employees at work	I have pirated software for work purposes					
	Never	**Hardly ever**	**Some times**	**Quite often**	**Always**	Totals
Do not Know	3	1	0	0	0	4
Never	34	4	0	0	0	38
Hardly ever	34	19	2	0	0	55
Sometimes	29	19	9	1	0	58
Quite often	23	17	15	9	0	64
Always	4	2	3	3	2	14
Total	127	62	29	13	2	233

Table 34: Cross-Tabulation for Hypothesis Sub-Set 23

Piracy by employees at work	I have pirated software for work purposes					
	Never / Hardly ever		**Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	4	2.12	0	0	4	1.72
Never / Hardly ever	91	48.15	2	4.55	93	39.91
Sometimes / Quite often / Always	94	49.74	42	95.45	136	58.37
Total	189	81.12	44	18.88	233	100

Table 35: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 23

Fisher's Exact Test for Count Data yielded a p-value of 0.0000001157, which is highly significant. We can thus reject H_{44}, and accept:

- H_{45} = There is a highly significant correlation (p=0.0000001157) between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to pirating software for work purposes.

Table 36 shows the Cross-Tabulation, and Table 37 the Combined Frequency Count for Hypothesis Sub-Set 24:

Piracy by employees at home	I have pirated software for personal purposes					
	Never	**Hardly ever**	**Some times**	**Quite often**	**Always**	Total
Do not Know	9	5	3	0	1	18
Never	11	7	0	0	0	18
Hardly ever	10	9	4	0	0	23
Sometimes	16	21	14	5	0	56
Quite often	15	30	30	13	2	90
Always	1	2	9	11	5	28
Total	62	74	60	29	8	233

Table 36: Cross-Tabulation for Hypothesis Sub-Set 24

Piracy by employees at home	I have pirated software for home purposes					
	Never / Hardly ever		**Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	14	10.29%	4	4.12%	18	7.73%
Never / Hardly ever	37	27.21%	4	4.12%	41	17.6%
Sometimes / Quite often / Always	85	62.5%	89	91.75%	174	74.68%
Total	136	58.37%	97	41.63%	233	100

Table 37: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 24

Pearson's Chi-squared test yielded a p-value of 0.00002603 (X-squared = 26.4208, df = 4), which is highly significant. We can thus reject H_{46}, and accept:

- H_{47} = There is a highly significant correlation (p=0.00002603) between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to pirating software for personal purposes.

Table 38 shows the Cross-Tabulation, and Table 39 the Combined Frequency Count for Hypothesis Sub-Set 28:

Abuse of confidential information	I have abused confidential information entrusted to me					
	Never	**Hardly ever**	**Sometimes**	**Quite often**	**Always**	Total
Do not Know	7	0	0	0	0	7
Never	63	2	0	0	0	65

Hardly ever	69	6	1	0	0	76
Sometimes	42	12	4	0	0	58
Quite often	13	8	2	1	0	24
Always	3	0	0	0	0	3
Total	197	28	7	1	0	233

Table 38: Cross-Tabulation for Hypothesis Sub-Set 28

Abuse of confidential information	I have abused confidential information entrusted to me					
	Never / Hardly ever		**Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	7	3.11%	0	0%	7	3%
Never / Hardly ever	140	62.22%	1	12.5%	141	60.52%
Sometimes / Quite often / Always	78	34.67%	7	87.5%	85	36.48%
Total	225	96.57%	8	3.43%	233	100%

Table 39: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 28

Fisher's Exact Test for Count Data yielded a p-value of 0.01106, which is borderline statistically significant. We can thus reject H_{54}, and accept:

- H_{55} = There is a borderline statistically significant correlation (p=0.01106) between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to abusing confidential information entrusted to one.

Table 40 shows the Cross-Tabulation, and Table 41 the Combined Frequency Count for Hypothesis Sub-Set 29:

Failure to disclose conflicts of interest	I have, in the past, failed to disclose a conflict of interest					
	Never	**Hardly ever**	**Sometimes**	**Quite often**	**Always**	Total
Do not Know	8	1	0	0	0	9
Never	54	1	0	0	0	55
Hardly ever	48	4	1	0	0	53
Sometimes	44	5	2	0	0	51
Quite often	36	12	5	1	0	54
Always	5	2	1	3	0	11
Total	195	25	9	4	0	233

Table 40: Cross-Tabulation for Hypothesis Sub-Set 29

Failure to disclose conflicts of	I have, in the past, failed to disclose a conflict of interest

interest	Never / Hardly ever		Some times / Quite often / Always		Totals	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	9	4.09%	0	0%	9	3.86%
Never / Hardly ever	107	48.64%	1	7.69%	108	46.35%
Sometimes / Quite often / Always	104	47.27%	12	92.31%	116	49.79%
Total	220	94.42%	13	5.58%	233	100%

Table 41: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 29

Fisher's Exact Test for Count Data yielded a p-value of 0.005523, which is statistically significant. We can thus reject H_{56}, and accept:

- H_{57} = There is a statistically significant correlation (p=0.005523) between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to failing to disclose a conflict of interest.

Table 42 shows the Cross-Tabulation, and Table 43 the Combined Frequency Count for Hypothesis Sub-Set 30:

Intentionally over/under selling IT to internal/external clients in order to obtain contracts	I have intentionally over/under sold IT to internal/external clients					
	Never	**Hardly ever**	**Sometimes**	**Quite often**	**Always**	Total
Do not Know	7	3	0	0	0	10
Never	48	3	0	0	0	51
Hardly ever	35	4	1	0	0	40
Sometimes	32	18	6	1	0	57
Quite often	31	18	7	1	0	57
Always	8	3	2	2	0	15
Total	161	49	16	4	0	230

Table 42: Cross-Tabulation for Hypothesis Sub-Set 30

Intentionally over/under selling IT to internal/external clients in order to obtain contracts	I have intentionally over/under sold IT to internal/external clients					
	Never / Hardly ever		**Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**

Do not Know	10	4.76%	0	0%	10	4.35%
Never / Hardly ever	90	42.86%	1	5%	91	39.57%
Sometimes / Quite often / Always	110	52.38%	19	95%	129	56.09%
Total	210	91.3%	20	8.7%	230	100%

Table 43: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 30

Fisher's Exact Test for Count Data yielded a p-value of 0.0005897, which is highly significant. We can thus reject H_{58}, and accept:

- H_{59} = There is a highly significant correlation (p=0.0005897) between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to intentionally over/under selling IT to internal/external clients in order to get a contract.

Table 44 shows the Cross-Tabulation, and Table 45 the Combined Frequency Count for Hypothesis Sub-Set 31:

Abuse of employees privacy	I have violated employees privacy					
	Never	**Hardly ever**	**Sometimes**	**Quite often**	**Always**	Total
Do not Know	8	0	0	0	0	8
Never	78	4	0	0	0	82
Hardly ever	46	5	1	0	0	52
Sometimes	34	9	3	0	0	46
Quite often	18	6	3	1	0	28
Always	12	2	1	1	0	16
Total	196	26	8	2	0	232

Table 44: Cross-Tabulation for Hypothesis Sub-Set 31

Abuse of employees privacy	I have violated employees privacy					
	Never / Hardly ever		**Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	8	3.6%	0	0%	8	3.45%
Never / Hardly ever	133	59.91%	1	10%	134	57.76%
Sometimes / Quite often / Always	81	36.49%	9	90%	90	38.79%
Total	222	95.69%	10	4.31%	232	100%

Table 45: Combined Frequency Count of Cross-Tabulation
for Hypothesis Sub-Set 31

Fisher's Exact Test for Count Data yielded a p-value of 0.005627, which is statistically significant. We can thus reject H_{60}, and accept:

- H_{61} = There is a statistically significant correlation (p=0.005627) between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes violating employees privacy.

Table 46 shows the Cross-Tabulation, and Table 47 the Combined Frequency Count for Hypothesis Sub-Set 32:

Abuse of customers privacy	I have violated customers privacy					
	Never	**Hardly ever**	**Sometimes**	**Quite often**	**Always**	Total
Do not Know	13	1	0	0	0	14
Never	92	3	0	0	0	95
Hardly ever	52	3	1	0	0	56
Sometimes	31	5	2	0	0	38
Quite often	17	4	1	0	0	22
Always	4	1	1	1	0	7
Total	209	17	5	1	0	232

Table 46: Cross-Tabulation for Hypothesis Sub-Set 32

Abuse of customers privacy	I have violated customers privacy					
	Never / Hardly ever		**Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	14	6.19%	0	0%	14	6.03%
Never / Hardly ever	150	66.37%	1	16.67%	151	65.09%
Sometimes / Quite often / Always	62	27.43%	5	83.33%	67	28.88%
Total	226	97.41%	6	2.59%	232	100%

Table 47: Combined Frequency Count of Cross-Tabulation
for Hypothesis Sub-Set 32

Fisher's Exact Test for Count Data yielded a p-value of 0.01511, which is borderline statistically significant. We can thus reject H_{62}, and accept:

- H_{63} = There is a borderline statistically significant correlation (p=0.01511) between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes violating customers privacy.

Table 48 shows the Cross-Tabulation, and Table 49 the Combined Frequency Count for Hypothesis Sub-Set 33:

Employees are unaware of ethical issues involving IT	I am unaware of the ethical issues involving IT					
	Never	**Hardly ever**	**Sometimes**	**Quite often**	**Always**	Total
Do not Know	9	0	0	1	1	11
Never	36	0	1	0	0	37
Hardly ever	25	6	1	1	2	35
Sometimes	30	7	8	1	1	47
Quite often	53	13	5	3	3	77
Always	13	3	4	1	2	23
Total	166	29	19	7	9	230

Table 48: Cross-Tabulation for Hypothesis Sub-Set 33

Employees are unaware of ethical issues involving IT	I am unaware of the ethical issues involving IT					
	Never / Hardly ever		**Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	9	4.62%	2	5.71%	11	4.78%
Never / Hardly ever	67	34.36%	5	14.29%	72	31.3%
Sometimes / Quite often / Always	119	61.03%	28	80%	147	63.91%
Total	195	84.78%	35	15.22%	230	100%

Table 49: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 33

Fisher's Exact Test for Count Data yielded a p-value of 0.04896, which is borderline statistically significant. We can thus reject H_{64}, and accept:

- H_{65} = There is a borderline statistically significant correlation (p=0.04896) between an individual's perception of their fellow employees within an organisation, and their own actual personal behaviour, when it comes to being aware of the ethical issues involving IT.

Table 50 shows the Cross-Tabulation, and Table 51 the Combined Frequency Count for Hypothesis Sub-Set 49:

Highest level of education	I do "half-a-job", producing work that is not my best					
	Never	**Hardly ever**	**Sometimes**	**Quite often**	**Always**	Total
High School	1	1	1	0	0	3
Matric	6	7	3	0	0	16
Professional	11	9	5	0	0	25
FET	9	12	1	0	0	22
HEI	90	52	18	1	0	161
Totals	117	81	28	1	0	227

Table 50: Cross-Tabulation for Hypothesis Sub-Set 49

Highest level of education	I do "half-a-job", producing work that is not my best					
	Never		**Hardly Ever / Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
High School / Matric / Professional / FET	27	23.08%	39	35.45%	66	29.07%
HEI	90	76.92%	71	64.55%	161	70.93%
Total	117	51.54%	110	48.46%	227	100%

Table 51: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 49

Fisher's Exact Test for Count Data yielded a p-value of 0.04223, which is borderline statistically significant. We can thus reject H_{96}, and accept:

- H_{97} = There is a borderline statistically significant correlation (p=0.04223) between the highest level of education received and whether an individual does ‘half-a-job’, producing work that is not their best.

Table 52 shows the Cross-Tabulation, and Table 53 the Combined Frequency Count for Hypothesis Sub-Set 62:

Job Title	I have, in the past, failed to disclose a conflict of interest					
	Never	**Hardly ever**	**Sometimes**	**Quite often**	**Always**	Total
Top Management	40	4	1	0	0	45
Management	44	4	0	0	0	48
Lower Management	14	2	0	0	0	16
IT Personnel	81	13	7	4	0	105
Academic	8	2	1	0	0	11

Totals	187	25	9	4	0	225

Table 52: Cross-Tabulation for Hypothesis Sub-Set 62

Job Title	I have, in the past, failed to disclose a conflict of interest					
	Never		**Hardly Ever / Some times / Quite often / Always**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Top Management / Management / Lower Management	98	52.41%	11	28.95%	109	48.44%
IT Personnel / Academic	89	47.59%	27	71.05%	116	51.56%
Total	187	83.11%	38	16.89%	225	100%

Table 53: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 62

Fisher's Exact Test for Count Data yielded a p-value of 0.012, which is borderline statistically significant. We can thus reject H_{122} and accept:

- H_{123} = There is a borderline statistically significant correlation (p=0.012) between the level of responsibility (as gauged by the Job Title of an individual) and whether an individual fails to disclose a conflict of interest.

Table 54 shows the Cross-Tabulation, and Table 55 the Combined Frequency Count for Hypothesis Sub-Set 67:

Piracy by employees at/for work	The effect of policies on ethical behaviour		
	Yes	**No**	Totals
Do not Know	4	0	4
Never	27	11	38
Hardly ever	44	11	55
Sometimes	49	9	58
Quite often	44	20	64
Always	9	5	14
Total	177	56	233

Table 54: Cross-Tabulation for Hypothesis Sub-Set 67

Piracy by employees at/for work	The effect of policies on ethical behaviour					
	Yes		**No**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	4	2.26%	0	0%	4	1.72
Never / Hardly ever	71	40.11%	22	39.29%	93	39.91
Sometimes	49	27.68%	9	16.07%	58	24.89
Quite often / Always	53	29.94%	25	44.64%	78	33.48
Total	177	75.97%	56	24.03%	233	100

Table 55: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 67

Fisher's Exact Test for Count Data yielded a p-value of 0.0009536, which is highly significant. We can thus reject H_{132}, and accept:

- H_{133} = There is a highly significant correlation (p=0.0009536) between the presence of a relevant Policy within an Organisation and the incidence of piracy by employees at/for work.

Table 56 shows the Cross-Tabulation, and Table 57 the Combined Frequency Count for Hypothesis Sub-Set 100:

Piracy by employees at/for work	The effect of counselling on ethical behaviour		
	Yes	**No**	Totals
Do not Know	1	3	4
Never	11	27	38
Hardly ever	23	32	55
Sometimes	11	47	58
Quite often	13	51	64
Always	3	11	14
Total	62	171	233

Table 56: Cross-Tabulation for Hypothesis Sub-Set 100

Piracy by employees at/for work	The effect of counselling on ethical behaviour					
	Yes		**No**		**Totals**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Do not Know	1	1.61	3	1.75	4	1.72

Never / Hardly ever	34	54.84	59	34.5	93	39.91
Sometimes	11	17.74	47	27.49	58	24.89
Quite often / Always	16	25.81	62	36.26	78	33.48
Total	62	26.61	171	73.39	233	100

Table 57: Combined Frequency Count of Cross-Tabulation for Hypothesis Sub-Set 100

Fisher's Exact Test for Count Data yielded a p-value of 0.04155, which is borderline statistically significant. We can thus reject H_{198}, and accept:

- H_{199} = There is a borderline statistically significant correlation (p=0.04155) between the presence of appropriate counselling within an organisation and the incidence of piracy by employees at/for work.

6.4 Analysis

6.4.1 The IT Industry

The majority (72.1%) of the respondents believe that the IT Industry worldwide never (0.43%), hardly ever (18.45%) or only sometimes (53.22%) behaves in an ethical manner, whilst a larger majority (97.88%) of the respondents feel that the IT Industry worldwide should quite often (13.3%) or should always (84.55%) behave in an ethical manner.

The majority (78.12%) of the respondents believe that the IT Industry in South Africa never (2.15%), hardly ever (18.03%) or only sometimes (57.94%) behaves in an ethical manner, whilst a larger majority (96.57%) of the respondents feel that the IT Industry in South Africa should quite often (12.88%) or should always (83.69%) behave in an ethical manner.

The majority (66.95%) of the respondents believe that the internal / external clients for whom the IT industry works for hardly ever (15.45%) or only sometimes (51.50%) behaves in an ethical manner. The respondents do believe, however, that the behaviour of the internal / external clients should quite often (13.30%) or always (83.26%) be conducted in an ethical manner.

6.4.2 The effect on profits

The minority (34.33%) of respondents believe that by being ethical it never (14.16%) or hardly ever (20.17%) becomes more difficult to earn a profit in the short-term. This is in contrast to the majority (64.38%) of respondents who believe that by being ethical it never (28.33%) or hardly ever (36.05%) becomes more difficult to earn a profit in the long-term.

6.4.3 Degree of exposure of Ethics in IT during the respondent's Education

The majority (82.84%) of the respondents reported to having had no (54.51%) or only low (28.33%) exposure to Ethics in IT during their Education. This is in contrast to the minority (17.17%) of the respondents who report that they had a moderate (12.02%) or high (5.15%) level.

6.4.4 Behaviour of fellow employees vs. respondents

6.4.4.1 Piracy at work

The majority (58.37%) of the respondents report that they sometimes (24.89%), quite often (27.47%) or always (6.01%) experience problems with piracy at/for work within their organisation. This is in contrast to the minority (39.92%) of the respondents who report that they never (16.31%) or hardly ever (23.61%) do, and the 1.72% who answered that they did not know.

The majority (81.12%) of the respondents report that they never (54.51%) or hardly ever (26.61%) pirate software for work purposes. This is in contrast to the minority (18.89%) of the respondents who report that they sometimes (12.45%), quite often (5.58%) or always (0.86%) do so.

6.4.4.2 Piracy at home

The majority (74.68%) of the respondents report that they sometimes (24.03%), quite often (38.63%) or always (12.02%) experience problems with piracy at/for home

within their organisation. This is in contrast to the minority (17.6%) of the respondents who report that they never (7.73%) or hardly ever (9.87%) do, and the 7.73% who answered that they did not know.

The majority (58.37%) of the respondents report that they never (26.61%) or hardly ever (31.76%) pirate software for personal purposes. This is in contrast to the minority (41.63%) of the respondents who report that they sometimes (25.75%), quite often (12.45%) or always (3.43%) do so.

6.4.4.3 Misrepresenting competence to internal/external clients

The majority (57.94%) of the respondents report that they sometimes (27.47%), quite often (24.03%) or always (6.44%) experience problems with employees misrepresenting their competence to their internal/external clients. This is in contrast to the minority (38.2%) of the respondents who report that they never (16.31%) or hardly ever (21.89%) do, and the 3.86% who answered that they did not know.

The majority (91.84%) of the respondents report that they never (76.39%) or hardly ever (15.45%) claim expertise in an area that they are not competent or qualified in when dealing with their internal / external clients. This is in contrast to the minority (8.16%) of the respondents who report that they sometimes (6.01%) or quite often (2.15%) do so.

6.4.4.4 Misrepresenting competence to employer

The majority (54.93%) of the respondents report that they sometimes (26.18%), quite often (25.32%) or always (3.43%) experience problems with employees misrepresenting their competence to their employer within their organisation. This is in contrast to the minority (41.2%) of the respondents who report that they never (17.17%) or hardly ever (24.03%) do, and the 3.86% who answered that they did not know.

The majority (94.85%) of the respondents report that they never (86.27%) or hardly ever (8.58%) claim expertise in an area that they are not competent or qualified in, in order to gain employment. This is in contrast to the minority (5.15%) of the respondents who report that they sometimes (3%) or quite often (2.15%) do so.

6.4.4.5 Producing "half-jobs" or work that is not the best

The majority (71.24%) of the respondents report that they sometimes (34.76%), quite often (31.33%) or always (5.15%) experience problems with employees producing "half-jobs" or work that is not their best within their organisation. This is in contrast to the minority (27.04%) of the respondents who report that they never (12.02%) or hardly ever (15.02%) do, and the 1.72% who answered that they did not know.

The majority (87.55%) of the respondents report that they never (51.93%) or hardly ever (35.62%) do "half-a-job" or produce work that is not their best whilst at work. This is in contrast to the minority (12.45%) of the respondents who report that they sometimes (12.02%) or quite often (0.43%) do so.

6.4.4.6 Abuse of confidential information

The majority (60.52%) of the respondents report that they never (27.9%) or hardly ever (32.62%) experience problems with the abuse of confidential information within their organisation. This is in contrast to the minority (36.48%) of the respondents who report that they sometimes (24.89%), quite often (10.3%) or always (1.29%) do, and the 3% who answered that they did not know.

The majority (96.57%) of the respondents report that they have never (84.55%) or hardly ever (12.02%) abused confidential information entrusted to them. This is in contrast to the minority (3.43%) of the respondents who report that they sometimes (3%) or quite often (0.43%) do so.

6.4.4.7 Failure to disclose conflicts of interest

The majority (49.79%) of the respondents report that they sometimes (21.89%), quite often (23.18%) or always (4.72%) experience problems with employees failing to disclose conflicts of interest to their organisation. This is in contrast to the minority (46.36%) of the respondents who report that they never (23.61%) or hardly ever (22.75%) do, and the 3.86% who answered that they did not know.

The majority (94.42%) of the respondents report that they have never (83.69%) or hardly ever (10.73%) failed to disclose a conflict of interest. This is in contrast to the minority (5.58%) of the respondents who report that they sometimes (3.86%) or quite often (1.72%) do so.

6.4.4.8 Intentionally over/under selling IT to internal/external clients in order to obtain contracts

The majority (55.79%) of the respondents report that they sometimes (24.89%), quite often (24.46%) or always (6.44%) experience problems with employees intentionally over/under selling IT to internal/external clients in order to obtain contracts. This is in contrast to the minority (39.06%) of the respondents who report that they never (21.89%) or hardly ever (17.17%) do, and the 5.15% who answered that they did not know.

The majority (90.13%) of the respondents report that they have never (69.1%) or hardly ever (21.03%) intentionally over/under sold IT to internal/external clients. This is in contrast to the minority (8.59%) of the respondents who report that they sometimes (6.87%) or quite often (1.72%) do so. 1.29% of the respondents did not answer this question.

6.4.4.9 Abuse of employees' privacy

The majority (57.94%) of the respondents report that they never (35.62%) or hardly ever (22.32%) experience problems with the abuse of employees' privacy in their

organisation. This is in contrast to the minority (38.63%) of the respondents who report that they sometimes (19.74%), quite often (12.02%) or always (6.87%) do, and the 3.43% who answered that they did not know.

The majority (95.28%) of the respondents report that they have never (84.12%) or hardly ever (11.16%) violated an employee's privacy. This is in contrast to the minority (4.29%) of the respondents who report that they sometimes (3.43%) or quite often (0.86%) do so. 0.43% of the respondents did not answer this question.

6.4.4.10 Abuse of a customer's privacy

The majority (65.23%) of the respondents report that they never (40.77%) or hardly ever (24.46%) experience problems with the abuse of a customer's privacy in their organisation. This is in contrast to the minority (28.75%) of the respondents who report that they sometimes (16.31%), quite often (9.44%) or always (3%) do, and the 6.01% who answered that they did not know.

The majority (97%) of the respondents report that they have never (89.7%) or hardly ever (7.3%) violated a customer's privacy. This is in contrast to the minority (2.58%) of the respondents who report that they sometimes (2.15%) or quite often (0.43%) do so. 0.43% of the respondents did not answer this question.

6.4.4.11 Awareness of the ethical issues involving IT

The majority (63.09%) of the respondents report that they sometimes (20.17%), quite often (33.05%) or always (9.87%) experience problems with employees in their organisation being unaware of the ethical issues involving IT. This is in contrast to the minority (31.33%) of the respondents who report that they never (15.88%) or hardly ever (15.45%) do, and the 5.58% who answered that they did not know.

The majority (83.69%) of the respondents report that they have never (71.24%) or hardly ever (12.45%) unaware of the ethical issues involving IT. This is in contrast to the minority (15.01%) of the respondents who report that they sometimes (8.15%),

quite often (3%), or always (3.86%) do so. 1.29% of the respondents did not answer this question.

6.4.5 Employer's confidence in graduate's awareness of ethics in IT

This question was applicable for 92.7% of the respondents. The majority (69.53%) of the respondents reported being not certain (31.33%) or only slightly confident (38.2%) in their entry-level graduate employees being sufficiently aware of their ethical and professional responsibilities as they undertake their work. This is as opposed to the minority (23.18%) who are confident (14.16%), highly confident (6.44%) or certain (2.58%) in their awareness.

6.4.6 The desired emphasis that should be given to ethical issues in a graduates' education

The majority (78.11%) of respondents desire advanced (18.88%) or expert (59.23%) treatment of piracy in an IT Professional's curriculum. This is in contrast to the minority (14.59%) who believe that this should be included at an intermediate (11.59%) or introductory (3%) level. 6.87% of the respondents believe that it should not be included at all. 0.43% did not respond.

The majority (88.41%) of respondents desire advanced (13.73%) or expert (74.68%) treatment of privacy in an IT Professional's curriculum. This is in contrast to the minority (6.44%) who believe that this should be included at an intermediate (4.29%) or introductory (2.15%) level. 4.29% of the respondents believe that it should not be included at all. 0.86% did not respond.

The majority (80.69%) of respondents desire advanced (21.46%) or expert (59.23%) treatment of over/under selling IT to internal/external clients in an IT Professional's curriculum. This is in contrast to the minority (12.01%) who believe that this should be included at an intermediate (8.58%) or introductory (3.43%) level. 6.44% of the respondents believe that it should not be included at all. 0.86% did not respond.

The majority (83.69%) of respondents desire advanced (21.03%) or expert (62.66%) treatment of conflicts of interest in an IT Professional's curriculum. This is in contrast to the minority (9.87%) who believe that this should be included at an intermediate (9.01%) or introductory (0.86%) level. 6.44% of the respondents believe that it should not be included at all.

The majority (91.85%) of respondents desire advanced (10.73%) or expert (81.12%) treatment of abuse of confidential information in an IT Professional's curriculum. This is in contrast to the minority (1.72) who believe that this should be included at an intermediate (0.86%) or introductory (0.86%) level. 6.44% of the respondents believe that it should not be included at all.

The majority (93.56%) of respondents desire advanced (15.88%) or expert (77.68%) treatment of importance of producing the best possible work in an IT Professional's curriculum. This is in contrast to the minority (3.01%) who believe that this should be included at an intermediate (2.15%) or introductory (0.86%) level. 3% of the respondents believe that it should not be included at all. 0.43% did not respond.

The majority (89.27%) of respondents desire advanced (21.46%) or expert (67.81%) treatment of misrepresentation of competence in an IT Professional's curriculum. This is in contrast to the minority (6.01%) who believe that this should be included at an intermediate (4.72%) or introductory (1.29%) level. 4.72% of the respondents believe that it should not be included at all.

6.4.7 Level of confidence in an organisation's Code of Conduct/ethics being able to address concerns

The majority (62.66%) of respondents were confident (26.18%), highly confident (18.88%) or certain (17.6%) that their organisation's Code of Conduct/Ethics addressed the ethical issues within IT. The minority (33.05%) were slightly confident (20.6%) or not certain (12.45%). 4.29% do not have a Code.

6.4.8 Ways in which the organisation deals with the problem of Ethics within organisation

The majority of organisations make use of Policies (75.97%), Disciplinary procedures (60.09%) and Contractual Agreements (59.66%). Respondents reported that they did not use Employment Penalties (76.39%) and Counselling (73.39%).

6.4.9 Cross-Tabulations

Table 28 shows that of the majority (96.57%) of the respondents who responded that they never/hardly ever abuse confidential information entrusted to them, it was found that the majority (84.6%) received none/low exposure of ethics in IT during their education, as opposed to the minority (16%) who received a moderate/high exposure. For the minority (3.43%) who sometimes/quite often or always abuse confidential information there was an equal distribution of those who received none to low exposure and moderate to high exposure to ethics during their IT education.

Table 30 shows that of the majority (71.82%) of the respondents who sometimes, quite often or always produce work that is not their best, it was found that the majority (68.35%) worked for organisations with more than 100 employees, as opposed to the minority (31.65%) who worked for organisations of less. For the minority (26.36%) who never or hardly ever produce work that is not their best, the majority (51.72%) work in organisations with up to 100 employees, the minority (48.28%) worked for organisations with more than 100 employees.

Table 32 shows that of the majority (63.64%) of the respondents who are sometimes, quite often or always unaware of the ethical issues involving IT, it was found that the majority (70%) worked for organisations with more than 100 employees, as opposed to the minority (30%) who worked for organisations of fewer employees. For the minority (30.91%) who are unaware of the ethical issues involving IT, the majority (54.41%) work in organisations with up to 100 employees, the minority (45.59%) worked for organisations with more than 100 employees.

Table 34 shows that for the majority (81.12%) of the respondents who never or hardly ever pirate at work or for business purposes, it was found that the majority (49.74%) work in organisations who have employees that sometimes, quite often or always pirate for work purposes, as opposed to the minority (48.15%) who do not. For the minority (18.88%) of the respondents who sometimes, quite often or always pirate at work or for business purposes, the majority (95.45%) of them work in organisations that have employees who sometimes, quite often or always pirate for work purposes, as opposed to the minority (4.55%) who do not.

Table 36 shows that for the majority (58.37%) of the respondents who never or hardly ever pirate at home or for personal purposes, it was found that the majority (62.5%) work in organisations who have employees that sometimes, quite often or always pirate for personal purposes, as opposed to the minority (27.21%) who do not. 10.29% did not know. For the minority (41.63%) of the respondents who sometimes, quite often or always pirate at home or for personal purposes, the majority (91.75%) of them work in organisations that have employees who sometimes, quite often or always pirate for personal purposes, as opposed to the minority (4.12%) who do not and the 4.12% who did not know.

Table 38 shows that for the majority (96.57%) of the respondents who never or hardly ever abuse confidential information entrusted to them, it was found that the majority (62.22%) work in organisations who have employees that never or hardly ever abuse confidential information entrusted to them, as opposed to the minority (34.67%) who sometimes, quite often or always do so. 3.11% did not know. For the minority (3.43%) of the respondents who sometimes, quite often or always abuse confidential information entrusted to them, the majority (87.5%) of them work in organisations that have employees who sometimes, quite often or always abuse confidential information entrusted to them, as opposed to the minority (12.5%) who never or hardly ever do so.

Table 40 shows that for the majority (94.42%) of the respondents who never or hardly ever fail to disclose a conflict of interest, it was found that the majority (48.64%) work

in organisations who have employees that never or hardly ever fail to disclose conflicts of interest, as opposed to the minority (47.27%) who sometimes, quite often or always do so. 4.09% did not know. For the minority (5.58%) of the respondents who sometimes, quite often or always fail to disclose conflicts of interest, the majority (92.31%) of them work in organisations that have employees who sometimes, quite often or always fail to disclose conflicts of interest, as opposed to the minority (7.69%) who never or hardly ever do so.

Table 42 shows that for the majority (91.3%) of the respondents who never or hardly ever intentionally over/under sell IT to internal/external clients in order to get a contract, it was found that the majority (52.38%) work in organisations who have employees that sometimes, quite often or always intentionally over/under sell IT to internal/external clients in order to get a contract, as opposed to the minority (42.86%) who never or hardly ever do so. 4.76% did not know. For the minority (8.7%) of the respondents who sometimes, quite often or always intentionally over/under sell IT to internal/external clients in order to get a contract, the majority (95%) of them work in organisations that have employees who sometimes, quite often or always intentionally over/under sell IT to internal/external clients in order to get a contract, as opposed to the minority (5%) who never or hardly ever do so.

Table 44 shows that for the majority (95.69%) of the respondents who never or hardly ever violate an employee's privacy, it was found that the majority (59.91%) work in organisations who have employees that never or hardly ever violate an employee's privacy, as opposed to the minority (36.49%) who sometimes, quite often or always do so. 3.6% did not know. For the minority (4.31%) of the respondents who sometimes, quite often or always violate an employee's privacy, the majority (90%) of them work in organisations that have employees who sometimes, quite often or always violate an employee's privacy, as opposed to the minority (10%) who never or hardly ever do so.

Table 46 shows that for the majority (97.41%) of the respondents who never or hardly ever violate a customer's privacy, it was found that the majority (66.37%) work in

organisations who have employees that never or hardly ever violate a customer's privacy, as opposed to the minority (27.43%) who sometimes, quite often or always do so. 6.19% did not know. For the minority (2.59%) of the respondents who sometimes, quite often or always violate a customer's privacy, the majority (83.33%) of them work in organisations that have employees who sometimes, quite often or always violate a customer's privacy, as opposed to the minority (16.67%) who never or hardly ever do so.

Table 48 shows that for the majority (84.78%) of the respondents who never or hardly ever violate a customer's privacy, it was found that the majority (61.03%) work in organisations who have employees that never or hardly ever are aware of the ethical issues involving IT, as opposed to the minority (34.36%) who sometimes, quite often or always are aware. 4.62% did not know. For the minority (15.22%) of the respondents who are sometimes, quite often or always aware of the ethical issues involving IT, the majority (80%) of them work in organisations that have employees who sometimes, quite often or are always aware of the ethical issues involving IT, as opposed to the minority (14.29%) who never or hardly ever do so. 5.71% did not know.

Table 50 shows that for the majority (51.54%) of the respondents who never produced work that is not their best, it was found that the majority (76.92%) had received some form of tertiary education from a Higher Education Institution, as opposed to the minority (23.08%) who had not received education. For the minority (48.46%) of the respondents who hardly ever, sometimes, quite often or always producing work that is not their best, the majority (64.55%) of them received some form of tertiary education from a Higher Education Institution, as opposed to the minority (35.45%) who did not.

Table 52 shows that for the majority (83.11%) of the respondents who never fail to disclose a conflict of interest, it was found that the majority (52.41%) work in some form of management position; as opposed to the minority (47.59%) who work in non-management positions. For the minority (16.89%) of the respondents who fail to

disclose a conflict of interest (whether they hardly ever, sometimes, quite often or always do so), the majority (71.05%) of them work in non-management positions, as opposed to the minority (28.95%) who work in management positions.

Table 54 shows that for the majority (75.97%) of the respondent's organisations who use a policy, it was found that the majority (40.11%) never or hardly ever engage in piracy at work, as opposed to the minority who sometimes (27.68%), or quite often or always (29.94%) do so. 2.26% did not know. For the minority (24.03%) of the respondent's organisations who do not use a policy, the majority (44.64%) quite often or always engages in software piracy, as opposed to the minority who never or hardly ever (39.29%) or only sometimes (16.07%) do so.

Table 56 shows that for the majority (73.39%) of the respondent's organisations who do not use counselling, it was found that the majority (36.26%) of employees quite often or always engage in piracy at work, as opposed to the minority who sometimes (27.49%), or hardly ever or never (34.5%) do so. For the minority (26.61%) of the respondent's organisations who do use counselling, the majority (54.84%) hardly ever or never engage in software piracy at work, as opposed to the minority who sometimes (17.74%) or quite often or always (25.81%) do so.

6.5 Discussion

6.5.1 The IT Industry

There is general agreement that whilst the IT industry worldwide does not always act in an ethical manner, there is greater agreement that it should. This is true for the IT industry in South Africa, as well as for the clients (both internal/external) for whom they work.

6.5.2 The effect on profits

In terms of how the profit-motive might impact the decision to be ethical, the majority believe that it would be more difficult to earn a profit in the short-term, though only the minority believe that it would be more difficult to earn a profit in the long-term.

6.5.3 Degree of exposure of Ethics in IT during the respondent's Education

The majority of respondents had not received any formal exposure to ethics during their education.

6.5.4 Behaviour of fellow employees vs. respondents

A constant trend emerging from the data is that respondents report that whilst unethical behaviour is prevalent within their organisations, and amongst their fellow employees – they themselves, personally, do not engage in such behaviour. This is true for the following behaviour types:

- Piracy at work
- Piracy at home
- Misrepresenting competence to internal/external clients
- Misrepresenting competence to employer
- Producing "half-jobs" or work that is not the best
- Failure to disclose conflicts of interest
- Intentionally over/under selling IT to internal/external clients in order to obtain contracts
- Awareness of the ethical issues involving IT

Whilst the individuals still report that they never or hardly ever behave unethically, the following behaviour was reported to also never or hardly ever occur within the respondent's organisations:

- Abuse of confidential information
- Abuse of employees' privacy
- Abuse of a customer's privacy

6.5.5 Employer's confidence in graduate's awareness of ethics in IT

The majority of the respondents reported being not certain or only slightly confident in their entry-level graduate employees being sufficiently aware of their ethical and professional responsibilities as they undertake their work.

6.5.6 The level of confidence in entry-level graduate employees

The majority of the respondents reported that they had some degree of certainty in their entry-level graduate employees being sufficiently aware of their ethical and professional responsibilities as they undertake their work.

6.5.7 The desired emphasis that should be given to ethical issues in a graduates' education

The majority of respondents desire advanced or expert treatment of the ethical issues within IT in an IT Professional's curriculum.

6.5.8 Level of confidence in an organisation's Code of Conduct/ethics being able to address concerns

The majority of respondents were to some degree of certainty confident that their organisation's Code of Conduct/Ethics addressed the ethical issues within IT.

6.5.9 Ways in which the organisation deals with the problem of Ethics within organisation

The majority of organisations make use of Policies, Disciplinary procedures and Contractual Agreements. Respondents reported that they did not use Employment Penalties and Counselling.

6.5.10 Cross-Tabulations

Whilst the majority of individuals report to have never or only hardly ever abusing confidential information, the majority of respondent's in that category received no to

low exposure of ethics in IT during their education. One would expect incidence of abuse in those who had been more appropriately educated in ethics to be lower – and indeed as a percentage of those who had received such education, more of them were prone to sometimes abuse. In looking at the Table 28 it can be seen that the 4 individuals had received moderate education, and that none of the individuals who had reported receiving high exposure to ethics during their Education sometimes, quite often or always abused. It can then be presumed that given a high degree of exposure to Ethics involving IT during one's education, one will be less likely to sometimes, quite often or always abuse confidential information.

The majority of respondents who never or hardly ever produce work that is not their best, work for organisations with less than 100 employees. The majority of the respondents who work for larger companies reported that they sometimes, quite often or always produce work that is not their best. One can presume that in working for a larger organisation it becomes easier to 'hide among the crowd' and thus work more inefficiently.

The majority of respondents who are sometimes, quite often or always unaware of the ethical issues involving IT, work for companies that have more than 100 employees. The majority of respondents who never or are hardly ever unaware of the ethical issues involving IT work for companies that have fewer than 100 employees. One can presume that in smaller organisations it is more difficult to 'hide' unethical behaviour.

The majority of individuals who reported that they never or hardly ever pirate for work purposes, work for organisations who they report have employees that sometimes, quite often or always pirate for work purposes. The majority of individuals who sometimes, quite often or always pirate for personal purposes, work for organisations who they report have employees that sometimes, quite often or always pirate for work purposes. One could presume then that the environment within which one works is a contributing factor to an individual's behaviour.

The majority of individuals who reported that they never or hardly ever pirate for personal purposes, work for organisations who they report have employees that never or hardly ever pirate for personal purposes. The majority of individuals who sometimes, quite often or always pirate for personal purposes, work for organisations who they report have employees that sometimes, quite often or always pirate for personal purposes. One could presume then that the environment within which one works is a contributing factor to an individual's behaviour.

The majority of individuals who have abused confidential information work for organisations who have employees who are reported to sometimes, quite often or always abuse confidential information entrusted to them. Conversely those who never abuse confidential information, which is the majority, work for organisations who are reported to have employees who never do the same. One could presume then that the environment within which one works is a contributing factor to an individual's behaviour.

The majority of individuals who have failed to disclose a conflict of interest work for organisations who have employees who are reported to sometimes, quite often or always fail to disclose conflicts of interest. Conversely those who never fail to disclose conflicts of interest, which are the majority, work for organisations who are reported to have employees who never fail to disclose conflicts of interest. One could presume then that the environment within which one works is a contributing factor to an individual's behaviour.

The majority of respondents who never or hardly ever intentionally over/under sell IT to internal/external clients work in organisations they report sometimes, quite often or always do. Those respondents that reported that they sometimes, quite often or always do so, also reported that their organisations do the same. We can see that this appears to be a common practice within organisations, though respondents maintain that they do not.

The majority of individuals who have violated an employee's privacy, work for organisations who have employees who are reported to sometimes, quite often or always abuse an employee's privacy. Conversely those who never abuse employee's privacy, which is the majority, work for organisations who are reported to have employees who never abuse employee's privacy. One could presume then that the environment within which one works is a contributing factor to an individual's behaviour.

The majority of individuals who have violated a customer's privacy, work for organisations who have employees who are reported to sometimes, quite often or always abuse a customer's privacy. Conversely those who never abuse a customer's privacy, which is the majority, work for organisations who are reported to have employees who never abuse a customer's privacy. One could presume then that the environment within which one works is a contributing factor to an individual's behaviour.

The majority of respondents reported that they were never unaware of the ethical issues involving IT, whereas the majority of organisations for whom they work were reported to be sometimes, quite often or always unaware of these issues.

The majority of respondents to the survey had received some form of higher education. Whilst the majority in both cases had therefore received higher education whether they produced "half-jobs" or not, there was a greater proportion who reported that they never produce half-jobs that were university educated.

Employees who are in management positions are more likely to disclose conflicts of interest than those who are not in management positions.

Where counselling was present, the majority of respondents hardly ever or never pirated; whereas in organisations where there was no counselling, the majority of respondents quite often or always pirated. We can therefore see that the presence of

counselling within an organisation has a diminishing effect on the level of software piracy for work or business purposes.

6.6 Sample Bias

Research by the HSRC (Moleke, Paterson and Roodt 2003:642) using data from the September Labour Force Survey of 2001 by Stats SA, (see Table 58), prompts the author to consider any bias of the demographics of the sample surveyed and the subsequent conclusions drawn.

	Industry							
Highest Qualification	**Mining**	**Manufacturing**	**Wholesale and retail trade**	**Transport, storage and communication**	**Financial and business services**	**Community, social and personal services**	**Total**	**Percentage**
Diploma/Certificate (with < Grade 12)	-	1,367	678	-	641	-	2,686	5.1
Diploma/Certificate (with Grade 12)	264	2,844	1,685	3,867	12,070	487	21,217	40.0
Degree	-	2,480	1,572	426	8,866	3,389	16,733	31.5
Postgraduate degree/diploma	-	-	779	2,572	5,690	1,948	10,989	20.7
Other	-	812	-	-	605	-	1,417	2.7
Total	264	7,503	4,714	6,865	27,872	5,824	53,042	100
Percentage	0.5	14.1	8.9	12.9	52.5	11.0	100	

Table 58: Qualification by industry demand for high-level ICT jobs in 2001. Source: Stats SA(2001)

The above table, using slightly different wording to the ones used in this study, also examined the education profile of ICT workers by industry sector. A cursory glance shows that there are discrepancies between the survey undertaken by the author, and the reality of the situation as reported by Stats SA. Table 59 below shows the contrasting percentages:

	Stats SA(2001)		This study	
	Total	**Percentage**	**Total**	**Percentage**
Diploma/Certificate (with < Grade 12)	2,686	5.10	3	1.29
Diploma/Certificate (with Grade 12)	21,217	40.00	16	6.87
Degree + Postgraduate degree/diploma	27,722	52.20	161	69.10
Other	1,417	2.70		
FET			22	9.44
Professional			25	10.73
Missing			6	2.58
Total	53,042	100	233	100

Table 59: Table comparing totals from Table 58 and those from the author's study.

Whilst it must be borne in mind that the Stats SA survey was conducted in 2001, and this survey was conducted in 2002, the differences between the two are non-negligible, such as 52.2% possessing a degree or post-graduate diploma in the Stats SA survey as opposed to 69.1% in this study; or 40% possessing a diploma or certificate, having passed Grade 12, in the Stats SA survey, whilst only 6.87% reporting the same qualification in this study.

A further look at their work (Moleke, Paterson and Roodt 2003:644) on ICT employment (see Table 60) shows additional discrepancies between the two studies, with 24.53% being reported to be employed in the Finance and Insurance industry, and only 12.88% reporting to work in that sector in this study; or 3.08% from the SAITIS(2000) study employed in Educational Services against 9.01% who reported to work for the same in the author's study; or 28.55% working in CS/IS specific sectors from the SAITIS(2000) report, contrasted against 36.48% who reported they are from that industry sector.

Sector	**SAITIS(2000)**		**This study**	
	#	%	#	%
Accommodation and food services	25	0.26		
Arts, entertainment and recreation	278	2.91	5	2.15
Agriculture, forestry, fishing and hunting	151	1.58	16	6.87
Construction	27	0.28		
Mining	100	1.05		
Computer systems design and related services	2,377	24.92	85	36.48
Information and data-processing services	346	3.63		

Educational services	294	3.08	21	9.01
Finance and insurance	2,340	24.53	30	12.88
Healthcare and social assistance	15	0.16	4	1.72
Management of companies and enterprises	168	1.76		
Manufacturing	1458	15.29	15	6.44
Other	110	1.15	58	24.9
Professional, scientific and technical services	735	7.71		
Public administration	420	4.4	4	1.72
Real estate, rental and leasing	18	0.19		
Retail trade	113	1.18	4	1.72
Wholesale trade	53	0.56		
Transport and storage	466	4.89	3	1.29
Utilities	44	0.46		
Total	9,538	100		

Table 60: Table comparing employment information from the SAITIS(2000) study with that from the author's study

This finding compels the author to ask why there is such a bias. There are two reasons for this bias. The first reason must surely be related to the sample and the manner in which the sample was surveyed. In the Stats SA sample, the September Labour Force Survey of 2001 and the SAITIS (2000) study were used – surveys more far-reaching than the one undertaken by the author. The secondly is that the author's survey made use of an "opt-in" system, where respondents were essentially self-selected. There was no verification of a respondent's identity as the surveys were filled in on-line, and the randomness of the sample cannot be guaranteed. Given these factors, the author believes that whilst the survey does produce valid insights into the industry and the problem under discussion, the identified bias precludes these insights from becoming facts.

6.7 Conclusion

The results of the survey to Industry were presented and after analysis and discussion, it has been seen that:

- Given a high degree of exposure to Ethics involving IT during one's education, one will be less likely to sometimes, quite often or always engage in unethical behaviour, such as abusing confidential information.

- In working for a larger organisation it becomes easier to 'hide among the crowd' and thus work more inefficiently and exhibit unethical behaviour.

- The environment within which one works is a contributing factor to an individual's behaviour – both for ethical and unethical behaviour.

- Employees who are in management positions are more likely to disclose conflicts of interest than those who are not in management positions.

- The presence of counselling or policies prohibiting unethical behaviour within an organisation has a diminishing effect on the level of unethical behaviour (for example software piracy for work or business purposes).

Therefore, it can be concluded, bearing in mind the status of the validity of the conclusions and the presence of a bias within the sample, that if an individual received a high exposure to ethics, as it relates to IT, during their education, and works within an environment that promotes ethical behaviour and actively discourages unethical behaviour through the use of organisational policies or counselling, this combination will most likely result in limited future unethical behaviour from that individual.

Chapter 7 Design of Empirical Study to Academic Institutions

The Empirical Study to Academic Institutions was designed as a structured questionnaire piloted to members of the Information Systems Department at Rhodes University and completed via email response by Heads and/or Lecturers from different Computer Science and Information Systems Departments from around South Africa. The purpose of the study was to survey the current state of affairs within Computer Science and Information Systems in terms of whether they teach, and if so, how they teach, computer ethics.

7.1 Introduction

Lee notes that "the image in which surveys are administered to random samples and produce statistics is not inaccurate at all, but it is just one possible type of survey. Webster's New Universal Unabridged Dictionary defines a survey as 'a general study or inspection' and illustrates its usage in the following quotation from John Locke: 'To take a survey of our own understandings.'" (1996)

It was in that spirit that the author undertook to survey the current state of affairs within Computer Science and Information Systems as far as teaching ethics in the Computing Curriculum goes.

7.2 Details of Survey

The full survey can be found in *Appendix D*. It consists of four questions about the respondent's demographics (name of institution at which individual works and the individuals designation within the institution) and eleven structured questions about

the extent ethics is covered in their curriculum, including such questions, among others, as where ethics is placed within the curriculum, the degree of emphasis it receives and how it is taught.

7.3 Number of Respondents

The number of institutions of higher learning has been in flux in recent years. In considering departments of Computer Science, Information Systems or Informatics etc. from various universities and technikons as possible respondents, the author was able to contact 35 of the 43 identified departments. Of these 35 questionnaires, 15 responses were received and all from 'surviving' institutions as listed below, (this represents 15 out of the 30 currently recognised institutions of higher learning):

No.	Institition	Dept.	Type
1	Rand Afrikaans University	CS/IT/I	University
2	Rhodes University	CS	University
3	Rhodes University	IS	University
4	Stellenbosch University	CS	University
5	University of Cape Town (UCT)	IS	University
6	University of Natal (Durban) (UN)	CS	University
7	University of Port Elizabeth	CS/IS	University
8	University of Pretoria (Tuks)	CS	University
9	University of Pretoria (Tuks)	I	University
10	University of the Witwatersrand, Johannesburg (Wits)	CS	University
11	University of Zululand	CS	University
12	University of Western Cape	IS	University
13	Border Technikon	IT	Technikon
14	Mangosuthu Technikon	CS	Technikon
15	Technikon Free State	IT	Technikon
16	Technikon SA / UNISA	IT	Technikon

Table 61: Table of Respondents to Academic Survey

CS = Computer Science, IT=Information Technology, IS=Information Systems, I=Informatics

7.4 Structure of Questionnaire

The questions about the Curriculua can be broadly be seen to answer the following questions: "What is taught?", "Who teaches it?", "How is it taught?", "When is it taught?", and "For how long is it taught?"

In response to the literature around this topic, the author sought to elicit whether a course on ethics existed and if it did, was it integrated across other curricula areas or presented as a stand-alone course. The teaching methodologies were examined together with the proportion of the curriculum and emphasis such a course would receive.

7.5 Delivery Mode

The questionnaire was distributed via e-mail to the Heads of Department of the various Computer Science and Information Systems Academic Departments within South Africa.

7.6 Hypotheses

Given the small size of the population it was not possible, nor desired, to draw statistical inferences from this survey but rather to obtain 'a rough feel' of the current state of affairs. Thus, there were no formal hypotheses associated with the research apart from desiring a general confirmation of the general perception that ethics is not taught, and if it is taught it is given very little emphasis and is taught by a person who is not trained in the relevant theory and practice.

7.7 Questions used within the Survey

A sample of the questionnaire can be found in *Appendix D*. The questionnaire was divided into two sections. The first section asked for some very elementary demographics (Name, Address, Institution, and Designation within Institution). The second section enquired into how ethics is covered in the curriculum; who teaches it and what their qualification is; what is included in the course and where in the course it is situated; whether it is a requirement to do the course; and what proportion of the curriculum should it occupy. Respondents were also asked what teaching methodology was used and whether the lecturer witnessed a change in the students as a result of the course.

7.8 Process of Analysis

The data was received and entered into the computer program *Statistica version 7* (StatSoft Inc). A simple statistical analysis consisting of calculating frequencies for the different variables was performed.

7.9 Summary

This chapter described the design of the Empirical Survey to Industry. It reported on the number of respondents to the survey as well as how the survey was structured and delivered. The summarised results of this Survey are reported in the following chapter. For a detailed set of results please see *Appendix F*.

Chapter 8 Results of Empirical Study to Academic Institutions

This chapter presents the results of the Empirical Study to Academic Institutions. Results are in the form of frequency histograms. Detailed results are available in Appendix F.

8.1 Introduction

This section confines itself to the presentation of the results from the Empirical Survey to Academic Institutions.

8.2 Response Rate

There are 28 institutions of higher learning and Table 61 shows that 15 (54%) of them responded to the survey. Surveys were sent via Heads of Departments of Computer Science and/or Information Systems within South Africa (as appropriate).

8.3 Results

8.3.1 Demographics

The author surveyed fifteen educational institutions as shown in Table 62 (four Technikons and eleven University departments of Information Systems and Computer Science) within South Africa.

	Universities	Technikons
Sample	11 (73%)	4 (27%)

Table 62: Academic Survey respondent's demographics

8.3.2 Frequencies

8.3.2.1 Stand-Alone vs. Integrated courses

Table 63 contains the frequency of institutions that opt for an Integrated or Stand-alone approach to Ethics, or indeed, if they adopt a joint approach.

Integrated	Stand-alone	Both
11 (74%)	2 (13%)	2 (13%)

Table 63: Stand-alone vs. Integrated Courses

The majority preferred an integrated approach.

8.3.2.2 Lecturer's Background

Table 64 shows which academic departments are responsible for running a course on Ethics.

Information Systems Department	Computer Science Department	Philosophy Department	Management Department	Other Department	No Response
5 (33%)	4 (27%)	2 (13%)	2 (13%)	1 (7%)	1 (7%)

Table 64: Lecturer's Background

The majority of institutions teach the course using staff from within the Information Systems Department.

8.3.2.3 Content and Level

Respondents were able to select more than one answer and therefore cumulative percentages may exceed 100%.

Table 65 shows the frequency of institutions that did not indicate any response, for any category of content, at any level.

	No Response
Piracy	1 (7%)

Misrepresentation of Competence	2 (14%)
Importance of producing the best possible work	1 (7%)
Abuse of Confidential information	1 (7%)
Conflicts of interest	1 (7%)
Over/under selling IT to internal/external clients	3 (21%)
Privacy	0 (0%)
Whistle-blowing	2 (14%)

Table 65: Frequency of 'No Response' received for Academic Survey

Table 66 shows the frequency of institutions that reported that no work is being done in any of the categories under consideration.

	None
Piracy	3 (20%)
Misrepresentation of Competence	5 (33%)
Importance of producing the best possible work	3 (20%)
Abuse of Confidential information	1 (7%)
Conflicts of interest	3 (20%)
Over/under selling IT to internal/external clients	6 (40%)
Privacy	2 (13%)
Whistle-blowing	7 (47%)

Table 66: Table of responses showing where no work is done

Table 67 shows the frequency of institutions that reported that they are doing work at the 1st Year level, in each of the categories under consideration, in either an integrated and/or stand-alone way.

1st Year	Integrated	Stand-Alone	Both	None
Piracy	6 (40%)	3 (20%)	1 (7%)	5 (33%)
Misrepresentation of Competence	4 (27%)	3 (20%)	1 (7%)	7 (47%)
Importance of producing the best possible work	7 (47%)	2 (13%)	0 (0%)	6 (40%)
Abuse of Confidential information	6 (40%)	1 (7%)	1 (7%)	7 (47%)
Conflicts of interest	4 (27%)	1 (7%)	1 (7%)	9 (60%)
Over/under selling IT to internal/external clients	1 (7%)	1 (7%)	1 (7%)	12 (80%)
Privacy	6 (40%)	3 (20%)	1 (7%)	5 (33%)
Whistle-blowing	2 (13%)	2 (13%)	0 (0%)	11 (73%)

Table 67: Content and Level at 1st Year

Table 68 shows the frequency of institutions that reported that they are doing work at the 2nd Year level, in each of the categories under consideration, in either an integrated and/or stand-alone way.

2nd Year	Integrated	Stand-Alone	Both	None
Piracy	5 (33%)	0 (0%)	0 (0%)	10 (67%)
Misrepresentation of Competence	2 (13%)	0 (0%)	0 (0%)	13 (87%)
Importance of producing the best possible work	7 (47%)	0 (0%)	0 (0%)	8 (53%)
Abuse of Confidential information	6 (40%)	1 (7%)	0 (0%)	8 (53%)
Conflicts of interest	3 (20%)	0 (0%)	0 (0%)	12 (80%)
Over/under selling IT to internal/external clients	0 (0%)	0 (0%)	0 (0%)	15 (100%)
Privacy	6 (40%)	0 (0%)	0 (0%)	9 (60%)
Whistle-blowing	0 (0%)	0 (0%)	0 (0%)	15 (100%)

Table 68: Content and Level at 2nd Year

Table 69 shows the frequency of institutions that reported that they are doing work at the 3rd Year level, in each of the categories under consideration, in either an integrated and/or stand-alone way.

3rd Year	Integrated	Stand-Alone	Both	None
Piracy	6 (40%)	0 (0%)	0 (0%)	9 (60%)
Misrepresentation of Competence	4 (27%)	1 (7%)	0 (0%)	10 (67%)
Importance of producing the best possible work	7 (47%)	1 (7%)	0 (0%)	7 (47%)
Abuse of Confidential information	7 (47%)	0 (0%)	0 (0%)	8 (53%)
Conflicts of interest	4 (27%)	0 (0%)	0 (0%)	11 (73%)
Over/under selling IT to internal/external clients	1 (7%)	0 (0%)	0 (0%)	14 (93%)
Privacy	6 (40%)	0 (0%)	0 (0%)	9 (60%)
Whistle-blowing	1 (7%)	0 (0%)	0 (0%)	14 (93%)

Table 69: Content and Level at 3rd Year

Table 70 shows the frequency of institutions that reported that they are doing work at the Honours level, in each of the categories under consideration, in either an integrated and/or stand-alone way.

Honours	Integrated	Stand-Alone	Both	None
Piracy	4 (27%)	1 (7%)	0 (0%)	10 (67%)
Misrepresentation of Competence	4 (27%)	1 (7%)	0 (0%)	10 (67%)
Importance of producing the best possible work	4 (27%)	1 (7%)	0 (0%)	10 (67%)
Abuse of Confidential information	6 (40%)	1 (7%)	0 (0%)	8 (53%)
Conflicts of interest	4 (27%)	1 (7%)	0 (0%)	10 (67%)
Over/under selling IT to internal/external clients	4 (27%)	0 (0%)	0 (0%)	11 (73%)
Privacy	6 (40%)	1 (7%)	0 (0%)	8 (53%)
Whistle-blowing	2 (13%)	1 (7%)	0 (0%)	12 (80%)

Table 70: Content and Level at Honours

Table 71 shows the frequency of institutions that reported that they are doing work at the Masters/PhD level, in each of the categories under consideration, in either an integrated and/or stand-alone way.

Masters/PhD	Integrated	Stand-Alone	Both	None
Piracy	1 (7%)	0 (0%)	0 (0%)	14 (93%)
Misrepresentation of Competence	1 (7%)	1 (7%)	0 (0%)	13 87%)
Importance of producing the best possible work	1 (7%)	0 (0%)	0 (0%)	14 (93%)
Abuse of Confidential information	1 (7%)	0 (0%)	0 (0%)	14 (93%)
Conflicts of interest	0 (0%)	0 (0%)	0 (0%)	15 (100%)
Over/under selling IT to internal/external clients	0 (0%)	0 (0%)	0 (0%)	15 (100%)
Privacy	1 (7%)	0 (0%)	0 (0%)	14 (93%)
Whistle-blowing	0 (0%)	0 (0%)	0 (0%)	15 (100%)

Table 71: Content and Level at Masters/PhD level

8.3.2.4 Course Requirement

Table 72 shows the frequency of institutions that require successful completion of the course for degree purposes

	Yes	No
Required for completion	7 (47%)	8 (53%)

Table 72: Course Requirement

8.3.2.5 Treatment of Topic

Table 73 shows the frequency of institutions that make use of Readings, Lectures, Tutorials/Practicals, Essays, or Tests when teaching the course.

	Readings	Lectures	Tutorials/Pracs	Essays	Tests	Other
Yes	10 (67%)	14 (93%)	4 (27%)	5 (33%)	10 (67%)	1 (7%)
No	5 (33%)	1 (7%)	11 (73%)	10 (67%)	5 (33%)	14 (93%)

Table 73: Treatment of Topic

8.3.2.6 Proportion of total curriculum

Table 74 shows the proportion each institution accords Ethics within the curriculum for each year.

	No Response	0%	5%	10%	15%	20%	25%
1st	5 (33%)	0 (0%)	7 (49%)	1 (6%)	1 (6%)	0 (0%)	1 (6%)
2nd	5 (33%)	1 (7%)	6 (40%)	3 (20%)	0 (0%)	0 (0%)	0 (0%)
3rd	4 (26%)	1 (7%)	6 (40%)	4 (27%)	0 (0%)	0 (0%)	0 (0%)
Honours	6 (40%)	1 (7%)	6 (40%)	2 (13%)	0 (0%)	0 (0%)	0 (0%)
Masters/PhD	11 (73%)	2 (13%)	0 (0%)	1 (7%)	0 (0%)	1 (7%)	0 (0%)

Table 74: Proportion of total curriculum

8.3.2.7 Degree of emphasis desired in curriculum

Table 75 shows the degree of emphasis, at each year that institutions believe should be placed on Ethics within the curriculum.

	No Response	None	Less than other topics	Similar to other topics
1st	1 (6%)	1 (7%)	9 (60%)	4 (27%)
2nd	2 (13%)	0 (0%)	10 (67%)	3 (20%)
3rd	2 (13%)	0 (0%)	8 (54%)	5 (33%)
Honours	4 (27%)	1 (7%)	8 (53%)	2 (13%)

Masters/PhD	8 (54%)	2 (13%)	3 (20%)	2 (13%)

Table 75: Degree of emphasis desired in curriculum

The majority view was that it should be less than other topics, but that it should still be included.

8.3.2.8 Most successful teaching methodologies

Table 76 shows the frequency of institutions that believe the teaching methods under consideration (Readings, Case-Studies, Tutorials/Practicals, Essays, Role-Playing or Lectures) to be the most successful in teaching ethics in Information Systems.

	Readings	Case-Studies	Tutorials/Pracs	Essays	Role-playing	Lectures
1st	4 (27%)	2 (13%)	3 (20%)	0 (0%)	2 (13%)	7 (47%)
2nd	2 (13%)	2 (13%)	2 (20%)	0 (0%)	1 (7%)	4 (27%)
3rd	1 (7%)	6 (40%)	1 (7%)	1 (7%)	2 (13%)	4 (27%)
Honours	2 (13%)	4 (27%)	0 (0%)	2 (13%)	2 (13%)	5 (33%)
Masters/PhD	2 (13%)	1 (7%)	0 (0%)	1 (7%)	0 (0%)	2 (13%)

Table 76: Most successful teaching methodologies

8.3.2.9 Degree of noticeable change in individuals

Table 77 shows the frequency of institutions where respondents were able to discern a noticeable change in the individuals taught as a result of the course on ethics in Information Systems.

No Response	No Change	Change in one or two individuals	Change in a couple of people	Change in a lot of people
5 (33%)	1 (7%)	2 (13%)	6 (40%)	1 (7%)

Table 77: Degree of noticeable change

8.3.2.10 Objective of Course

Table 78 shows the frequency of institutions that share the general objectives identified in the survey.

	To achieve a general awareness of ethics surrounding IT	To enable students to justify their decisions as 'right' in terms of ethics	To teach students a process of making decisions that will take ethics into account	To develop an understanding of a wide spectrum of behaviour that is, and is not, ethical
Yes	10 (67%)	6 (39%)	10 (67%)	8 (53%)
No	5 (33%)	9 (61%)	5 (33%)	7 (47%)

Table 78: Objective of Course

Only two institutions (13%) did not identify with any of the objectives above.

8.4 Analysis

When asked how institutions covered ethics within the Information Systems Curriculum, the majority (74%) preferred an integrated approach whilst a similar minority (13%) preferred a stand-alone or joint approach.

The majority of institutions teach the course using staff from the Information Systems Department (33%), the Computer Science Department (27%) or the Management (13%) or Philosophy (13%) departments, with the remainder (7%) using staff from other departments.

The content of the course, and the level at which it is taught was investigated:

- No response was received in the areas of piracy (7%), Misrepresentation of Competence (14%), Importance of producing the best possible work (7%), Abuse of Confidential information (7%), Conflicts of interest (7%), Over/under selling IT to internal/external clients (21%), and Whistle-blowing (14%).
- No work is being done by institutions in Piracy (20%), Misrepresentation of Competence (33%), Importance of producing the best possible work (20%), Abuse of Confidential information (7%), Conflicts of interest (20%),

Over/under selling IT to internal/external clients (40%), Privacy (13%), or Whistle-blowing (47%).

- At first year level:
  - The issue of piracy is taught in an integrated (40%), stand-alone (20%), or integrated and stand-alone (7%) way. 67% report that it is not covered at all.
  - The issue of not misrepresenting one's competence is taught in an integrated (27%), stand-alone (20%), or integrated and stand-alone (7%) way. 47% report that it is not covered at all.
  - The issue of the importance of producing the best possible work is taught in an integrated (47%) or stand-alone (13%) way. 40% report that it is not covered at all.
  - The issue of the abuse of confidential information is taught in an integrated (40%), stand-alone (7%), or integrated and stand-alone (7%) way. 47% report that it is not covered at all.
  - The issue of declaring conflicts of interest is taught in an integrated (27%), stand-alone (7%), or integrated and stand-alone (7%) way. 60% report that it is not covered at all.
  - The problems of the over/under selling IT to internal/external clients is taught in an integrated (7%), stand-alone (7%), or integrated and stand-alone (7%) way. 80% report that it is not covered at all.
  - The importance of Privacy is taught in an integrated (40%), stand-alone (20%), or integrated and stand-alone (7%) way. 33% report that it is not covered at all.
  - The issue of whistle-blowing is taught in an integrated (13%), stand-alone (13%), or integrated and stand-alone (0%) way. 73% report that it is not covered at all.
- At second year level:

- The issue of piracy is taught in an integrated (33%) way. 67% report that it is not covered at all.
- The issue of not misrepresenting one's competence is taught in an integrated (13%) way. 87% report that it is not covered at all.
- The issue of the importance of producing the best possible work is taught in an integrated (47%) way. 53% report that it is not covered at all.
- The issue of the abuse of confidential information is taught in an integrated (40%), or stand-alone (7%) way. 53% report that it is not covered at all.
- The issue of declaring conflicts of interest is taught in an integrated (20%) way. 80% report that it is not covered at all.
- The problem of the over/under selling IT to internal/external clients is not taught at all.
- The importance of Privacy is taught in an integrated (40%) way. 60% report that it is not covered at all.
- The issue of whistle-blowing is not covered at all.

- At third year level:
  - The issue of piracy is taught in an integrated (40%) way. 60% report that it is not covered at all.
  - The issue of not misrepresenting one's competence is taught in an integrated (27%), or stand-alone (7%) way. 67% report that it is not covered at all.
  - The issue of the importance of producing the best possible work is taught in an integrated (47%) or stand-alone (7%) way. 47% report that it is not covered at all.

- The issue of the abuse of confidential information is taught in an integrated (47%) way. 53% report that it is not covered at all.
- The issue of declaring conflicts of interest is taught in an integrated (27%) way. 73% report that it is not covered at all.
- The problems of the over/under selling IT to internal/external clients is taught in an integrated (7%) way. 93% report that it is not covered at all.
- The importance of Privacy is taught in an integrated (40%) way. 60% report that it is not covered at all.
- The issue of whistle-blowing is taught in an integrated (7%) way. 93% report that it is not covered at all.

- At Honours level:
  - The issue of piracy is taught in an integrated (27%) or stand-alone (7%) way. 67% report that it is not covered at all.
  - The issue of not misrepresenting one's competence is taught in an integrated (27%) or stand-alone (7%) way. 67% report that it is not covered at all.
  - The issue of the importance of producing the best possible work is taught in an integrated (27%) or stand-alone (7%) way. 67% report that it is not covered at all.
  - The issue of the abuse of confidential information is taught in an integrated (40%) or stand-alone (7%) way. 53% report that it is not covered at all.
  - The issue of declaring conflicts of interest is taught in an integrated (27%) or stand-alone (7%) way. 67% report that it is not covered at all.
  - The problems of the over/under selling IT to internal/external clients is taught in an integrated (27%) way. 73% report that it is not covered at all.

- The importance of Privacy is taught in an integrated (40%) or stand-alone (7%) way. 53% report that it is not covered at all.
- The issue of whistle-blowing is taught in an integrated (13%) or stand-alone (7%) way. 80% report that it is not covered at all.

- At Masters/PhD level:
  - The issue of piracy is taught in an integrated (7%) way. 93% report that it is not covered at all.
  - The issue of not misrepresenting one's competence is taught in an integrated (7%) or stand-alone (7%) way. 87% report that it is not covered at all.
  - The issue of the importance of producing the best possible work is taught in an integrated (7%) way. 93% report that it is not covered at all.
  - The issue of the abuse of confidential information is taught in an integrated (7%) way. 93% report that it is not covered at all.
  - The issue of declaring conflicts of interest is not covered at all.
  - The problems of the over/under selling IT to internal/external clients are not covered at all.
  - The importance of Privacy is taught in an integrated (7%) way. 93% report that it is not covered at all.
  - The issue of whistle-blowing is not covered at all.

The majority (53%) of institutions do not require successful completion of an ethics course for degree purposes. The minority (47%) do.

In terms of delivery methods, the majority presented lectures (93%), made use of readings (67%) and tests (67%). The minority used tutorials or practicals (27%), essays (33%) or some other method (7%) during the course of their treatment of Ethics within the Information Systems curriculum.

The majority of institutions accorded 5% of their curriculum to Ethics in Information Systems.

- At first year level the majority (49%) accorded 5% of the curriculum, whilst an equal minority (6%) accorded 10, 15 and 25% of the curriculum to Ethics in Information Systems.
- At the second year level, the majority (40%) accorded 5% of the curriculum, with a slight minority of institutions (20%) affording 10% of the curriculum. 7% of the institutions reported that they did not afford any curriculum space in 2nd year, whilst 33% did not respond.
- At the third year level, the majority (40%) accorded 5% of the curriculum, with a slight minority (27%) affording 10% of the curriculum. 7% of the institutions reported that they did not afford any curriculum space in 3rd year, whilst 26% did not respond.
- At the Honours level, the majority (40%) accorded 5% of the curriculum, with a slight minority (13%) affording 10% of the curriculum. 7% of the institutions reported that they did not afford any curriculum space in the Honours year, whilst 40% did not respond.
- At the Masters/PhD level, the majority (13%) did not accord any curriculum space, whilst one institution (7%) accorded 10% of the curriculum, another (7%) provided 20% of the curriculum for Ethics in Information Systems. This is to be expected as at Masters/PhD level the work is usually individual research and not course-work.

When asked what the desired emphasis should be, respondents noted that it should be less than other topics:

- The majority (60%) felt that at first year level it should be less than other topics, whilst a minority (27%) felt that it should be similar to other topics. 7% felt that it should not be present at first year. 6% did not respond.

- The majority (67%) felt that at second year level it should be less than other topics, whilst a minority (20%) felt that it should be similar to other topics. 13% did not respond.
- The majority (54%) felt that at third year level it should be less than other topics, whilst a minority (33%) felt that it should be similar to other topics. 13% did not respond.
- The majority (53%) felt that at Honours level it should be less than other topics, whilst a minority (13%) felt that it should be similar to other topics. 7% felt that it should not be present at the Honours level. 27% did not respond.
- The majority (20%) felt that at Masters/PhD level it should be less than other topics, whilst a minority (13%) felt that it should be similar to other topics. 13% felt that it should not be present at the Masters/PhD level. 54% did not respond.

When asked what the most successful teaching methodologies would be for teaching Ethics in Information Systems:

- At first year level the preference of respondents was for lectures (47%), readings (27%), tutorials or practicals (20%), case-studies (13%) and role-playing (13%).
- At second year level, the preference of respondents was for lectures (27%), tutorials or practicals (20%), readings and case-studies (both at 13%), and role-playing (7%).
- At third year level, the preference of respondents was for case-studies (40%), lectures (27%), role-playing (13%) and readings, essays and tutorials and practicals (all at 7%).
- At Honours level, the preference of respondents was for lectures (33%), case-studies (27%), and readings, essays and role-playing (all at 13%).

- At Masters/PhD level, the preference of respondents was for lectures and readings (both at 13%) and case-studies and essays (both at 7%).

At the conclusion of teaching the course, 13% of teachers were able to discern a change in one or two individuals, and 7% in a lot of people. The majority (40%) noticed a change in a couple of people. 7% noticed no change, and 33% did not respond.

In terms of the objectives of the course, four possible objectives were suggested:

- To achieve a general awareness of ethics surrounding IT (67%).
- To enable students to justify their decisions as 'right' in terms of ethics (39%).
- To teach students a process of making decisions that will take ethics into account (67%).
- To develop an understanding of a wide spectrum of behaviour that is, and is not, ethical (53%).

8.5 Discussion

The majority of institutions preferred an integrated approach to teaching ethics, whilst the remainder were split in following either an integrated/stand-alone course or a stand-alone course by itself.

Departments are mounting these courses using mostly staff from their own disciplines. This is probably due to the majority of institutions adopting an integrated approach to teaching ethics, but it has the disadvantage that some of the more philosophical concepts may be treated in a less rigorous fashion.

The content of the course, and the level at which it is taught was investigated. Findings include:

- that at the first-year level, the majority of institutions focus on misrepresentation of competence, importance of producing the best possible

work, abuse of confidential information, and privacy. Issues of piracy, conflicts of interest, over/under selling IT to internal/external clients and whistle-blowing are not examined by the majority of institutions at the first-year level.

- that at the second-year level, the minority of institutions focus on piracy, misrepresentation of competence, importance of producing the best possible work, abuse of confidential information, conflicts of interest and privacy. Issues around the over/under selling of IT to internal/external clients and Whistle-blowing are not covered at all by any of the institutions at the second-year level.

- that at the third-year level, the majority of institutions focus on the importance of producing the best possible work, whilst the minority focus on piracy, misrepresentation of competence, abuse of confidential information, conflicts of interest, over/under selling IT to internal/external clients and whistle-blowing.

- that at the Honours-level, the minority of institutions focus on piracy, misrepresentation of competence, importance of producing the best possible work, abuse of confidential information, conflicts of interest, over/under selling IT to internal/external clients, privacy and whistle-blowing. The majority of institutions do not include any of the above.

- those at the Masters/PhD level, the majority of institutions do not include any of the factors mentioned above. This is due to the nature of the Masters/PhD, especially the research Masters/PhD – which usually has a very specific focus, to the exclusion of all else. The survey did not distinguish between taught higher degrees, and research higher degrees.

Just less than half the institutions are not doing any work in the area of Whistle-Blowing, whilst two-fifths are not looking at any of the issues related to Over/Under

selling IT to internal/external clients. One third of institutions are not addressing the issue of misrepresentation of one's competence to one's employer, and one fifth are not looking at the issues of piracy, the necessity to declare conflicts of interest and the importance of producing the best possible work. Slightly less than 90% of the institutions are addressing Privacy.

Three respondents did not answer any of the questions regarding the over/under selling of IT to internal/external clients; whilst two failed to answer questions surrounding the misrepresentation of competence and whistle-blowing. Issues of piracy, the importance of producing the best possible work, the abuse of confidential information and the importance of declaring conflicts of interest were not answered by one of the institutions surveys.

The majority of institutions do not require successful completion of an ethics course for degree purposes.

The majority of institutions accorded 5% of their curriculum to Ethics in Information Systems. When asked what the desired emphasis should be, respondents noted that it should be less than other topics:

In terms of teaching methods, Readings and lectures appear to be popular, with case-studies favoured in the senior years. Surprisingly, Role-Playing and small-group Tutorials did not feature very much in the senior years.

Teachers who taught an ethics course mostly noticed some degree of change with only one response stating that the course had had no effect.

The survey found that to give students an appreciation of the ethical issues, and to help them make decisions taking ethics into account were the major aims of the courses within the curriculum.

8.6 Conclusion

The majority of institutions currently integrate Computer Ethics across 5% of the curriculum, across all years (but in varying degrees). Staff from their own computer science or information systems departments teach the course and do not require successful completion of the integrated or stand-alone course for degree purposes. Respondents felt that Computer Ethics should receive less attention than other topics but that attention should be given. In terms of the 8 factors identified to be part of a Computer Ethics course, half of them are addressed by the majority of institutions at the first-year level and one of them is addressed by the majority of institutions at the third-year level. At other levels all 8 are addressed by the minority of institutions except for two factors which are not addressed at all by any of the institutions at the second-year level. Just less than half the institutions are not doing any work in the area of Whistle-Blowing, whilst two-fifths are not looking at any of the issues related to Over/Under selling IT to internal/external clients. One third of institutions are not addressing the issue of misrepresentation of one's competence to one's employer, and one fifth are not looking at the issues of piracy, the necessity to declare conflicts of interest and the importance of producing the best possible work. Slightly less than 90% of the institutions are addressing Privacy. In terms of teaching methods, Readings and lectures appear to be popular, with case-studies favoured in the senior years. Surprisingly, Role-Playing and small-group Tutorials did not feature very much in the senior years. Lecturers reported that they did notice a change in at least one, two or more individuals during or after the course. The survey found that to give students an appreciation of the ethical issues, and to help them make decisions taking ethics into account were the major aims of the courses within the curriculum.

We can thus conclude that whilst Ethics is not receiving as much attention as perhaps the official curricula recommend; most institutions are trying to sensitise their students to the issues involved in Computer Ethics.

Part IV Proposed Model

After having considered the context of Ethics in IS within South African curricula and assessing the need demonstrated by the empirical research, a model of how to teach Ethics in IS is presented.

Chapter 9 New Course Module

This chapter presents the proposed new undergraduate course module on the ethical aspects of Information Systems.

9.1 Introduction

The analysis of the survey data in the preceding chapters point to two facts. Firstly, that there is a lack of awareness of the ethical issues involving Information Technology amongst the respondents; and secondly that there is general agreement that this topic should be included in the degree curricula of individuals entering the profession. This has been borne out not only by the survey, but also by the consistent and increasing focus of curricula recommendations. Arising from these facts the author would like to propose a new course module using the algorithm developed by Pretorius *et al*.

9.2 Development of a model

Figure 3 shows the influence that the proposed model, a new course module in Ethics, draws upon.

9.2.1 Contributions from the Literature

In Chapter 2 the development of ethics within Moral Philosophy was considered and, in Chapter 3, the resultant theoretical and applied ethical theories. What has been found is that the essential truths articulated long ago in Moral Philosophy continue to echo and reverberate down the centuries, continuing to be relevant to us today. In examining the theoretical and applied ethical theories the development in this area has been recorded – particularly as it relates to Computer Ethics, as an applied ethical theory, and to Information Ethics, as the underlying foundational theoretical macro-ethic. Information Ethics is seen to be an advance for Moral Philosophy because it

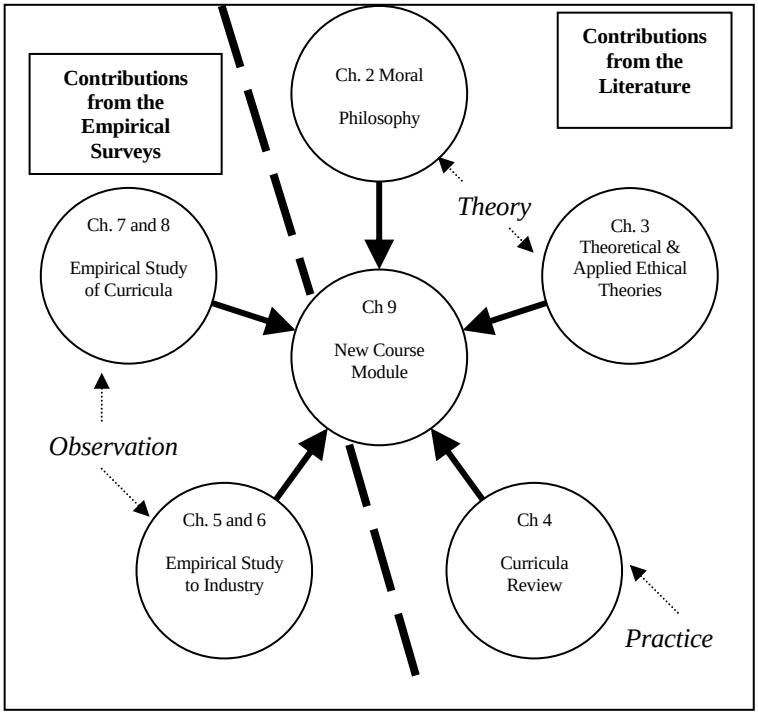


Figure 3: Inputs of the Proposed Model

allows moral concern to be applied to more than just those 'living' entities, but to entities for which we have 'information'. The discipline is no doubt an emerging one and will continue to impact our understanding of Computer Ethics. It is appropriate therefore that this be explained whilst teaching computer ethics.

The examination of curricula and various professional codes in Chapter 4 show that all official curricula recommendations demand that some treatment be given, preferably in an integrated way, to the issues of social and professional responsibility, as well as to the ethical implications of people's work, decisions, and conduct as members of a profession. It was further put forward that the best person to teach the course would be someone from within the discipline of Computer Science / Information Systems – but who would be acquainted with the philosophical theory. This is affirmed by the literature referred to earlier, especially in light of the evolution

of the applied Computer Ethics into the underlying theoretical Information Ethics. A method of determining integration and the creation of a stand-alone module was also examined.

9.2.2 Insight from the Empirical studies

The Empirical Studies showed that if an individual received a high exposure to ethics, as it relates to computers, during their education, and were to later work within an environment that promotes ethical behaviour and actively discourages unethical behaviour through the use of organisational policies or counselling, this combination will most likely result in limited future unethical behaviour from that individual.

In examining the *status quo* of how institutions currently teach Computer Ethics, it was found that the majority of institutions currently integrate Computer Ethics across 5% of the curriculum, across all years (but in varying degrees). Staff from the CS / IS departments, teach the course (confirming the observations of the literature).

Respondents of the Empirical Study to Academic Institutions felt that Computer Ethics should receive less attention than other topics but the coverage of the factors listed in Table 6 is limited, leading one to conclude that whilst only a little attention should be given, it is currently not enough. Approximately half the institutions are not doing any work in the area of Whistle-Blowing, whilst two-fifths are not looking at any of the issues related to Over/Under selling IT to internal/external clients. One third of institutions are not addressing the issue of misrepresentation of one's competence to one's employer, and one fifth are not looking at the issues of piracy, the necessity to declare conflicts of interest and the importance of producing the best possible work. On a positive note though, just under 90% of the institutions are addressing Privacy. In terms of teaching methods, Readings and lectures appear to be popular, with case-studies favoured in the senior years. Surprisingly, Role-Playing and small-group Tutorials did not feature very much in the senior years.

9.3 A New Course Module on Ethics in Information Systems

This section describes the proposed new course module on Ethics in Information Systems. It draws on all of the discussion and work presented previously, as well as incorporating the ideas of the author.

This section first examines what should be taught and then looks at how and where it should be taught within the Information Systems Curriculum. It concludes with making recommendations on who should teach it.

9.3.1 What should be taught?

Table 79 below is based upon the recommendations of the Official Curricula and is meant to supplement the broad recurring themes identified earlier and contained in Table 6, as well as the recommendations from the ImpactCS project, contained in Table 4. As such, Table 79 has been cross-referenced to the elements of Tables 4 and 6.

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Table 6	Table 4	Academic Year
1	**History of Computing** *Prehistory—the world before 1946* *History of computer hardware, software, networking* *Pioneers of computing* ▪ List the contributions of several pioneers in the computing field. ▪ Compare daily life before and after the advent of personal computers and the Internet. ▪ Identify significant continuing trends in the history of the computing field.		1a	1

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Table 6	Table 4	Academic Year
2	**Social Content of Computing** *Introduction to the social implications of computing* *Social implications of networked communication* *Growth of, control of, and access to the Internet* *Gender-related issues* *International issues* ▪ Interpret the social context of a particular implementation. ▪ Identify assumptions and values embedded in a particular design. ▪ Evaluate a particular implementation through the use of empirical data. ▪ Describe positive and negative ways in which computing alters the modes of interaction between people. ▪ Explain why computing/network access is restricted in some countries.		3d	1
3	**Methods and tools of analysis** *Making and evaluating ethical arguments* *Identifying and evaluating ethical choices* *Understanding the social context of design* *Identifying assumptions and values* ▪ Analyze an argument to identify premises and conclusion. ▪ Illustrate the use of example, analogy, and counter-analogy in ethical argument. ▪ Detect use of basic logical fallacies in an argument. ▪ Identify stakeholders in an issue and our obligations to them. ▪ Articulate the ethical tradeoffs in a technical decision.		3a 3b 3c	1

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Table 6	Table 4	Academic Year
4	**Professional and Ethical Responsibilities** *Community values and the laws by which we live* *The nature of professionalism* *Various forms of professional credentialing and the advantages and disadvantages* *The role of the professional in public policy* *Maintaining awareness of consequences* *Ethical dissent and whistle-blowing* *Codes of ethics, conduct, and practice (IEEE, ACM, SE, AITP, and so forth)* *Dealing with harassment and discrimination "Acceptable use" policies for computing in the workplace* ▪ Identify progressive stages in a whistle-blowing incident. ▪ Specify the strengths and weaknesses of relevant professional codes as expressions of professionalism and guides to decision-making. ▪ Identify ethical issues that arise in software development and determine how to address them technically and ethically. ▪ Develop a computer use policy with enforcement measures. ▪ Analyze a global computing issue, observing the role of professionals and government officials in managing the problem. ▪ Evaluate the professional codes of ethics from the ACM, the IEEE Computer Society, and other organizations.	E G	1d 1e	1
5	**Risks and liabilities of computer-based systems** *Historical examples of software risks (such as the Therac-25 case)* *Implications of software complexity* *Risk assessment and management* ▪ Explain the limitations of testing as a means to ensure correctness. ▪ Describe the differences between correctness, reliability, and safety. ▪ Discuss the potential for hidden problems in reuse of existing components. ▪ Describe current approaches to managing risk, and characterize the strengths and shortcomings of each.		4a	2

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Table 6	Table 4	Academic Year
6	**Intellectual property** *Foundations of intellectual property* *Copyrights, patents, and trade secrets* *Software piracy* *Software patents* *Transnational issues concerning intellectual property* ▪ Distinguish among patent, copyright, and trade secret protection. ▪ Discuss the legal background of copyright in national and international law. ▪ Explain how patent and copyright laws may vary internationally. ▪ Outline the historical development of software patents. ▪ Discuss the consequences of software piracy on software developers and the role of relevant enforcement organizations.	A		2
7	**Privacy and civil liberties** *Ethical and legal basis for privacy protection* *Privacy implications of massive database systems* *Technological strategies for privacy protection* *Freedom of expression in cyberspace* *International and intercultural implications* ▪ Summarize the legal bases for the right to privacy and freedom of expression in one's own nation and how those concepts vary from country to country. ▪ Describe current computer-based threats to privacy. ▪ Explain how the Internet may change the historical balance in protecting freedom of expression. ▪ Explain both the disadvantages and advantages of free expression in cyberspace. ▪ Describe trends in privacy protection as exemplified in technology.	D		2
8	**Computer crime** *History and examples of computer crime* *"Cracking" ("hacking") and its effects* *Viruses, worms, and Trojan horses* *Crime prevention strategies* ▪ Outline the technical basis of viruses and denial-of-service attacks. ▪ Enumerate techniques to combat "cracker" attacks. ▪ Discuss several different "cracker" approaches and motivations. ▪ Identify the professional's role in security and the tradeoffs involved.		4c 4d 4e	2

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Table 6	Table 4	Academic Year
9	**Economic issues in computing** *Monopolies and their economic implications* *Effect of skilled labour supply and demand on the quality of computing products* *Pricing strategies in the computing domain* *Differences in access to computing resources and the possible effects thereof* ▪ Summarize the rationale for antimonopoly efforts. ▪ Describe several ways in which the information technology industry is affected by shortages in the labour supply. ▪ Suggest and defend ways to address limitations on access to computing. ▪ Outline the evolution of pricing strategies for computing goods and services.	F		2
10	**Ethics and the IS Professional** to present and discuss the professional and ethical responsibilities of the IS practitioner ▪ use professional code of ethics to evaluate specific IS actions ▪ describe ethical and legal issues ▪ discuss and explain ethical considerations of software usage, sales, distribution, operation and maintenance		1d	2
11	**Ethically responsible decision-making** to explain Kallman & Grillo's (1993:20) Guide to Ethical Decision Making (See Appendix XXX) ▪ Examine the legal issues. ▪ Consult guidelines. ▪ Discover applicable ethical principles. ▪ Make a defensible ethical choice based on your conclusions from the preceding steps.		2a 2b 2c	2
12	**IS Professional Code of Ethics** to explain the use of a professional code of ethics to evaluate specific IS actions ▪ identify and describe professional organizations ▪ explain setting an ethical standard ▪ explain and examine ethical issues and arguments and failed approaches as a function of power and social context ▪ identification of stakeholders in a given IS development context, and the effect of development on these individuals ▪ describe use of the codes of ethics and ensure that project actions are consistent with these prescriptions	E G	1d 1e 3b 3c 3d 3e	3

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Table 6	Table 4	Academic Year
12	**IS Society and Ethics** to introduce the societal implications of IS and related ethical issues; to introduce and explore ethical concepts and issues relating to personal and professional behaviour; to introduce, compare and contrast ethical models and approaches to ▪ discuss and explain ethics and principled behaviour and the concept of ethical practice in IS ▪ discuss major ethical models and discuss the reasons for being ethical ▪ explain the use of professional codes of ethics; explain the burden of professionalism resulting from trust associated with computing knowledge and skills ▪ discuss and explain the basis and nature of questionable ethical approaches ▪ discuss and explain the ethical and social analysis of IS development ▪ discuss and explain the issues of power and its social impact in the development life cycle	B C	1b 1c	3
13	**Ethics and Legal Issues** to discuss and explain ethical and legal principles and issues; to discuss and explain ethical considerations of information systems development, planning, implementation, usage, sales, distribution, operation and maintenance ▪ list and explain ethical and legal issues in development, ownership, sales, acquisition, use and maintenance of computer systems and software ▪ explain the utilization of ethical models, for example principle centred leadership to IS life cycle stages ▪ give examples of the effects of social context on technology development		1b	3
14	**Interorganizational Ethical Issues** to present and explain ethical, contractual, and regulatory issues involving domestic and trans-border interactions involving interorganizational business relationships		5b	3
15	**Philosophical frameworks** *Philosophical frameworks, particularly utilitarianism and deontological theories* *Problems of ethical relativism* *Scientific ethics in historical perspective* *Differences in scientific and philosophical approaches* *Explanation of Floridi's Innovative Approach to Computer Ethics and the importance of Information Ethics* ▪ Summarize the basic concepts of relativism, utilitarianism, and deontological theories. ▪ Recognize the distinction between ethical theory and professional ethics, in the context of Information Ethics. ▪ Identify the weaknesses of the various approaches to Computer Ethics as espoused by Floridi		1c	3

Table 79: New Course Leaning Objects, cross-referenced to Tables 4 and 6, by Academic Year

9.3.2 How / where should it be taught?

The inclusion of a more in-depth study of the philosophy, especially in light of the emerging 'Information Ethics', as well as a focus on using case-studies is suggested as an improvement that should be considered by educators teaching a course in Computer Ethics.

It is evident from Table 80 that this course requires a mixed approach of having a stand-alone course in the 1st and 3rd years, and integrating Computer Ethics into various topics throughout the curriculum.

9.3.3 Who should teach this course?

The integrated portions of this course should be taught by the staff teaching those topics into which it is being integrated. The stand-alone portion should ideally be taught be someone who is enthusiastic about the subject, and who can lend the necessary support and affirmation of the course's importance.

9.4 Applying the model to Rhodes University

This section attempts to apply this model to Rhodes University using the modified De Ridder algorithm, to take into account Table 79.

9.4.1 The *status quo* – Information Systems at Rhodes University

The current undergraduate Information Systems curriculum is listed below:

- **First Year**

  Information Systems does not currently have an Information Systems 1 course, but requires students to have completed Computer Science 1. There is a particular module, Problem Solving A*, specifically for Information Systems students, but there are also other useful courses (for example the* Information Technology in Society *course)*

  - CSC101
    - Computer Concepts (3 Lectures)

        - Windows, the Desktop Environment & File Management (2 Lectures)
        - Word Processing (3 Lectures)
        - Presentations (3 Lectures)
        - Spreadsheets (3 Lectures)
        - Databases (3 Lectures)
        - Office Tools Integration (3 Lectures)
        - Networks & Internet Computing (9 Lectures)
        - Problem Solving A (Info Sys) (11 Lectures)
        - Problem Solving B (VBA) (15 Lectures)
        - Information Technology in Society (5 Lectures)
    - CSC102
        - Programming A
        - Programming B
        - Programming C

- **Second Year**
    - INF201
        - Information Systems Theory (8 Lectures, 1 Practical)
        - Information Technology in the Organisation (8 Lectures, 2 Practicals)
        - End-User Development Tools (12 Lectures, 4 Practicals)
        - Decision Modelling (12 Lectures, 4 Practicals)
        - Information Systems Management (12 Lectures)

      Students in the IS Professional stream continue to INF202. Students in the Accounting stream continue to INF203.

    - INF202
        - Analysis (25 Lectures, 6 Practicals)
        - Application Development Tools (23 Lectures, 3 Practicals)
        - Information Security (8 Lectures)
    - INF203
        - Accounting Information Systems (25 Lectures, 5 Practicals)
        - Accounting Support Tools (12 Lectures, 3 Practicals)
        - Information Systems Security & Control (12 Lectures, 2 Practicals)
- **Third Year**

  Students who completed INF202 may proceed to INF301

    - INF301
        - Project Management (19 Lectures, 4 Practicals)
        - Corporate Communications (11 Lectures, 2 Practicals)
        - Analysis (15 Lectures, 3 Practicals)
        - Design (14 Lectures, 3 Practicals)

        - Information Systems Theory (10 Lectures)
    - INF302
        - Data Manipulation (15 Lectures, 3 Practicals)
        - Advanced Programming Development Concepts and Tools (24 Lectures, 5 Practicals)
        - Data Communications (10 Lectures, 1 Practical)
        - E-Business (10 Lectures, 1 Practical)

Two approaches are offered for consideration. The first is an integrative approach that tries to integrate as much of the recommended topics as possible into the existing curriculum. De Ridder *et al*'s algorithm is used. The second is a stand-alone approach that would use an initial course, followed by some integration, and concluded by another stand-alone course at the end of the degree.

9.4.2 An integrative approach - applying the De Ridder *et al* algorithm to Rhodes University

Step 1 of the algorithm, the core modules:

The following core modules are identified:

- CSC101: Information Technology in Society
- CSC101: Problem Solving A
- INF201: Decision Modelling
- INF201: IS Management
- INF202: Application Development Tools
- INF203: IS Security & Control
- INF302: Data Manipulation
- INF301: IS Theory

Step 2 of the algorithm, set A and T:

Let $A = \{\}$, the empty set and T={Table 4 + Table 6}

Step 3 of the algorithm, the set N:

Set $N = T$

Set *N* thus consists of all the topics.

Step 4 of the algorithm, the sets C_i

The topics which would be incorporated in these modules are indicated in brackets.

- CSC101: Information Technology in Society (1a,1d)
- CSC101: Problem Solving A (3a,3b,3c)
- INF201: Decision Modelling (2a,2b,2c)
- INF201: IS Management (F,1b,5b)
- INF202: Application Development Tools (4c,4d,4e)
- INF203: IS Security & Control (4a)
- INF302: Data Manipulation (D)
- INF301: IS Theory (B,C,E,G,1b,1c,1d,1e,3b,3c,3d,3e)

Therefore *m*=8

Step 5 The pair-wise disjoint intersection of the sets C_i*:*

(This step eliminates the overlap)

- CSC101: Information Technology in Society [Set C_1={1a,1d}]
- CSC101: Problem Solving A [Set C_2={3a,3b,3c}]
- INF201: Decision Modelling [Set C_3={2a,2b,2c}]
- INF 201: IS Management [Set C_4={F,1b,5b}]
- INF202: Application Development Tools [Set C_5={4c,4d,4e}]
- INF203: IS Security & Control [Set C_6={4a}]
- INF302: Data Manipulation [Set C_7={D}]
- INF301: IS Theory [Set C_8={B,C,E,G,1c,1e,3d,3e}]

Step 6 Indicate the union of these modified sets C_i *by C*

- C={1a,1b,1c,1d,1e,2a,2b,2c,3a,3b,3c,3d,3e,4a,4c,4d,4e,5b,B,C,D,E,F,G}

Step 7 The remaining topics, $T-(A\cup C)$*, should constitute the basis of the stand-alone module.*

The remaining topics will constitute the basis of the stand-alone module. They are:

{A,H,4b,5a,5c}

Eliminating the overlap in this way may not be desirable as some topics bear repeating and would require some repetition in order to integrate more smoothly, thus it would be best to not to be too strict with this but to rely on the 'common sense' of the person presenting the course. Therefore, the resulting curriculum might look like:

# Lectures	Title *Topic(s)* ▪ Learning Objectives / Goals	Suggested Location in curriculum	Table 6	Table 4	Year
1	**History of Computing**	Information Technology in Society		1a	1
3	**Social Content of Computing**			3d	1
3	**Ethics and the IS Professional**			1d	1
2	**Methods and tools of analysis**	Problem Solving A		3a 3b 3c	1
3	**Professional and Ethical Responsibilities**	Stand Alone	E G	1d 1e 5a 5c	1
3	**Intellectual property**		A H	4b	2
2	**Risks and liabilities of computer-based systems**	IS Security & Control		4a	2
2	**Privacy and civil liberties**	Data Manipulation	D		2
3	**Computer crime**	Application Development Tools		4c 4d 4e	2
2	**Economic issues in computing**	IS Management	F		2
2	**Ethically responsible decision-making**	Decision Modelling		2a 2b 2c	2
2	**IS Professional Code of Ethics**	IS Theory	E G	1d 1e 3b 3c 3d 3e	3
2	**IS Society and Ethics**		B C	1b 1c	3
2	**Ethics and Legal Issues**	IS Management		1b	3
2	**Interorganizational Ethical Issues**			5b	3
3	**Philosophical frameworks**	Stand Alone		1c	3

Table 80: Suggested Location in Curriculum

9.4.3 A stand-alone approach

The first module should be offered in the introductory stages of the course, preferably at first year level and should consist of outcomes that would allow the student to:

1) distinguish between the basic cultural, social, legal, and ethical issues inherent in the discipline of computing.
2) understand where the discipline has been, where it is, and where it is heading.
3) identify their individual roles in this process, as well as appreciate the philosophical questions, technical problems, and aesthetic values that play an important part in the development of the discipline.
4) be aware of the basic legal rights of software and hardware vendors and users, and they also need to appreciate the ethical values that are the basis for those rights.

In this course the students would be introduced to the various codes of ethics of the professional organisations and informed of the legal obligations and social expectations on Information Systems Professionals. A thorough explanation of how these codes are grounded in sound moral theory and emphasis on their importance within society should be expressed and active compliance with them encouraged. Students should be offered concrete examples of how these codes apply in their own lives (for example music/software piracy).

The second course module, which would be very short, should be presented at the end of the degree programme and serve as a summation of the course, contextualising the individual and their responsibility within society as an Information Professional. The application of the ethical issues should also be explored. This will be a in a deeper sense than what has gone before, and will include issues such as over/under-selling in order to obtain a contract; quality assurance and its necessity in terms of the broader

reputational risk of the profession within society; and should consist of outcomes that would allow the student to:

1) anticipate the impact of introducing a given product into a given environment
2) ascertain whether that product enhances or degrades the quality of life
3) appreciate the product's impact upon individuals, groups, and institutions
4) understand the responsibility that they will bear, and the possible consequences of failure
5) understand their own limitations as well as the limitations of their tools
6) make a long-term commitment ot remaining current in their chosen specialties and in the discipline of computing as a whole
7) be able to identify the ethical issues surrounding their decisions

In the intervening years between these two modules, lecturers should be encouraged to highlight any ethical issues associated with their course (for example the privacy issues associated with security and control or database concepts).

9.5 Conclusion

The need for a course module on the ethical issues involving Information Technology was determined and a solution was provided which entailed offering an integrated and a stand-alone option. The integrated option attempts to uses 2 course in first year, 5 in second and 3 in the third to integrate the Computer Ethics components into the curriculum. The stand-alone option consists of two course modules; the first in the beginning of the degree programme which would cover broad ethical theory and introduce the concept of codes of conduct and professional responsibility; the second would be a "pulling-the-threads-together" type of lecture and would provide an overview of the IS Professional's role within society. In the intervening years the ethical issues associated with each specific course taught would be highlighted.

Part V Concluding Remarks

The conclusions of the research are presented and discussed as well as ideas for further research.

Chapter 10 Conclusions

This chapter presents the conclusions of the research and identifies area of further research.

10.1 Introduction

An increased emphasis is being placed on ethics generally, and in Information Systems and IS Curricula in particular. There are serious ethical, if not legal, problems present in the IT industry today. Levels of piracy, abuse of information and customers and employees' privacy, misrepresentation of skills and of work and conflicts of interest abound. The situation requires one to investigate this problem more broadly, with the intention to introduce a course module on Ethics in Information Systems.

10.2 Contributions of the thesis

Norman concludes his analysis of Moral Philosophy saying that "contemporary virtue ethics traces its ancestry back to Aristotle, and rights-based theories look to Kant. Considering also the continuing vitality of utilitarianism, and of contractarian ethics in the Hobbesian mode, we may fairly conclude that the main ethical traditions of previous centuries are still, in one incarnation or another, alive and well" (1995:591).

Floridi's Innovative Approach is more complete than the previous approaches to Computer Ethics and proposes that existence is more fundamental than being alive (that is things exist without necessarily being alive) and that the only proof we have of an object's existence is that we have information about it. It has been shown that Computer Ethics has prompted a deeper philosophical debate and that Information Ethics, as described by Floridi, offers the conceptual basis for further rigorous academic study, not only in Computer Ethics, but in Moral Philosophy as well. What is important for members of Computer Science and Information Systems though, is that the future of Computer Ethics will be conjoined with Information Ethics, and that Professionalism is no longer a sufficient to justify or determine the solution to a

Computer-Ethics problem. Therefore, grounding in Information Ethics will be essential as this will form the backbone of the future development of the discipline.

All of the official curricula recommendations are in agreement that between 16 and 35 hours of lecture time should be devoted to a 'Social and Professional issues course', which encompasses the ethical aspects associated with computers. Current work in South Africa was examined and the issue of who should teach the course was discussed. Despite arguments on both sides, the favoured view at present is for a member of the Computer Science / Information Systems department to teach the course. In terms of whether to integrate ethics into the curricula or to offer a stand-alone course, the official curricula recommended that computer ethics should be integrated across the curriculum. For practical reasons this may not always be possible and so a capstone course (containing all that could not be integrated) was proposed as a way forward. The de Ridder *et al* Algorithm was shown to be a useful tool to do this.

The results of the survey to Industry, after analysis and discussion, demonstrate that:

- Given a high degree of exposure to Ethics involving IT during one's education, one will be less likely to sometimes, quite often or always engage in unethical behaviour, such as abusing confidential information.

- In working for a larger organisation it becomes easier to 'hide among the crowd' and thus work more inefficiently and exhibit unethical behaviour.

- The environment within which one works is a contributing factor to an individual's behaviour – both for ethical and unethical behaviour.

- Employees who are in management positions are more likely to disclose conflicts of interest than those who are not in management positions.

- The presence of counselling or policies prohibiting unethical behaviour within an organisation has a diminishing effect on the level of unethical behaviour (for example software piracy for work or business purposes).

It can be concluded that if an individual received a high exposure to ethics, as it relates to IT, during their education, and works within an environment that promotes ethical behaviour and actively discourages unethical behaviour through the use of organisational policies or counselling, this combination will most likely result in limited future unethical behaviour from that individual.

The majority of institutions currently integrate Computer Ethics across 5% of the curriculum, across all years (but in varying degrees). Staff from their own computer science or information systems departments teach the course and do not require successful completion of the integrated or stand-alone course for degree purposes. Respondents felt that Computer Ethics should receive less attention than other topics but that attention should be given. In terms of the 8 factors identified to be part of a Computer Ethics course, half of them are addressed by the majority of institutions at the first-year level and one of them is addressed by the majority of institutions at the third-year level. At other levels all 8 are addressed by the minority of institutions except for two factors which are not addressed at all by any of the institutions at the second-year level. Just less than half the institutions are not doing any work in the area of Whistle-Blowing, whilst two-fifths are not looking at any of the issues related to Over/Under selling IT to internal/external clients. One third of institutions are not addressing the issue of misrepresentation of one's competence to one's employer, and one fifth are not looking at the issues of piracy, the necessity to declare conflicts of interest and the importance of producing the best possible work. Slightly less than 90% of the institutions are addressing Privacy. In terms of teaching methods, Readings and lectures appear to be popular, with case-studies favoured in the senior years. Surprisingly, Role-Playing and small-group Tutorials did not feature very much in the senior years. Lecturers reported that they did notice a change in at least one, two or more individuals during or after the course. The survey found that to give

students an appreciation of the ethical issues, and to help them make decisions taking ethics into account were the major aims of the courses within the curriculum.

Whilst Ethics is not receiving as much attention as perhaps the official curricula recommend, most institutions are trying to sensitise their students to the issues involved in Computer Ethics.

The need for a course module on the ethical issues involving Information Technology is clear and a solution which entails offering an integrated and a stand-alone option is proposed. The integrated option attempts to use 2 courses in first year, 5 in second and 3 in the third to integrate the Computer Ethics components into the curriculum. The stand-alone option consists of two course modules; the first in the beginning of the degree programme which would cover broad ethical theory and introduce the concept of codes of conduct and professional responsibility; the second would be a "pulling-the-threads-together" type of lecture and would provide an overview of the IS Professional's role within society. In the intervening years, the ethical issues associated with each specific course taught would be highlighted.

10.3 Limitations of the research

The following limitations should be noted:

- Whilst an attempt to practically apply the proposed model to Rhodes University's Department of Information Systems did take place – it must be remembered that this research did not actually implement it, and so no comment can be made as to its effectiveness. (See Future Work below).

- The sample size for the surveys should be qualified that

    - Whilst 233 responses for the Industry Survey was sufficient to draw statistical inferences, due to the nature of the topic under consideration and the often bi-polar responses led to some responses having less than

5 observations – which ruled out some statistical tests, that otherwise would have been conducted.

- Whilst the response for the Survey to Academic Institutions is 15, and some might think that this is too small, it must be remembered that there are very few Tertiary Education Institutions in South Africa, and as a result of the mergers, some Departments were possibly otherwise preoccupied and thus unable to answer the survey.

- Some questions within the survey employed the use of double-negatives which upon reflection may have lead to incorrect responses.

- There was a bias in the sample which had its origins in the Sampling Strategy used, which could be described as follows: Firstly to assume that the readers of ITWeb form a valid (random) sample of people working in IT industry; Secondly, that they were surveyed by means of a questionnaire on ITWeb's website; Thirdly, 233 responses were received (from the presumably thousands of readers of ITWeb). The limitation in this strategy was that the respondents responding to the survey were self-selected – and therefore not representative of the IT industry as a whole, and therefore, biased.

10.4 Further Research

Further research is needed in this area. Particularly in the areas of:

- Validating the success of the proposed model by actually implementing it.

- Examining the effect of generational perspectives to Ethics.

- Making Information Ethics more accessible so that it can be taught more clearly and easily by members of staff who will not have a thorough grounding in philosophy.

- Further work in assessing the ethical awareness of the IT industry in South Africa.

- Follow-up work to determine the extent to which Academic Institutions have implemented the recommendations from the official curricula, and the reasons underlying their actions.

Appendix A Official Curricula Bodies of Knowledge

The full text of the Official Curricula Bodies of Knowledge on the Social, Professional and Ethical Issues within Computer Science, Computer Engineering, Software Engineering and Information Systems is provided.

A. Official Curricula Bodies of Knowledge

Annexure A: Computer Science

The following is taken from the Computing Curricula 2001, Computer Science Volume (Roberts *et al* 2001:141)

Social and Professional Issues

Although technical issues are obviously central to any computing curriculum, they do not by themselves constitute a complete educational program in the field. Students must also develop an understanding of the social and professional context in which computing is done.

This need to incorporate the study of social issues into the curriculum was recognized in the following excerpt from Computing Curricula 1991 (Tucker *et al* 1991):

> Undergraduates also need to understand the basic cultural, social, legal, and ethical issues inherent in the discipline of computing. They should understand where the discipline has been, where it is, and where it is heading. They should also understand their individual roles in this process, as well as appreciate the philosophical questions, technical problems, and aesthetic values that play an important part in the development of the discipline.
>
> Students also need to develop the ability to ask serious questions about the social impact of computing and to evaluate proposed answers to those questions. Future practitioners must be able to anticipate the impact of introducing a given product into a given environment. Will that product enhance or degrade the quality of life? What will the impact be upon individuals, groups, and institutions?
>
> Finally, students need to be aware of the basic legal rights of software and hardware vendors and users, and they also need to appreciate the ethical values that are the basis for those rights. Future practitioners must understand the responsibility that they will bear, and the possible consequences of failure. They must understand their own limitations as well as the limitations of their tools. All practitioners

must make a long-term commitment to remaining current in their chosen specialties and in the discipline of computing as a whole.

The material in this knowledge area is best covered through a combination of one required course along with short modules in other courses. On the one hand, some units listed as core -- in particular, SP2, SP3, SP4, and SP6 -- do not readily lend themselves to being covered in other traditional courses. Without a standalone course, it is difficult to cover these topics appropriately. On the other hand, if ethical considerations are covered only in the standalone course and not "in context," it will reinforce the false notion that technical processes are void of ethical issues. Thus it is important that several traditional courses include modules that analyze ethical considerations in the context of the technical subject matter of the course. Courses in areas such as software engineering, databases, computer networks, and introduction to computing provide obvious context for analysis of ethical issues. However, an ethics-related module could be developed for almost any course in the curriculum. It would be explicitly against the spirit of the recommendations to have only a standalone course. Running through all of the issues in this area is the need to speak to the computer practitioner's responsibility to proactively address these issues by both moral and technical actions.

The ethical issues discussed in any class should be directly related to and arise naturally from the subject matter of that class. Examples include a discussion in the database course of data aggregation or data mining, or a discussion in the software engineering course of the potential conflicts between obligations to the customer and obligations to the user and others affected by their work. Programming assignments built around applications such as controlling the movement of a laser during eye surgery can help to address the professional, ethical and social impacts of computing.

There is an unresolved pedagogical conflict between having the core course at the lower (freshman-sophomore) level versus the upper (junior-senior) level. Having the course at the lower level

1. Allows for coverage of methods and tools of analysis (SP3) prior to analyzing ethical issues in the context of different technical areas
2. Assures that students who drop out early to enter the workforce will still be introduced to some professional and ethical issues.

On the other hand, placing the course too early may lead to the following problems:

1. Lower-level students may not have the technical knowledge and intellectual maturity to support in-depth ethical analysis. Without basic understanding of technical alternatives, it is difficult to consider their ethical implications.
2. Students need a certain level of maturity and sophistication to appreciate the background and issues involved. For that reason, students should have completed at least the discrete mathematics course and the second computer science course. Also, if students take a technical writing course, it should be a prerequisite or co requisite for the required course in the SP area.
3. Some programs may wish to use the course as a "capstone" experience for seniors.

Although items SP2 and SP3 are listed with a number of hours associated, they are fundamental to all the other topics. Thus, when covering the other areas, instructors should continually be aware of the social context issues and the ethical analysis skills. In practice, this means that the topics in SP2 and SP3 will be continually reinforced as the material in the other areas is covered.

SP1. History of computing [core]

Minimum core coverage time: 1 hour

Topics:

- Prehistory -- the world before 1946
- History of computer hardware, software, networking
- Pioneers of computing

Learning objectives:

1. List the contributions of several pioneers in the computing field.
2. Compare daily life before and after the advent of personal computers and the Internet.
3. Identify significant continuing trends in the history of the computing field.

SP2. Social context of computing [core]

Minimum core coverage time: 3 hours

Topics:

- Introduction to the social implications of computing
- Social implications of networked communication
- Growth of, control of, and access to the Internet
- Gender-related issues

- International issues

Learning objectives:

1. Interpret the social context of a particular implementation.
2. Identify assumptions and values embedded in a particular design.
3. Evaluate a particular implementation through the use of empirical data.
4. Describe positive and negative ways in which computing alters the modes of interaction between people.
5. Explain why computing/network access is restricted in some countries.

SP3. Methods and tools of analysis [core]

Minimum core coverage time: 2 hours

Topics:

- Making and evaluating ethical arguments
- Identifying and evaluating ethical choices
- Understanding the social context of design
- Identifying assumptions and values

Learning objectives:

1. Analyze an argument to identify premises and conclusion.
2. Illustrate the use of example, analogy, and counter-analogy in ethical argument.
3. Detect use of basic logical fallacies in an argument.
4. Identify stakeholders in an issue and our obligations to them.
5. Articulate the ethical tradeoffs in a technical decision.

SP4. Professional and ethical responsibilities [core]

Minimum core coverage time: 3 hours

Topics:

- Community values and the laws by which we live
- The nature of professionalism
- Various forms of professional credentialing and the advantages and disadvantages
- The role of the professional in public policy
- Maintaining awareness of consequences
- Ethical dissent and whistle-blowing

- Codes of ethics, conduct, and practice (IEEE, ACM, SE, AITP, and so forth)
- Dealing with harassment and discrimination
- "Acceptable use" policies for computing in the workplace

Learning objectives:

1. Identify progressive stages in a whistle-blowing incident.
2. Specify the strengths and weaknesses of relevant professional codes as expressions of professionalism and guides to decision-making.
3. Identify ethical issues that arise in software development and determine how to address them technically and ethically.
4. Develop a computer use policy with enforcement measures.
5. Analyze a global computing issue, observing the role of professionals and government officials in managing the problem.
6. Evaluate the professional codes of ethics from the ACM, the IEEE Computer Society, and other organizations.

SP5. Risks and liabilities of computer-based systems [core]

Minimum core coverage time: 2 hours

Topics:

- Historical examples of software risks (such as the Therac-25 case[41])
- Implications of software complexity
- Risk assessment and management

Learning objectives:

1. Explain the limitations of testing as a means to ensure correctness.
2. Describe the differences between correctness, reliability, and safety.
3. Discuss the potential for hidden problems in reuse of existing components.
4. Describe current approaches to managing risk, and characterize the strengths and shortcomings of each.

SP6. Intellectual property [core]

Minimum core coverage time: 3 hours

[41] Available at http://sunnyday.mit.edu/papers/therac.pdf

Topics:

- Foundations of intellectual property
- Copyrights, patents, and trade secrets
- Software piracy
- Software patents
- Translational issues concerning intellectual property

Learning objectives:

1. Distinguish among patent, copyright, and trade secret protection.
2. Discuss the legal background of copyright in national and international law.
3. Explain how patent and copyright laws may vary internationally.
4. Outline the historical development of software patents.
5. Discuss the consequences of software piracy on software developers and the role of relevant enforcement organizations.

SP7. Privacy and civil liberties [core]

Minimum core coverage time: 2 hours

Topics:

- Ethical and legal basis for privacy protection
- Privacy implications of massive database systems
- Technological strategies for privacy protection
- Freedom of expression in cyberspace
- International and intercultural implications

Learning objectives:

1. Summarize the legal bases for the right to privacy and freedom of expression in one's own nation and how those concepts vary from country to country.
2. Describe current computer-based threats to privacy.
3. Explain how the Internet may change the historical balance in protecting freedom of expression.
4. Explain both the disadvantages and advantages of free expression in cyberspace.
5. Describe trends in privacy protection as exemplified in technology.

SP8. Computer crime [elective]

recommended coverage time: 3 hours

Topics:

- History and examples of computer crime
- "Cracking" ("hacking") and its effects
- Viruses, worms, and Trojan horses
- Crime prevention strategies

Learning objectives:

1. Outline the technical basis of viruses and denial-of-service attacks.
2. Enumerate techniques to combat "cracker" attacks.
3. Discuss several different "cracker" approaches and motivations.
4. Identify the professional's role in security and the tradeoffs involved.

SP9. Economic issues in computing [elective]

Recommended coverage time: 2 hours

Topics:

- Monopolies and their economic implications
- Effect of skilled labour supply and demand on the quality of computing products
- Pricing strategies in the computing domain
- Differences in access to computing resources and the possible effects thereof

Learning objectives:

1. Summarize the rationale for antimonopoly efforts.
2. Describe several ways in which the information technology industry is affected by shortages in the labour supply.
3. Suggest and defend ways to address limitations on access to computing.
4. Outline the evolution of pricing strategies for computing goods and services.

SP10. Philosophical frameworks [elective]

Recommended coverage time: 2 hours

Topics:

- Philosophical frameworks, particularly utilitarianism and deontological theories
- Problems of ethical relativism
- Scientific ethics in historical perspective

- Differences in scientific and philosophical approaches

Learning objectives:

1. Summarize the basic concepts of relativism, utilitarianism, and deontological theories.
2. Recognize the distinction between ethical theory and professional ethics.
3. Identify the weaknesses of the "hired agent" approach, strict legalism, naïve egoism, and naïve relativism as ethical frameworks.

Advanced Courses Social and Professional Issues (SP)
CS380. Professional Practice
CS381. Social Context of Computing
CS382. Computers and Ethics
CS383. Computing Economics
CS384. Computer Law
CS385. Intellectual Property
CS386. Privacy and Civil Liberties

A.Computer Engineering

Social and Professional Issues (CE-SPR)

Although technical issues are obviously central to any curriculum in computer engineering, they do not in themselves constitute a complete educational program in the field. Students must also develop an understanding of the social and professional context in which they apply their computer engineering education.

The material in this knowledge area is best covered through a combination of one required course along with short modules in other courses. On the one hand, some units listed as core—in particular, CE-SPR1, CE-SPR2, CE-SPR3, and CE-SPR5—do not readily conform to topics covered in other technical courses. Without a standalone course, it is difficult to cover these topics appropriately. On the other hand, if ethical considerations are covered only in the standalone course and not “in context” of technical topics, it will reinforce the false notion that technological processes are void of ethical issues. Thus it is important that several traditional courses include modules that analyze ethical considerations in the context of the technical subject matter.

Ethics-related modules could be developed for almost any course in the curriculum. Courses in areas such as software engineering, databases, computer networks, data mining, and human computer interfaces provide obvious context for analysis of ethical issues and should arise naturally from those subjects. For example, a programming assignment built around applications such as controlling the movement

of a laser during eye surgery can help to address the professional, ethical, and social impacts of computing.

Running through all of the issues in this area is the need to speak to the computer engineer's responsibility to proactively address societal issues by both moral and technical actions. Computer engineers must be cognizant of their responsibility to the public. They must also be aware of the potential conflicts between the obligations to their employer and the obligations to the customer, user, and others affected by their work. Chapter 2 of this report provides a more in-depth discussion of professionalism, professional practices, and the societal responsibilities of computer engineers.

CE-SPR0. History and overview of social and professional issues [core]

Suggested time: 1 hour

Topics:

- Indicate some reasons for studying social and professional issues.
- Highlight some people that influenced or contributed to the area of social and professional issues.
- Indicate some important topic areas such social context of computing, professional and ethical responsibilities, risks and trade-offs, intellectual property, privacy, and codes of ethics and professional conduct.
- Contrast between what is legal to what is ethical.
- Explain the importance of ethical integrity in the practice of computer engineering.
- Mention some ways a computer engineer may have to make conflicting ethical choices in practicing the engineering profession.
- Explain the meaning of whistle blowing and the dilemma it sometimes places on computer engineers.
- Explain professionalism relative to a practicing engineer.
- Show that credentialing preserves the integrity of a professional.
- Describe risk and its contrast with safety.
- Explain the difference between a patent and a copyright.
- Describe how privacy issues affect the practice of computer engineering.
- Explore some additional resources associated with social and professional issues.
- Explain the purpose and role of social and professional issues in computer engineering.

Learning objectives:

1. Identify some contributors to social and professional issues and relate their achievements to the knowledge area.
2. Contrast between ethical and legal issues.
3. Contrast between a patent and a copyright.
4. Identify some ways of credentialing a person to practice computer engineering.
5. Describe issues that contrast risk issues with safety issues.
6. Identify some issues in computer engineering that address privacy.
7. Describe whistle blowing and the conflicts between ethics and practice that may result from doing so.
8. Describe how computer engineering uses or benefits from social and professional issues.

CE-SPR1. Social context of computing [core]

Suggested time: 3 hours

Topics:

- Introduction to the social implications of computing
- Social implications of networked communication
- Growth of, control of, and access to the Internet
- Gender-related issues
- International issues

Learning objectives:

1. Interpret the social context of a particular implementation.
2. Identify assumptions and values embedded in a particular design.
3. Evaluate a particular implementation through the use of empirical data.
4. Describe positive and negative ways in which computing altars the modes of interaction between people.
5. Explain why computing/network access is restricted in some countries.

CE-SPR2. Methods and tools of analysis [core]

Suggested time: 2 hours

Topics:

- Making and evaluating ethical arguments
- Identifying and evaluating ethical choices
- Understanding the social context of design
- Identifying assumptions and values

Learning objectives:

1. Analyze an argument to identify premises and conclusion.
2. Illustrate the use of example, analogy, and counter-analogy in ethical argument.
3. Detect use of basic logical fallacies in an argument.
4. Identify stakeholders in an issue and our obligations to them.
5. Articulate the ethical tradeoffs in a technical decision.

CE-SPR3. Professional and ethical responsibilities [core]

Suggested time: 3 hours

Topics:

- Community values and the laws by which we live
- The nature of professionalism
- Various forms of professional credentialing and the advantages and disadvantages
- The role of the professional in public policy
- The role of licensure and practice in engineering
- Contrasts of licensure in engineering but not other disciplines
- Maintaining awareness of consequences
- Ethical dissent and whistle blowing
- Codes of ethics, conduct, and practice (NSPE, IEEE, ACM, SE, AITP, and so forth)
- Dealing with harassment and discrimination
- "Acceptable use" policies for computing in the workplace

Learning objectives:

1. Identify progressive stages in a whistle-blowing incident.
2. Specify the strengths and weaknesses of relevant professional codes as expressions of professionalism and guides to decision-making.
3. Provide arguments for and against licensure in non-engineering professions.
4. Identify ethical issues that arise in software development and determine how to address them technically and ethically.
5. Develop a computer use policy with enforcement measures.

CE-SPR4. Risks and liabilities of computer-based systems [core]

Suggested time: 2 hours

Topics:

- Historical examples of software risks (such as the Therac-25 case)
- Product safety and public consumption
- Implications of software complexity
- Risk assessment and management

Learning objectives:

1. Explain the limitations of testing as a means to ensure correctness.
2. Recognize the importance of product safety when designing computer systems.
3. Describe the differences between correctness, reliability, and safety.
4. Recognize unwarranted assumptions of statistical independence of errors.
5. Discuss the potential for hidden problems in reuse of existing components.

CE-SPR5. Intellectual property [core]

Suggested time: 3 hours

Topics:

- Foundations of intellectual property
- Copyrights, patents, and trade secrets
- Software piracy
- Software patents
- Transnational issues concerning intellectual property

Learning objectives:

1. Distinguish among patent, copyright, and trade secret protection.
2. Discuss the legal background of copyright in national and international law.
3. Explain how patent and copyright laws may vary internationally.
4. Outline the historical development of software patents.

CE-SPR6. Privacy and civil liberties [core]

Suggested time: 2 hours

Topics:

- Ethical and legal basis for privacy protection
- Privacy implications of massive database systems
- Technological strategies for privacy protection
- Freedom of expression in cyberspace
- International and intercultural implications

Learning objectives:

1. Summarize the legal bases for the right to privacy and freedom of expression in one's own nation and how those concepts vary from country to country.
2. Describe current computer-based threats to privacy.
3. Explain how the Internet may change the historical balance in protecting freedom of expression.

CE-SPR7. Computer crime [elective]

Suggested time: 3 hours

Topics:

- History and examples of computer crime
- "Cracking" ("hacking") and its effects
- Viruses, worms, and Trojan horses
- Crime prevention strategies

Learning objectives:

1. Outline the technical basis of viruses and denial-of-service attacks.
2. Enumerate techniques to combat "cracker" attacks.
3. Discuss several different "cracker" approaches and motivations.
4. Identify the professional's role in security and the tradeoffs involved.

CE-SPR8. Economic issues in computing [elective]

Suggested time: 6 hours

Topics:

- Costing out jobs with considerations on manufacturing, hardware, software, and engineering implications.
- Cost estimates versus actual costs in relation to total costs
- Use of engineering economics in dealing with finances
- Entrepreneurship: prospects and pitfalls
- Monopolies and their economic implications
- Effect of skilled labour supply and demand on the quality of computing products
- Pricing strategies in the computing domain
- Differences in access to computing resources and the possible effects thereof

Learning objectives:

1. Describe the assessment of total job costs.
2. Evaluate the risks of entering one's own business.
3. Apply engineering economic principles when considering fiscal arrangements.
4. Summarize the rationale for antimonopoly efforts.
5. Describe several ways in which the information technology industry is affected by shortages in the labour supply.
6. Suggest and defend ways to address limitations on access to computing.

CE-SPR9. Philosophical frameworks [elective]
Suggested time: 2 hours

Topics:

- Philosophical frameworks, particularly utilitarianism and deontological theories
- Problems of ethical relativism
- Scientific ethics in historical perspective
- Differences in scientific and philosophical approaches

Learning objectives:

1. Summarize the basic concepts of relativism, utilitarianism, and deontological theories.
2. Recognize the distinction between ethical theory and professional ethics.
3. Identify the weaknesses of the "hired agent" approach, strict legalism, naïve egoism, and naïve relativism as ethical frameworks.

B. Software Engineering

The following is taken from the Computing Curricula 2001, Software Engineering Volume (LeBlanc *et al* 2004:1).

Professional Practice Course Description

Professional Practice is concerned with the knowledge, skills, and attitudes that software engineers must possess to practice software engineering in a professional, responsible, and ethical manner. The study of professional practices includes the areas of technical communication, group dynamics and psychology, and social and professional responsibilities.

Units and Topics

For each topic, a Bloom taxonomy level (indicating what capability a graduate should possess) and the topic's relevance (indicating whether the topics is essential, desirable, or optional to the core) are designated.

Bloom's attributes are specified using one of the letters k, c, or a, which represent:

- Knowledge (k) - Remembering previously learned material. Test observation and recall of information; that is, "bring to mind the appropriate information" (for example dates, events, places, knowledge of major ideas, mastery of subject matter).

- Comprehension (c) - Understanding information and the meaning of material presented. For example, be able to translate knowledge to a new context, interpret facts, compare, contrast, order, group, infer causes, predict consequences, etc.

- Application (a) - Ability to use learned material in new and concrete situations. For example, using information, methods, concepts, and theories to solve problems requiring the skills or knowledge presented.

A topic's relevance to the core is represented as follows:

- Essential (E) - The topic is part of the core.

- Desirable (D) - The topic is not part of the core, but it should be included in the core of a particular program if possible; otherwise, it should be considered as part of elective materials.

- Optional (O) - The topic should be considered as elective only.

Reference		k,c,a	E,D,O	Hours	Related Topics
PRF	Professional Practice			35	
PRF.psy	*Group dynamics / psychology*			5	
PRF.psy.1	Dynamics of working in teams/groups	a	E		
PRF.psy.2	Individual cognition (for example limits)	k	E		Psychology of HCI
PRF.psy.3	Cognitive problem complexity	k	E		Relationship of requirements to systems engineering, human-centered design etc.
PRF.psy.4	Interacting with stakeholders	c	E		Generating system objectives
PRF.psy.5	Dealing with uncertainty and ambiguity	k	E		
PRF.psy.6	Dealing with multicultural environments	k	E		
PRF.com	*Communication skills (specific to SE)*			10	
PRF.com.1	Reading, understanding and summarising readings (for example source code, documentation)	a	E		Requirements documentation basics
PRF.com.2	Writing (assignments, reports, evaluations, justifications, etc.)	a	E		
PRF.com.3	Team and group communication (both oral and written, email, etc.)	a	E		Project personnel and organization
PRF.com.4	Presentation skills	a	E		
PRF.pr	*Professionalism*			20	
PRF.pr.1	Accreditation, certification and licensing	k	E		
PRF.pr.2	Codes of ethics and professional conduct	c	E		
PRF.pr.3	Social, legal, historical, and professional issues and concerns	c	E		Requirements for software life cycle process
PRF.pr.4	The nature and role of professional societies	k	E		Life cycle process models and standards
PRF.pr.5	The nature and role of software engineering standards	k	E		Requirements documentation basics, Performance analysis and tuning, Life cycle process models and standards, Requirements for software life cycle process, Software quality standards
PRF.pr.6	The economic impact of software	c	E		Engineering economics for software
PRF.pr.7	Employment contracts	k	E		

NT291 Professional Software Engineering Practice

Course description:

History of computing and software engineering. Principles of professional software engineering practice and ethics. Societal and environmental obligations of the software engineer. Role of professional organizations. Intellectual property and other laws relevant to software engineering practice.

Learning objectives:

Upon completion of this course, students will have the ability to:

- Make ethical decisions when faced with ethical dilemmas, with reference to general principles of ethics as well as codes of ethics for engineering, computing, and software engineering.
- Apply concern for safety, security, and human rights to engineering and management decision-making.
- Understand basics of the history of engineering, computing, and software engineering.
- Describe and apply the laws that affect software engineers, including laws regarding copyright, patents, and other intellectual property.
- Describe the effect of software engineering decisions on society, the economy, the environment, their customers, their management, their peers, and themselves.
- Describe the importance of the various different professional societies relevant to software engineering in the state, province or country, as well as internationally.
- Understand the role of standards and standards-making bodies in engineering and software engineering.
- Understand the need for continual professional development as an engineer and a software engineer.

Additional teaching considerations:

- It is suggested that this course be taught in part using presentations by guest speakers. For example, there could be talks by an expert on ethics, a representative of a professional society, an intellectual property expert, etc.
- Students should be asked to read and discuss articles relevant to the course from the popular, trade, and academic press.
- Students should be asked to debate various ethical issues.
- Care should be taken to present both sides of certain issues. In particular, we feel that the case both for and against the licensing of software engineers should be presented, since respected leaders of the profession still have diametrically opposite views on this. Another issue where it is important to

present both sides include patenting of software. We believe it is entirely acceptable for the instructor to present their 'political' opinions on these issues as long as students are able to learn how the 'other side' thinks and are not penalized for opposing the instructor's views.

Total hours of SEEK coverage: 14
PRF.pr (13 core hours of 20) - Professionalism
PRF.pr.1 - Accreditation, certification, and licensing
PRF.pr.2 - Codes of ethics and professional conduct
PRF.pr.3 - Social, legal, historical, and professional issues and concerns
PRF.pr.4 - The nature and role of professional societies
PRF.pr.5 - The nature and role of software engineering standards
PRF.pr.6 - The economic impact of software
QUA.cc (1 core hour of 2) - Software quality concepts and culture
QUA.cc.2 - Society's concern for quality
QUA.cc.3 - The costs and impacts of bad quality

i. Information Systems

The IS2002 Curriculum (Gorgone *et al* 2002) contains the following learning units which are integrated into the curriculum:

Learning Unit 12: Fundamentals of CIS - IS Literacy - Ethics and the IS Professional (Level 1)		
Presentation Goals	**Learning Unit Objectives**	**Body of Knowledge**
to present and discuss the professional and ethical responsibilities of the IS practitioner	use professional code of ethics to evaluate specific IS actions (LO-0117) describe ethical and legal issues; discuss and explain ethical considerations of software usage, sales, distribution, operation and maintenance (LO-0157)	2 2.8.1 Software sales, licensing and agency 2 2.8.2 Contract fundamentals 3 2.8.5 Protection of intellectual property rights 3 2.8.6 Ethics: plagiarism, honesty, codes of ethics 3 2.8.7 Risks, losses and liability in computing applications 1 2.8.8 Warranties 3 2.9.3 Professional organizations: for example, DPMA, ACM, TIMS, ASM, DSI, ACE, IEEE... 2 2.10.4 Consulting Skills 3 2.10.7 Personal goal setting, decision making, and time management 2 2.10.10 Fostering creativity and opportunity finding 2 3.7.5 Project control: planning, cost estimation, resource allocation, software tech... 3 3.7.7 Management concerns; stress and time management

Learning Unit 31: IS Theory - IT and Organizational Systems - IS Society and Ethics (Level 2)		
Presentation Goals	**Learning Unit Objectives**	**Body of Knowledge**

to introduce the societal implications of IS and related ethical issues to introduce and explore ethical concepts and issues relating to personal and professional behaviour to introduce, compare and contrast ethical models and approaches to explore ethical and social analysis skills to consider the nature and existence of power	discuss and explain ethics and principled behaviour and the concept of ethical practice in IS (LO-0045) discuss ethical major ethical models and discuss the reasons for being ethical explain the use of professional codes of ethics; explain the burden of professionalism resulting from trust associated with computing knowledge and skills discuss and explain the basis and nature of questionable ethical approaches discuss and explain the ethical and social analysis of IS development discuss and explain the issues of power and its social impact in the development life cycle	2 2.8.6 Ethics: Personal and professional responsibility 2 2.8.7 Risks, losses and liability in computing applications 2 2.10.6 Proactive attitude and approach

Learning Unit 85: IS Theory - IT and Organizational Systems - IS Professional Code of Ethics (Level 2)		
Presentation Goals	**Learning Unit Objectives**	**Body of Knowledge**
to explain the use of a professional code of ethics to evaluate specific IS actions	identify and describe professional organizations (LO-0043) explain setting an ethical standard (LO-0044) explain and examine ethical issues and arguments and failed approaches as a function of power and social context identification of stakeholders in a given IS development context, and the effect of development on these individuals describe use of the codes of ethics and ensure that project actions are consistent with these prescriptions (LO-0127)	2 2.8.3 Privacy law 3 2.8.5 Protection of intellectual property rights 2 2.8.6 Ethics: Personal and professional responsibilities; ethical models, 2 2.9.1 Current literature periodicals, professional, academic journals 2 2.9.2 Certification issues 3 2.9.3 Professional organizations: for example, DPMA, ACM, TIMS, ASM, DSI, ACE, IEEE... 2 2.9.4 Professional conferences 2 2.10.6 Proactive attitude and approach

Learning Unit 119: IS Theory - IT and Organizational Systems - Ethics and Legal Issues (Level 3)		
Presentation Goals	**Learning Unit Objectives**	**Body of Knowledge**
to discuss and explain ethical and legal principles and issues; to discuss and explain ethical considerations	list and explain ethical and legal issues in development, ownership, sales, acquisition, use and maintenance of computer systems and software (LO-0215)	2 2.8.1 Software sales, licensing and agency 2 2.8.3 Privacy law 2 2.8.5 Protection of intellectual property rights

of information systems development, planning, implementation, usage, sales, distribution, operation and maintenance	explain the utilization of ethical models, for example principle centred leadership to IS life cycle stages give examples of the effects of social context on technology development	2 2.8.6 Ethics: Personal and professional responsibility; ethical models 2 2.8.7 Risks, losses and liability in computing applications 2 2.8.8 Warranties

Appendix B Codes of Ethics

B. Codes of Ethics

C.ACM

Bylaw 15. ACM Code of Ethics and Professional Conduct

(Available [On-line]: http://www.acm.org/constitution/bylaw15.html)

Preamble. Commitment to ethical professional conduct is expected of every member of the Association for Computing Machinery (ACM).

This Code, consisting of 24 imperatives formulated as statements of responsibility, identifies the elements of such a commitment. It contains many, but not all, issues professionals are likely to face. Section 1 outlines fundamental ethical considerations, while Section 2 addresses additional, more specific considerations of professional conduct. Statements in Section 3 pertain more specifically to individuals who have a leadership role, whether in the workplace or in a volunteer capacity such as with organizations like ACM. Principles involving compliance with this Code are given in Section 4.

The Code shall be supplemented by a set of guidelines which provide explanation to assist members in dealing with the various issues contained in the Code. It is expected that the Guidelines will be changed more frequently than the Code.

The Code and its supplementary Guidelines are intended to serve as a basis for ethical decision making in the conduct of professional work. Secondarily, they may serve as a basis for judging the merit of a formal complaint pertaining to the violation of professional ethical standards.

It should be noted that although computing is not mentioned in the imperatives of Section 1.0, the Code is concerned with how these fundamental imperatives apply to one's conduct as a computing professional. These imperatives are expressed in a general form to emphasize that ethical principles which apply to computer ethics are derived from more general ethical principles.

It is understood that some words and phrases in a code of ethics are subject to varying interpretations, and that any ethical principle may conflict with other ethical principles in specific situations. Questions related to ethical conflicts can best be answered by thoughtful consideration of fundamental principles, rather than reliance on detailed regulations.

1. **General Moral Imperatives:** As an ACM member I will...

- 1.1 Contribute to society and human well-being.
- 1.2 Avoid harm to others.
- 1.3 Be honest and trustworthy.
- 1.4 Be fair and take action not to discriminate.
- 1.5 Honour property rights including copyrights and patents.
- 1.6 Give proper credit for intellectual property
- 1.7 Respect the privacy of others.
- 1.8 Honour confidentiality.

2. **More specific Professional Responsibilities:** As an ACM computing professional I will...
    - 2.1 Strive to achieve the highest quality in both the process and products of professional work.
    - 2.2 Acquire and maintain professional competence.
    - 2.3 Know and respect existing laws pertaining to professional work.
    - 2.4 Accept and provide appropriate professional review.
    - 2.5 Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks.
    - 2.6 Honour contracts, agreements, and assigned responsibilities.
    - 2.7 Improve public understanding of computing and its consequences.
    - 2.8 Access computing and communication resources only when authorized to do so.
3. **Organizational Leadership Imperatives:** As an ACM member and an organizational leader, I will...
    - 3.1 Articulate social responsibilities of members of an organizational unit and encourage full acceptance of those responsibilities.
    - 3.2 Manage personnel and resources to design and build information systems that enhance the quality, effectiveness and dignity of working life.

- 3.3 Acknowledge and support proper and authorized uses of an organization's computing and communication resources.
- 3.4 Ensure that users and those who will be affected by a computing system have their needs clearly articulated during the assessment and design of requirements; later the system must be validated to meet requirements.
- 3.5 Articulate and support policies that protect the dignity of users and others affected by a computing system.
- 3.6 Create opportunities for members of the organization to learn the principles and limitations of computer systems.

4. **Compliance with the Code:** As an ACM member, I will...
   - 4.1 Uphold and promote the principles of this Code.
   - 4.2 Treat violations of this Code as inconsistent with membership in the ACM.

D.AITP

Code of Ethics

(Available [On-line]: http://www.aitp.org/organization/about/ethics/ethics.jsp)

I acknowledge:

That I have an obligation to management, therefore, I shall promote the understanding of information processing methods and procedures to management using every resource at my command.

That I have an obligation to my fellow members, therefore, I shall uphold the high ideals of AITP as outlined in the Association Bylaws. Further, I shall cooperate with my fellow members and shall treat them with honesty and respect at all times.

That I have an obligation to society and will participate to the best of my ability in the dissemination of knowledge pertaining to the general development and understanding of information processing. Further, I shall not use knowledge of a confidential nature to further my personal interest, nor shall I violate the privacy and confidentiality of information entrusted to me or to which I may gain access.

That I have an obligation to my College or University, therefore, I shall uphold its ethical and moral principles.

That I have an obligation to my employer whose trust I hold, therefore, I shall endeavour to discharge this obligation to the best of my ability, to guard my employer's interests, and to advise him or her wisely and honestly.

That I have an obligation to my country, therefore, in my personal, business, and social contacts, I shall uphold my nation and shall honour the chosen way of life of my fellow citizens.

I accept these obligations as a personal responsibility and as a member of this Association. I shall actively discharge these obligations and I dedicate myself to that end.

Standard of Conduct

(Available [On-line]: http://www.aitp.org/organization/about/conduct/conduct.jsp)

These standards expand on the Code of Ethics by providing specific statements of behaviour in support of each element of the Code. They are not objectives to be strived for, they are rules that no true professional will violate. It is first of all expected that an information processing professional will abide by the appropriate laws of their country and community. The following standards address tenets that apply to the profession.

In recognition of my obligation to management I shall:

- Keep my personal knowledge up-to-date and insure that proper expertise is available when needed.
- Share my knowledge with others and present factual and objective information to management to the best of my ability.
- Accept full responsibility for work that I perform.
- Not misuse the authority entrusted to me.
- Not misrepresent or withhold information concerning the capabilities of equipment, software or systems.
- Not take advantage of the lack of knowledge or inexperience on the part of others.

In recognition of my obligation to my fellow members and the profession I shall:

- Be honest in all my professional relationships.
- Take appropriate action in regard to any illegal or unethical practices that come to my attention. However, I will bring charges against any person only when I have reasonable basis for believing in the truth of the allegations and without any regard to personal interest.
- Endeavour to share my special knowledge.
- Cooperate with others in achieving understanding and in identifying problems.
- Not use or take credit for the work of others without specific acknowledgement and authorization.
- Not take advantage of the lack of knowledge or inexperience on the part of others for personal gain.

In recognition of my obligation to society I shall:

- Protect the privacy and confidentiality of all information entrusted to me.
- Use my skill and knowledge to inform the public in all areas of my expertise.
- To the best of my ability, insure that the products of my work are used in a socially responsible way.
- Support, respect, and abide by the appropriate local, state, provincial, and federal laws.
- Never misrepresent or withhold information that is germane to a problem or situation of public concern nor will I allow any such known information to remain unchallenged.
- Not use knowledge of a confidential or personal nature in any unauthorized manner or to achieve personal gain.

In recognition of my obligation to my employer I shall:

- Make every effort to ensure that I have the most current knowledge and that the proper expertise is available when needed.
- Avoid conflict of interest and insure that my employer is aware of any potential conflicts.
- Present a fair, honest, and objective viewpoint.
- Protect the proper interests of my employer at all times.
- Protect the privacy and confidentiality of all information entrusted to me.
- Not misrepresent or withhold information that is germane to the situation.
- Not attempt to use the resources of my employer for personal gain or for any purpose without proper approval.
- Not exploit the weakness of a computer system for personal gain or personal satisfaction.

E. Australian Computer Society (ACS)

Code of Ethics

(Available [On-line]: https://www.acs.org.au/about_acs/acs131.htm)

A Requirement

An essential characteristic of a profession is the need for its members to abide by a Code of Ethics. The Society requires its members to subscribe to a set of values and ideals which uphold and advance the honour, dignity and effectiveness of the profession of information technology.

Code of Ethics

1. To uphold and advance the honour, dignity and effectiveness of the profession of information technology and in keeping with high standards of competence and ethical conduct, a member must:
    1. (a) be honest, forthright and impartial, and
    2. (b) loyally serve the community, and
    3. (c) strive to increase the competence and prestige of the profession, and
    4. (d) use special knowledge and skill for the advancement of human welfare.
2. The personal commitments set out in 3 and 4 bind each member with regard to that member's professional conduct.
3. Values and Ideals
   I must act with professional responsibility and integrity in my dealings with the community and clients, employers, employees and students. I acknowledge:
    1. Priorities: I must place the interests of the community above those of personal or sectional interests.
    2. Competence: I must work competently and diligently for my clients and employers.
    3. Honesty: I must be honest in my representations of skills, knowledge, services and products.
    4. Social Implications: I must strive to enhance the quality of life of those affected by my work.
    5. Professional Development: I must enhance my own professional development, and that of my colleagues, employees and students.

6. Information Technology Profession: I must enhance the integrity of the information technology profession and the respect of its members for each other.

4. Standards of Conduct
   The standards of conduct set out in these National Regulations explain how the Code of Ethics applies to a member's professional work. The list of standards is not necessarily exhaustive and should not be read as definitively demarking the acceptable from the unacceptable in professional conduct in all practical situations faced by a member. The intention of the standards of conduct is to illustrate, and to explain in more detail, the meaning of the Code of Ethics in terms of specific behaviour. The fact that a member engages in, or does not engage in, these standards does not of itself guarantee that a member is acting ethically, or unethically, as applicable. A member is expected to take into account the spirit of the Code of Ethics in order to resolve ambiguous or contentious issues concerning ethical conduct.
5. Priorities
   In accordance with 3.1:
   1. I must endeavour to preserve continuity of information technology services and information flow in my care.
   2. I must endeavour to preserve the integrity and security of the information of others.
   3. I must respect the proprietary nature of the information of others.
   4. I must endeavour to preserve the confidentiality of the information of others.
   5. I must advise my client or employer of any potential conflicts of interest between my assignment and legal or other accepted community requirements.
   6. I must advise my clients and employers as soon as possible of any conflicts of interest or conscientious objections which face me in connection with my work.
6. Competence
   In accordance with 3.2:
   1. I must endeavour to provide products and services which match the operational and financial needs of my clients and employers.
   2. I must give value for money in the services and products I supply.
   3. I must make myself aware of relevant standards, and act accordingly.

4. I must respect and protect my clients' and employers' proprietary interests.
5. I must accept responsibility for my work.
6. I must advise my clients and employers when I believe a proposed project is not in their best interest.
7. I must go beyond my brief, if necessary, in order to act professionally.

7. Honesty
   In accordance with 3.3:
   1. I must not knowingly mislead a client or potential client as to the suitability of a product or service.
   2. I must not misrepresent my skills or knowledge.
   3. I must give opinions which are as far as possible unbiased and objective.
   4. I must give realistic estimates for projects under my control.
   5. I must qualify professional opinions which I know are based on limited knowledge or experience.
   6. I must give credit for work done by others where credit is due.
8. Social Implications
   In accordance with 3.4:
   1. I must protect and promote the health and safety of those affected by my work.
   2. I must consider and respect people's privacy which might be affected by my work.
   3. I must respect my employees and refrain from treating them unfairly.
   4. I must endeavour to understand, and give due regard to, the perceptions of those affected by my work.
   5. I must attempt to increase the feelings of personal satisfaction, competence, and control of those affected by my work.
   6. I must not require, or attempt to influence, any person to take any action which would involve a breach of the Code of Ethics.
9. Professional Development
   In accordance with 3.5:
   1. I must continue to upgrade my knowledge and skills.
   2. I must increase my awareness of issues affecting the information technology profession and its relationship with the community.

3. I must encourage my colleagues, employees and students to continue their own professional development.

10. Information Technology Profession
    In accordance with 3.6:
    1. I must respect, and seek when necessary, the professional opinions of colleagues in their areas of competence.
    2. I must not knowingly engage in, or be associated with, dishonest or fraudulent practices.
    3. I must not attempt to enhance my own reputation at the expense of another's reputation.
    4. I must co-operate in advancing information processing by communication with other professionals, students and the public, and by contributing to the efforts of professional and scientific societies and schools.
    5. I must distance myself professionally from someone whose membership of the Society has been terminated because of unethical behaviour or unsatisfactory conduct.
    6. I must take appropriate action if I discover a member, or a person who could potentially be a member, of the Society engaging in unethical behaviour.
    7. I must seek advice from the Society when faced with an ethical dilemma I am unable to resolve by myself.
    8. I must do what I can to ensure that the corporate actions of the Society are in accordance with this Code of Ethics.
    9. I acknowledge my debt to the computing profession and in return must protect and promote professionalism in information technology

F. BCS

Code of Conduct

(Available [On-line]: http://www.bcs.org/BCS/Join/WhyJoin/Conduct.htm)

This Code sets out the professional standards required by the Society as a condition of membership. It applies to members of all grades, including students, and affiliates, and also non-members who offer their expertise as part of the Society's Professional Advice Register.

Within this document, the term 'relevant authority' is used to identify the person or organisation which has authority over your activity as an individual. If you are a

practising professional, this is normally an employer or client. If you are a student, this is normally an academic institution.

The Code governs your personal conduct as an individual member of the BCS and not the nature of business or ethics of the relevant authority. It will, therefore, be a matter of your exercising your personal judgement in meeting the Code's requirements.

Any breach of the Code of Conduct brought to the attention of the Society will be considered under the Society's disciplinary procedures. You should also ensure that you notify the Society of any significant violation of this Code by another BCS member.

The Public Interest

1. You shall carry out work or study with due care and diligence in accordance with the relevant authority's requirements, and the interests of system users. If your professional judgement is overruled, you shall indicate the likely risks and consequences.
    - The crux of the issue here, familiar to all professionals in whatever field, is the potential conflict between full and committed compliance with the relevant authority's wishes, and the independent and considered exercise of your judgement.
    - If your judgement is overruled, you are encouraged to seek advice and guidance from a peer or colleague on how best to respond.
2. In your professional role you shall have regard for the public health, safety and environment.
    - This is a general responsibility, which may be governed by legislation, convention or protocol.
    - If in doubt over the appropriate course of action to take in particular circumstances you should seek the counsel of a peer or colleague.
3. You shall have regard to the legitimate rights of third parties.
    - The term 'third Party' includes professional colleagues, or possibly competitors, or members of 'the public' who might be affected by an IS project without their being directly aware of its existence.
4. You shall ensure that within your professional field/s you have knowledge and understanding of relevant legislation, regulations and standards, and that you comply with such requirements.

- As examples, relevant legislation could, in the UK, include The UK Public Disclosure Act, Data Protection or Privacy legislation, Computer Misuse law, legislation concerned with the export or import of technology, possibly for national security reasons, or law relating to intellectual property. This list is not exhaustive, and you should ensure that you are aware of any legislation relevant to your professional responsibilities. - In the international context, you should be aware of, and understand, the requirements of law specific to the jurisdiction within which you are working, and, where relevant, to supranational legislation such as EU law and regulation. You should seek specialist advice when necessary.

5. You shall conduct your professional activities without discrimination against clients or colleagues
    - Grounds of discrimination include race, colour, ethnic origin, sexual orientation
    - All colleagues have a right to be treated with dignity and respect.
    - You should adhere to relevant law within the jurisdiction where you are working and, if appropriate, the European Convention on Human Rights.
    - You are encouraged to promote equal access to the benefits of IS by all groups in society, and to avoid and reduce 'social exclusion' from IS wherever opportunities arise.
6. You shall reject any offer of bribery or inducement.

Duty to Relevant Authority

7. You shall avoid any situation that may give rise to a conflict of interest between you and your relevant authority. You shall make full and immediate disclosure to them if any conflict is likely to occur or be seen by a third party as likely to occur.
8. You shall not disclose or authorise to be disclosed, or use for personal gain or to benefit a third party, confidential information except with the permission of your relevant authority, or at the direction of a court of law.
9. You shall not misrepresent or withhold information on the performance of products, systems or services, or take advantage of the lack of relevant knowledge or inexperience of others.

Duty to the Profession

10. You shall uphold the reputation and good standing of the BCS in particular, and the profession in general, and shall seek to improve professional standards through participation in their development, use and enforcement.
    - As a Member of the BCS you also have a wider responsibility to promote public understanding of IS - its benefits and pitfalls
    - and, whenever practical, to counter misinformation that brings or could bring the profession into disrepute.
    - You should encourage and support fellow members in their professional development and, where possible, provide opportunities for the professional development of new members, particularly student members. Enlightened mutual assistance between IS professionals furthers the reputation of the profession, and assists individual members.
11. You shall act with integrity in your relationships with all members of the BCS and with members of other professions with whom you work in a professional capacity.
12. You shall have due regard for the possible consequences of your statements on others. You shall not make any public statement in your professional capacity unless you are properly qualified and, where appropriate, authorised to do so. You shall not purport to represent the BCS unless authorised to do so.
    - The offering of an opinion in public, holding oneself out to be an expert in the subject in question, is a major personal responsibility and should not be undertaken lightly.
      - To give an opinion that subsequently proves ill founded is a disservice to the profession, and to the BCS.
13. You shall notify the Society if convicted of a criminal offence or upon becoming bankrupt or disqualified as Company Director.

Professional Competence and Integrity

14. You shall seek to upgrade your professional knowledge and skill, and shall maintain awareness of technological developments, procedures and standards which are relevant to your field, and encourage your subordinates to do likewise.
15. You shall not claim any level of competence that you do not possess. You shall only offer to do work or provide a service that is within your professional competence.

- You can self-assess your professional competence for undertaking a particular job or role by asking, for example,
  - i. am I familiar with the technology involved, or have I worked with similar technology before?
  - ii. have I successfully completed similar assignments or roles in the past?
  - iii. can I demonstrate adequate knowledge of the specific business application and requirements successfully to undertake the work?

16. You shall observe the relevant BCS Codes of Practice and all other standards which, in your judgement, are relevant, and you shall encourage your colleagues to do likewise.
17. You shall accept professional responsibility for your work and for the work of colleagues who are defined in a given context as working under your supervision.

G. CIPS

Code of Ethics

(Available [On-line]: http://www.cips.ca/about/ethics/english/ethics.pdf)

The following statements are agreed to by all members of CIPS as a condition of membership.

I acknowledge that my position as an information systems professional carries with it certain obligations, and I will take diligent personal responsibility for their discharge.

- P) To the public: I will endeavour at all times to protect the public interest. I will strive to promote understanding of information systems and their application. I will not represent myself as an authority on topics in which I lack competence.

- M) To myself and my profession: I will guard my competence and effectiveness as a valuable possession. I will work to maintain them despite changing circumstances and requirements. I will demonstrate the highest personal standards of moral responsibilities, character, and integrity when acting in my professional capacity.

- C) To my colleagues: I will treat my colleagues with integrity and respect their right to success. I will contribute to the information systems profession to the best of my ability.

- E) To my employer and/or clients: I will give conscientious service to further my employer's and/or client's legitimate best interests through management's direction.

- R) To my employees and contracted staff: I will observe their obligation to uphold the Code of Ethics of the professional societies to which they belong.

- S) To my students: I will provide a scholarly education to my students in a supportive and helpful manner.

H. Computer Society of South Africa (CSSA)

Code of Conduct

(Available [On-line]: http://www.cssa.org.za/home.asp?pid=854)

A Member of the Computer Society of South Africa:

- Will behave at all times with integrity. A member will not knowingly lay claim to a level of competence not possessed and will at all times exercise competence at least to the level claimed.
- Will act with complete loyalty towards a client when entrusted with confidential information.

- Will act with impartiality when purporting to give independent advice and must disclose any relevant interests.
- Will accept full responsibility for any work undertaken and will construct and deliver that which has been agreed to.
- Will not seek personal advantage to the detriment of the Society and will actively seek to enhance the image of the Society.
- Will not engage in discriminatory practices in professional activities on any basis whatsoever.

Notes for Guidance
The six principles set out above make up the Computer Society of South Africa (CSSA) Code of Conduct, and each member of the Society, as a condition of membership, undertakes to adhere to these principles. The principles are clear, but have an inevitable appearance of generality. In the following pages each principle is supported by a number of notes for guidance which will help in specific interpretation. Members of the Society will readily appreciate that continued evidence of the determination to abide by the Code will ensure the public trust and confidence in computer professionals which is so necessary to the continuing effective use of computers.

Terminology
The following convention applies to the reading of this Code:

"Member" includes all categories of corporate membership defined in the Society's Articles of Association.
"Client" is any person or organisation for whom the member works, or undertakes to provide computer-based aid, in any way.
"User" is any person, department or organisation served by computer-based systems.
"System" means all applications involving the use of computer and information technology. The term does not imply any particular mode of processing, for example Local batch or remote real time, etc. "System" may be interpreted as encompassing non-computer procedures and disciplines, for example Clerical, Manual, etc.

Integrity
"A member will behave at all times with integrity. A member will not knowingly lay claim to a level of competence not possessed, and will at all times exercise competence at least to the level claimed."

Integrity implies wholeness, soundness, completeness: anything the member does should be done competently. Where necessary, additional guidance or expertise should be obtained from qualified advisers.

While claims to competence should not be made lightly, a member will not shelter behind this principle to avoid being helpful and co-operative; any guidance or advice that can be provided from experience should be readily given.

A Member should act in a manner based on trust and good faith towards clients or employers and towards others with whom he or she is associated.

A Member should express an opinion on a subject only when it is founded on adequate knowledge and honest conviction, and will properly qualify any opinion expressed outside the level of professional competence attained.

A Member should not deliberately make false or exaggerated statements as to the state of affairs existing or expected regarding any aspect of the construction or use of computers.

A Member should comply with the CSSA Code of Conduct and any other codes that are applicable and ensure that clients are aware of the significance of his or her work.

A Member has an obligation to be aware of relevant developments in information technology.

A Member should not engage in any illegal activities, including copyright or patent violations.

Confidentiality

"A member will act with complete loyalty towards a client when entrusted with confidential information."

A member shall take adequate measures to ensure the confidentiality of a client's information. A member should not disclose, or permit to be disclosed, or use to personal advantage, any confidential information relating to the affairs of present or previous employers or customers without their prior permission. The principle covers the need to protect confidential data.

Various kinds of information can be considered by a client or employer to be confidential. Even the fact that a project exists may be sensitive. Business plans, trade secrets, personal information are all examples of confidential data.

Training is required for all staff on measures to ensure confidentiality, to guard against the possibility of a third party intentionally or inadvertently misusing data and to be vigilant for leaks of confidentiality arising from careless use of data or indiscretions.

Impartiality
"A Member will act with impartiality when purporting to give independent advice and will disclose any relevant interests."

The principle is primarily directed to the case where a Member or Members relatives or friends may make a private profit if the client or employer follows advice given. Any such interest should be disclosed in advance.

A second interpretation is where there is no immediate personal profit but the future business or scope of influence of the department depends on a certain solution being accepted. Whereas salespersons are assumed to have a bias towards their own company, an internal consultant should always consider the welfare of the organisation as a whole and not just the increased application of computers.

Responsibility
"A Member will accept full responsibility for any work undertaken and will construct and deliver that which has been agreed to."

Trust and responsibility are at the heart of professionalism. A Member should seek out responsibility and discharge it with integrity. A member should complete the work accepted within the agreed time and budget. If that which has been promised cannot be achieved then the client or employer must be alerted at the earliest possible time so that corrective action can be taken.

Members should have regard to the effect of computer based systems insofar as they are known to them. On the basic human rights of individuals, whether within the organisation, its customers or suppliers, or among the general public.

Subject to the confidential relationship between themselves and their customers, members are expected to transmit the benefit of information acquired during the practice of the profession, as a result of technical knowledge, to alleviate any situation that may harm or seriously affect a third party.

A Member should combat ignorance about technology wherever it is found, and in particular in those areas where application of technology appears to have dubious social merit.

Relationship to the Society
"A Member will not seek personal advantage to the detriment of the Society and will actively seek to enhance the image of the Society."

It is necessary to write this principle into the Code of Conduct to prevent misuse of the considerable influence that a professional society can have. Nevertheless, its impact is largely internal and the points that have been made should be read in that light.

A Member should not bring the Society into disrepute by personal behaviour or acts when acknowledged or known to be a representative of the Society.

A Member should not misrepresent the views of the Society nor represent that the views of a segment or group of the Society constitutes the view of the Society as a whole. When acting or speaking on behalf of the Society, Members should, if faced with conflict of interest, declare their position. Members should not serve their own pecuniary interests or those of the company which normally employs them when purporting to act in an independent manner as representatives of the Society, save as permitted by the Society following a full disclosure of all the facts.

Members are expected to apply the same high standard of behaviour in their social life as is demanded of them in their professional activities insofar as these interact. Confidence is at the root of the validity of the qualifications of the Society and conduct which in any way undermines that confidence (for example. a gross breach of a confidential relationship) is of deep concern to the Society.

Members should conduct themselves with courtesy and consideration towards everyone they come into contact with in the course of their professional work.

Non-discrimination
"A member will not engage in discriminatory practices in professional activities, on any basis whatsoever."

Professional people should ensure that their dealings with others are free from unfair discriminatory behaviour.

Wherever they have the opportunity to control or influence the hiring and management of employees, their decisions should be based solely on the skills, experience and performance of the employee. This implies hiring and remunerating on an equal opportunity basis.

Wherever possible, members should support and/or initiate programmes that encourage the development and training of professionals and managers on an equal opportunity basis.

Appendix C Survey to Industry

The quick brown fox jumps over the lazy dog.

C. Survey to Industry

Preamble

An ethical person is one who *does the right thing* even when it is difficult to do so. One noted researcher defines an ethical issue as arising "whenever one party in pursuit of its goals, engages in behaviour that materially affects the ability of another party to pursue its goals. When the effect is helpful - good, right or just - we say the behaviour is praiseworthy or exemplary. When, however, the effect is harmful - bad, wrong or unjust - the behaviour is unethical." (Mason 1995:55). From an ethical perspective, IT developers have a professional duty to be honest in their representations about the capabilities of new information systems. We all know that managing user expectations is a delicate balancing act, since there are dangers to both overselling and underselling technology. Overselling has negative ethical implications, but underselling can lead to immediate user rejection. Some might say that the best approach is to strive for total honesty. Issues of piracy, systems failure, etc. indicate a prevalence of unethical behaviour within the industry. Technology affords numerous opportunities for acting unethically and, because of a lack of constraining parameters, unwittingly so.

Please note that your responses to this survey will remain completely confidential and will be used solely for the purposes of the author's research.

A.1 Section 1: General Demographics

1.1 Gender:

☐ Male **1** ☐ Female **2**

1.2 Province:

☐ Eastern Cape **1** ☐ Free State **2** ☐ Gauteng **3** ☐ Kwa-Zulu Natal **4** ☐ Limpopo **5**
☐ Mpumalanga **6** ☐ Northern Cape **7** ☐ North-West **8** ☐ Western Cape **9** ☐ Outside South Africa **10**

1.3 Home Language:

☐ Afrikaans **1** ☐ English **2** ☐ isiNdebele **3** ☐ isiXhosa **4** ☐ isiZulu **5** ☐ Sepedi **6**
☐ Sesotho **7** ☐ Setswana **8** ☐ siSwati **9** ☐ Tshivenda **10** ☐ Xitsonga **11**
☐ Other (Please specify): _____ **12**

1.4 Age:

☐ < 20 **1** ☐ 20-24 **2** ☐ 25-29 **3** ☐ 30-39 **4** ☐ 40-49 **5** ☐ 50-59 **6**
☐ 60-64 **7** ☐ > 65 **8**

1.5 Highest level of Education:

1 ☐ Primary School
2 ☐ High School
3 ☐ Matric or equivalent
4 ☐ Further Education & Training (for example Technical College)
5 ☐ Professional Certification (for example Microsoft, CISCO, Novell, Oracle, SUN, etc…)
6 ☐ Tertiary Education (for example University or Technikon)

1.6 Number of people who report to you:

☐ 0 **1** ☐ 1-10 **2** ☐ 11-20 **3** ☐ >20 **4**

1.7 Your Job Title: _____

1.8 Nature of business (please select one):

1 ☐ Banking/accounting/finance
2 ☐ Construction / mining / agriculture / engineering
3 ☐ Consulting
4 ☐ Education
5 ☐ Entertainment/marketing/advertising
6 ☐ Government
7 ☐ Healthcare/pharmaceutical
8 ☐ Information technology
9 ☐ Legal/real estate
10 ☐ Manufacturing (non-computer)
11 ☐ Non-profit
12 ☐ Retail/wholesale
13 ☐ Telecommunications
14 ☐ Transportation
15 ☐ Parastatal utilities, incl. electricity, water, post-office, etc.

1.9 Size of organisation:

☐ 0-50 employees **1** ☐ 51-100 employees **2** ☐ 101-500 employees **3** ☐ >500 employees **4**

I. Section 2: Ethics

2.1 Do you believe that the IT Industry worldwide *behaves* in an ethical manner?

☐ Never **1** ☐ Hardly Ever **2** ☐ Sometimes **3** ☐ Quite Often **4** ☐ Always **5**

2.2 Do you believe that the IT Industry worldwide should behave in an ethical manner?

☐ Never **1** ☐ Hardly Ever **2** ☐ Sometimes **3** ☐ Quite Often **4** ☐ Always **5**

2.3 Do you believe that the IT Industry in South Africa behaves in an ethical manner?

☐ Never **1** ☐ Hardly Ever **2** ☐ Sometimes **3** ☐ Quite Often **4** ☐ Always **5**

2.4 Do you believe that the IT Industry in South Africa should behave in an ethical manner?

☐ Never ☐ Hardly Ever ☐ Sometimes ☐ Quite Often ☐ Always
1 **2** **3** **4** **5**

2.5 Do you believe that internal / external clients for whom the IT Industry work *behave* in an ethical manner?

☐ Never ☐ Hardly Ever ☐ Sometimes ☐ Quite Often ☐ Always
1 **2** **3** **4** **5**

2.6 Do you believe that internal / external clients for whom the IT Industry work *should behave* in an ethical manner?

☐ Never ☐ Hardly Ever ☐ Sometimes ☐ Quite Often ☐ Always
1 **2** **3** **4** **5**

2.7 Do you believe that by being ethical, it becomes more difficult to earn a profit, in the short term?

☐ Never ☐ Hardly Ever ☐ Sometimes ☐ Quite Often ☐ Always
1 **2** **3** **4** **5**

2.8 Do you believe that by being ethical, it becomes more difficult to earn a profit, in the long term?

☐ Never ☐ Hardly Ever ☐ Sometimes ☐ Quite Often ☐ Always
1 **2** **3** **4** **5**

2.9 During your education, to what extent was the topic of Ethics and Information Technology examined?

☐ None ☐ Low ☐ Moderate ☐ High ☐ Always
1 **2** **3** **4** **5**

2.10 Please indicate, in the table below, the frequency of the problems you experience with Ethics *in your organisation*, specifically as it relates to Information Technology. Please check all that apply.

		Never 1	Hardly Ever 2	Sometimes 3	Quite Often 4	Always 5	Do not know 6
2.10.1	PIRACY BY EMPLOYEES AT/FOR WORK	☐	☐	☐	☐	☐	☐
2.10.2	PIRACY BY EMPLOYEES AT/FOR HOME	☐	☐	☐	☐	☐	☐
2.10.3	MISREPRESENTATION OF COMPETENCE TO INTERNAL / EXTERNAL CLIENTS	☐	☐	☐	☐	☐	☐
2.10.4	MISREPRESENTATION OF COMPETENCE TO EMPLOYER	☐	☐	☐	☐	☐	☐
2.10.5	PRODUCING "HALF-JOBS" OR WORK THAT IS NOT THE BEST POSSIBLE	☐	☐	☐	☐	☐	☐
2.10.6	ABUSE OF CONFIDENTIAL INFORMATION	☐	☐	☐	☐	☐	☐
2.10.7	FAILURE TO DISCLOSE CONFLICTS OF INTEREST	☐	☐	☐	☐	☐	☐
2.10.8	INTENTIONALLY OVER / UNDER SELLING IT TO INTERNAL / EXTERNAL CLIENTS IN ORDER TO OBTAIN CONTRACTS	☐	☐	☐	☐	☐	☐
2.10.9	ABUSE OF EMPLOYEES PRIVACY	☐	☐	☐	☐	☐	☐
2.10.10	ABUSE OF CUSTOMERS PRIVACY	☐	☐	☐	☐	☐	☐
2.10.11	EMPLOYEES ARE UNAWARE OF ETHICAL ISSUES INVOLVING IT	☐	☐	☐	☐	☐	☐
2.10.12	OTHER (PLEASE SPECIFY):	☐	☐	☐	☐	☐	☐

2.11 Please indicate, in the table below, the behaviour *you have exhibited*, specifically as it relates to Information Technology. Please tick all that apply.

		Never 1	Hardly Ever 2	Sometimes 3	Quite Often 4	Always 5
2.11.1	I have pirated software for work purposes	☐	☐	☐	☐	☐

		Never 1	Hardly Ever 2	Sometimes 3	Quite Often 4	Always 5
2.11.2	I have pirated software for personal purposes	☐	☐	☐	☐	☐
2.11.3	I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients	☐	☐	☐	☐	☐
2.11.4	I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment	☐	☐	☐	☐	☐
2.11.5	I do "half-a-job", producing work that is not my best	☐	☐	☐	☐	☐
2.11.6	I have abused confidential information entrusted to me	☐	☐	☐	☐	☐
2.11.7	I have, in the past, failed to disclose a conflict of interest	☐	☐	☐	☐	☐
2.11.8	I have intentionally over/under sold IT to internal / external clients	☐	☐	☐	☐	☐
2.11.9	I have violated employees privacy	☐	☐	☐	☐	☐
2.11.10	I have violated customers privacy	☐	☐	☐	☐	☐
2.11.11	I am unaware of the ethical issues involving IT	☐	☐	☐	☐	☐
2.11.12	Other (please specify):	☐	☐	☐	☐	☐

2.12 Please indicate the level of confidence you have that your entry-level *graduate* employees are sufficiently aware of their ethical and professional responsibilities as they undertake their work?

☐ Not certain **1** ☐ Slightly confident **2** ☐ Confident **3** ☐ Highly confident **4** ☐ Certain **5** ☐ N/A **6**

2.13 Please indicate how much emphasis you would like to see being given to ethical issues within the Information Systems Profession in a graduates' education?

		None 1	Introductory 2	Intermediate 3	Advanced 4	Expert 5
2.13.1	Piracy	☐	☐	☐	☐	☐
2.13.2	Misrepresentation of competence	☐	☐	☐	☐	☐
2.13.3	Importance of producing the best possible work	☐	☐	☐	☐	☐

		None 1	Introductory 2	Intermediate 3	Advanced 4	Expert 5
2.13.4	Abuse of confidential information	☐	☐	☐	☐	☐
2.13.5	Conflicts of interest	☐	☐	☐	☐	☐
2.13.6	Over / under selling IT to internal / external clients	☐	☐	☐	☐	☐
2.13.7	Privacy	☐	☐	☐	☐	☐
2.13.8	Other (please specify):	☐	☐	☐	☐	☐

2.14 Please indicate the level of confidence you have that your organisation's Code of Conduct / Ethics policy addresses your concerns with regards to *Ethics and Information Technology*.

☐ Not certain ☐ Slightly confident ☐ Confident ☐ Highly confident ☐ Certain

1 **2** **3** **4** **5**

☐ Do not have a policy

6

2.15 How does your organisation deal with the problem of Ethics in the organisation? (Please tick all that apply)

☐ Policies ☐ Contractual agreements ☐ Penalties ☐ Counselling ☐ Discipline

1 **2** **3** **4** **5**

☐ Other (please specify): _____

6

2.16 Please indicate ways in which you have overcome ethical problems in the organisation? Please also indicate the level of success of the solution and any possible future corrective/remedial actions taken.

_____

_____

_____

Thank you for completing this survey. If you would like to volunteer to be part of further surveys by the Department of Information Systems at Rhodes University please email Matthew Charlesworth (M.Charlesworth@ru.ac.za). Please do not hesitate to email Matthew Charlesworth (M.Charlesworth@ru.ac.za) to request to be kept informed of the results, should you desire. Additionally, should you wish to share any Ethics policies or anecdotes of actual experience with such policies with the authors of the study, your help would be most gratefully appreciated.

Appendix D Survey to Academic Institutions

This section contains the survey used for Academic Institutions.

D. Survey to Academic Institutions

J. Preamble

Please complete and return via:
1. email to M.Charlesworth@ru.ac.za or
2. Fax: (046) 636-1915, Attention: Matthew Charlesworth.

K. Section 1: General Demographics

1.1 Your name _____

1.2 Your address_____

1.3 Name of institution at which you work _____

1.4 Designation within institution _____

L. Section 2: To what extent is Ethics covered in your curriculum?

2.1 How do you cover ethics within your Information Systems curriculum?

☐ Stand-alone course module ☐ Integrated into or across other modules
1 **2**

☐ It is not included. Why not? _____
3

2.2 Who teaches the course?

☐ Information Systems Department ☐ Philosophy Department ☐ Management Department
1 **2** **3**

☐ Another Department: Please specify: _____
4

2.3 Does the person presenting the course have an appropriate qualification in Ethics and Information Systems?

☐ Yes: Please specify: _____ ☐ No
1 **2**

2.4 Please indicate what is included in the course and at what level.

	None	1st years		2nd years		3rd years		Honours		Masters/PhD	
		☐ Integrated	☐ Stand-alone	☐ Integrated	☐ Stand-alone	☐ Integrated	☐ Stand-alone	☐ Integrated	☐ Stand-alone	☐ Integrated	☐ Stand-alone
Piracy	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Misrepresentation of competence	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Importance of producing the best possible work	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Abuse of confidential information	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conflicts of interest	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Over / under selling IT to internal / external clients	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Privacy	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Whistle-Blowing	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other (please specify): _____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

2.5 Is successful completion of the ethics course required for degree purposes?

☐ Yes **1** ☐ No **2**

2.6 Please indicate what your treatment of the topic involves (please tick all that apply)

☐ Readings **1** ☐ Lectures **2** ☐ Tutorial/Pracs **3**

☐ Essays **4** ☐ Tests **5** ☐ Other (please specify) _____ **6**

2.7 What proportion of the curriculum refers to Ethics? Please tick:

Year / %	0	5	10	15	20	25	30	Other
1st	☐	☐	☐	☐	☐	☐	☐	☐_____
2nd	☐	☐	☐	☐	☐	☐	☐	☐_____
3rd	☐	☐	☐	☐	☐	☐	☐	☐_____
4th / Honours	☐	☐	☐	☐	☐	☐	☐	☐_____
Masters / PhD	☐	☐	☐	☐	☐	☐	☐	☐_____

2.8 Please indicate how much emphasis Ethics should receive within your curriculum?

	None at all	Less than other topics	Similar to other topics	More than other topics
1st Year	☐	☐	☐	☐
2nd Year	☐	☐	☐	☐
3rd Year	☐	☐	☐	☐
4th Year / Honours	☐	☐	☐	☐
Masters / PhD	☐	☐	☐	☐

2.9 Please indicate what teaching methodologies used to teach ethics in Information Systems are most successful?

	Readings	Case-Studies	Tutorials/Pracs	Essays	Role-playing	Lectures
1st Year	☐	☐	☐	☐	☐	☐
2nd Year	☐	☐	☐	☐	☐	☐
3rd Year	☐	☐	☐	☐	☐	☐
4th Year / Honours	☐	☐	☐	☐	☐	☐
Masters / PhD	☐	☐	☐	☐	☐	☐

2.10 Do you witness a change in students' behaviour because of completing this course?

☐ No change **1** ☐ in one or two individuals **2** ☐ in a couple of people **3** ☐ in a lot of people **4**

2.11 Please indicate what it is that you wish to achieve through the course.

1 ☐ A general awareness of the ethics surrounding IT

2 ☐ Enable students to justify their decision as 'right' in terms of ethics

3 ☐ Teach students a process of making decisions that will take ethics into account

4 ☐ An understanding of a wide spectrum of behaviour that is, and is not, ethical

Thank you for your time.

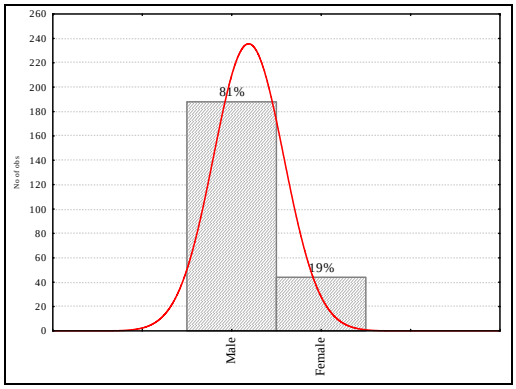
Appendix E Detailed Results of Survey of Industry

This section reports the raw data from the survey to industry.

E. Detailed Results of Survey to Industry

Demographics

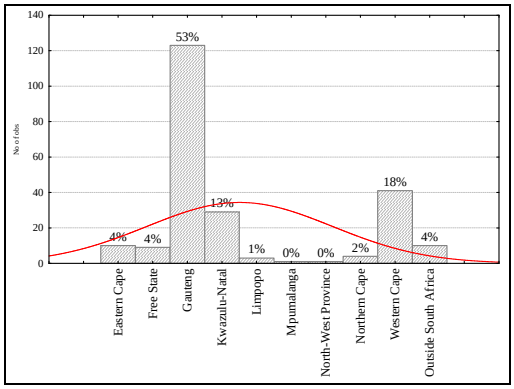
Gender



	Count	Percent
Male	188	80.69
Female	44	18.88
Missing	1	0.43

Figure 4: Respondents to the Industry Survey by Gender

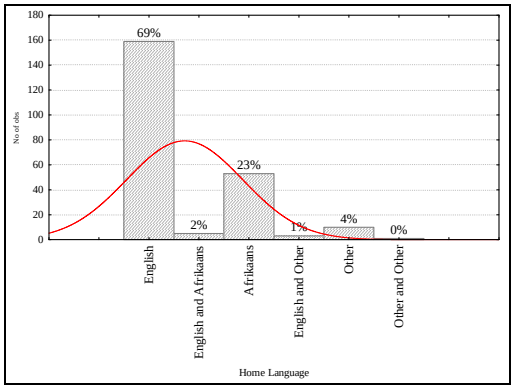
Province



	Count	Percent
Eastern Cape:	10	4.29
Free State:	9	3.86
Gauteng	123	52.79
Kwazulu-Natal:	29	12.45
Limpopo	3	1.29
Mpumalanga:	1	0.43
North-West Province:	1	0.43
Northern Cape:	4	1.72
Western Cape:	41	17.60
Outside South Africa:	10	4.29
Missing	2	0.86

Figure 5: Respondents to the Industry Survey by Province

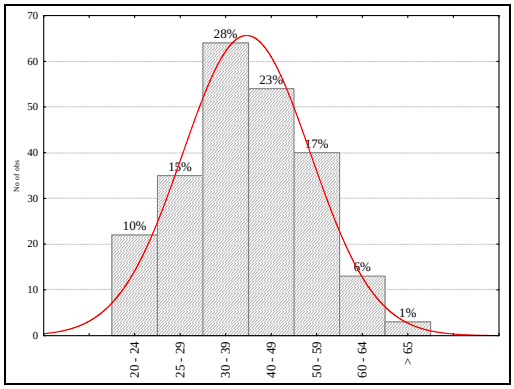
Home Language



	Count	Percent
English	159	68.24
Afrikaans:	53	22.75
Setswana:	1	0.43
Sepedi	1	0.43
Sesotho	1	0.43
isiXhosa:	2	0.86
Xitsonga:	1	0.43
siSwati	1	0.43
isiZulu	1	0.43
English and Afrikaans:	5	2.15
Setswana and IsiZulu:	1	0.43
German	1	0.43
English and Greek:	1	0.43
English and isiXhosa:	1	0.43
Polish	1	0.43
English and Gujarati:	1	0.43
Missing	2	0.86

Figure 6: Respondents to the Industry Survey by Home Language

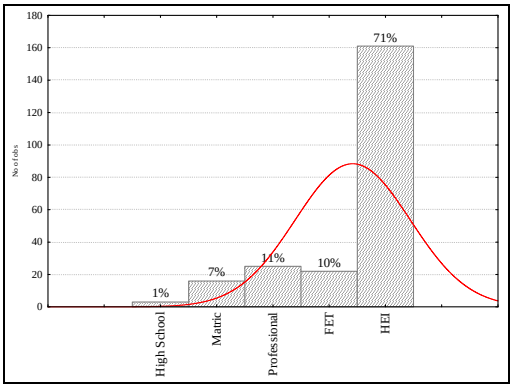
Age



	Count	Percent
20 - 24:	22	9.44
25 - 29:	35	15.02
30 - 39:	64	27.47
40 - 49:	54	23.18
50 - 59:	40	17.17
60 - 64:	13	5.58
> 65:	3	1.29
Missing	2	0.86

Figure 7: Respondents to the Industry Survey by Age

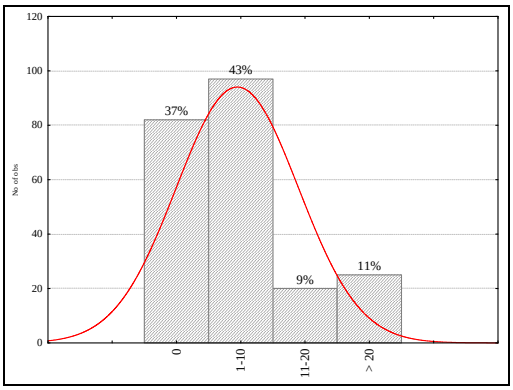
Highest Level of Education received



	Count	Percent
High School	3	1.29
Matric	16	6.87
Professional	25	10.73
FET	22	9.44
HEI	161	69.10
Missing	6	2.58

Figure 8: Respondents to the Industry Survey by Highest Level of Education received

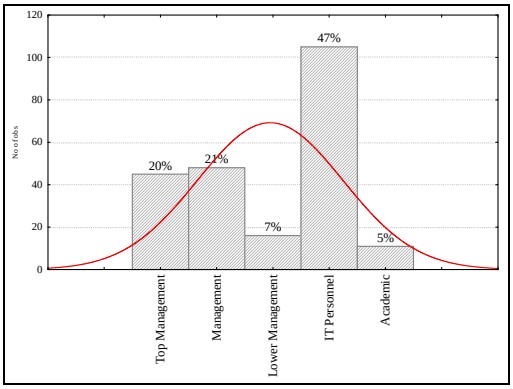
Number of people that report to one



	Count	Percent
0	82	35.19
1-10:	97	41.63
11-20:	20	8.58
> 20:	25	10.73
Missing	9	3.86

Figure 9: Respondents to the Industry Survey by the number of people who report to one

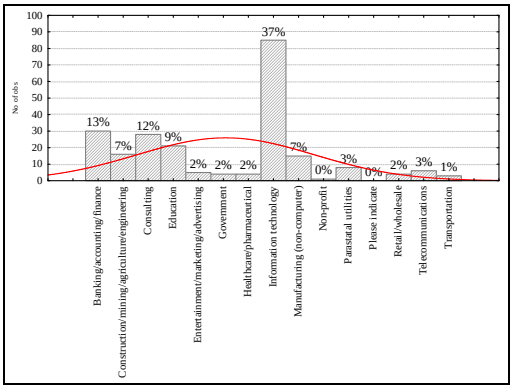
Job Category



	Count	Percent
Top Management:	45	19.31
Management:	48	20.60
Lower Management:	16	6.87
IT Personnel:	105	45.06
Academic:	11	4.72
Missing	8	3.43

Figure 10: Respondents to the Industry Survey by their Job Title Category

Nature of Business

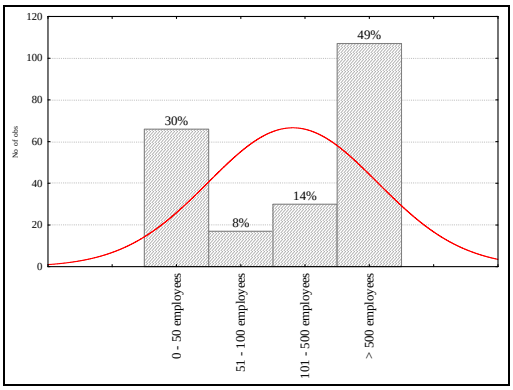


	Count	Percent
Banking / accounting / finance:	30	12.88
Construction / mining / agriculture / engineering:	16	6.87
Consulting:	28	12.02
Education:	21	9.01
Entertainment / marketing / advertising:	5	2.15
Government:	4	1.72
Healthcare / pharmaceutical:	4	1.72
Information technology:	85	36.48
Manufacturing (non-computer):	15	6.44
Non-profit:	1	0.43
Parastatal utilities:	8	3.43
Retail / wholesale:	4	1.72
Telecommunications:	6	2.58

Transportation:	3	1.29
Missing	3	1.29

Figure 11: Respondents to the Industry Survey by their organisational sector

Size of Organisation

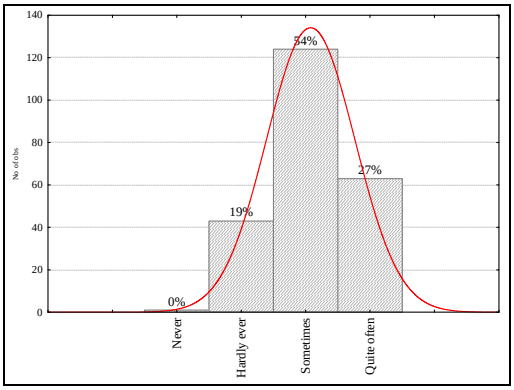


	Count	Percent
0 - 50 employees:	66	28.33
51 - 100 employees:	17	7.30
101 - 500 employees:	30	12.88
> 500 employees:	107	45.92
Missing	13	5.58

Figure 12: Respondents to the Industry Survey by their organisational size

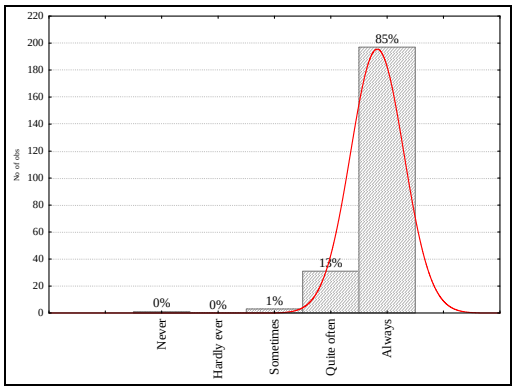
Frequency Histograms

Perceptions about Ethics in the IT Industry



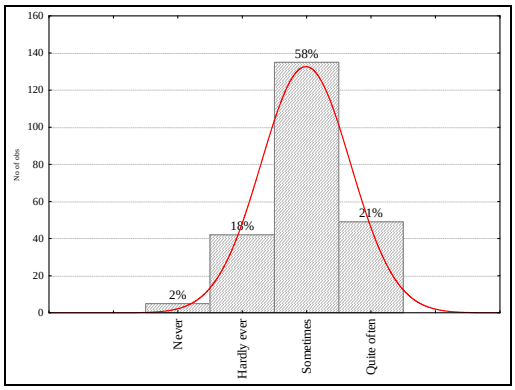
	Count	Percent
Never	1	0.43
Hardly ever:	43	18.45
Sometimes:	124	53.22
Quite often:	63	27.04
Missing	2	0.86

Figure 13: I believe that the IT Industry worldwide behaves in an ethical manner?



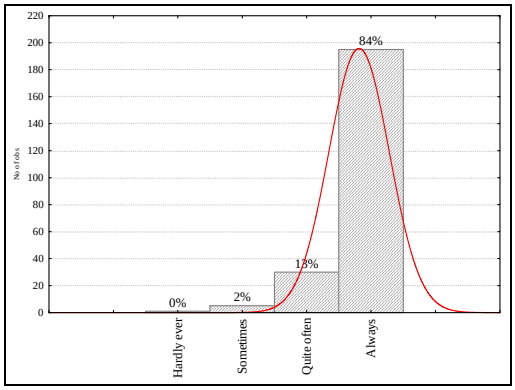
	Count	Percent
Never	1	0.43
Sometimes:	3	1.29
Quite often:	31	13.30
Always	197	84.55
Missing	1	0.43

Figure 14: I believe that the IT Industry worldwide should behave in an ethical manner?



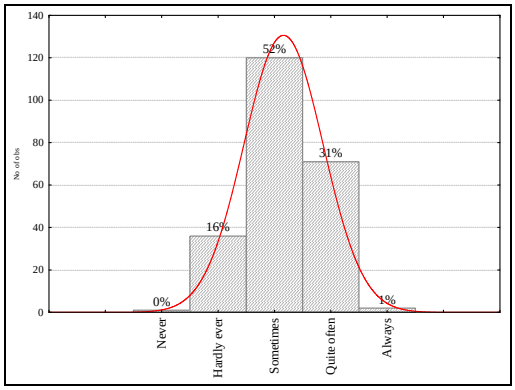
	Count	Percent
Never	5	2.15
Hardly ever:	42	18.03
Sometimes:	135	57.94
Quite often:	49	21.03
Missing	2	0.86

Figure 15: I believe that the IT Industry in South Africa behaves in an ethical manner?



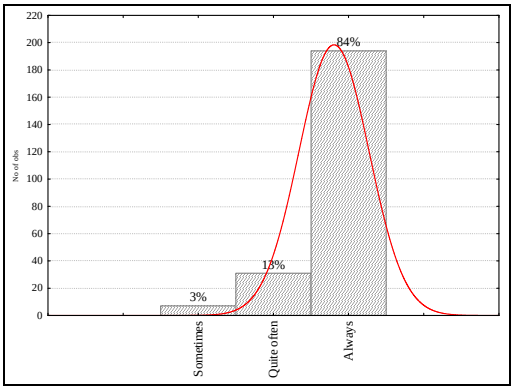
	Count	Percent
Hardly ever:	1	0.43
Sometimes:	5	2.15
Quite often:	30	12.88
Always	195	83.69
Missing	2	0.86

Figure 16: I believe that the IT Industry in South Africa should behave in an ethical manner?



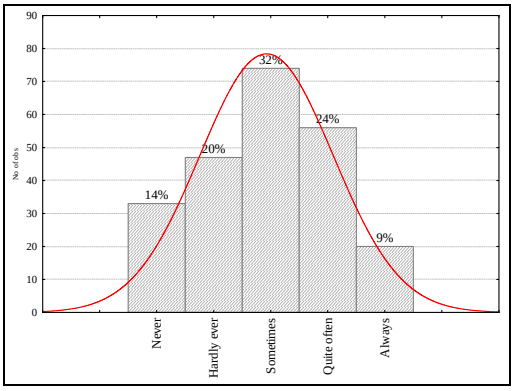
	Count	Percent
Never	1	0.43
Hardly ever:	36	15.45
Sometimes:	120	51.50
Quite often:	71	30.47
Always	2	0.86
Missing	3	1.29

Figure 17: I believe that internal / external clients for whom the IT Industry work behave in an ethical manner?



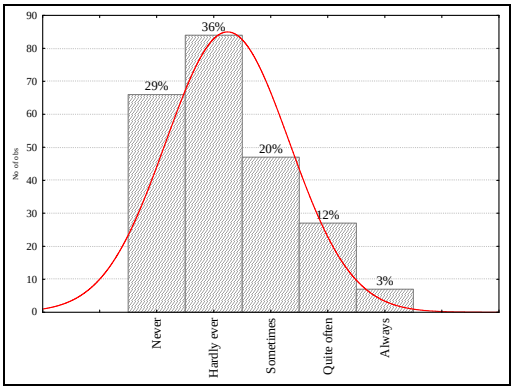
	Count	Percent
Sometimes:	7	3.00
Quite often:	31	13.30
Always	194	83.26
Missing	1	0.43

Figure 18: I believe that internal / external clients for whom the IT Industry work should behave in an ethical manner?



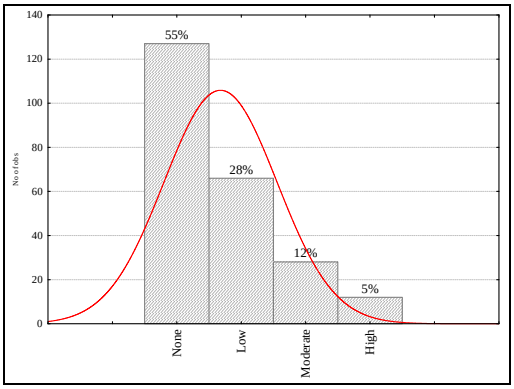
	Count	Percent
Never	33	14.16
Hardly ever:	47	20.17
Sometimes:	74	31.76
Quite often:	56	24.03
Always	20	8.58
Missing	3	1.29

Figure 19: I believe that by being ethical, it becomes more difficult to earn a profit, in the short term?



	Count	Percent
Never	66	28.33
Hardly ever:	84	36.05
Sometimes:	47	20.17
Quite often:	27	11.59
Always	7	3.00
Missing	2	0.86

Figure 20: I believe that by being ethical, it becomes more difficult to earn a profit, in the long term?



	Count	Percent
None	127	54.51
Low	66	28.33
Moderate:	28	12.02
High	12	5.15
Missing	0	0.00

Figure 21: Extent of Ethics in IT in Education

Perceptions of an Organisation's Ethical Behaviour

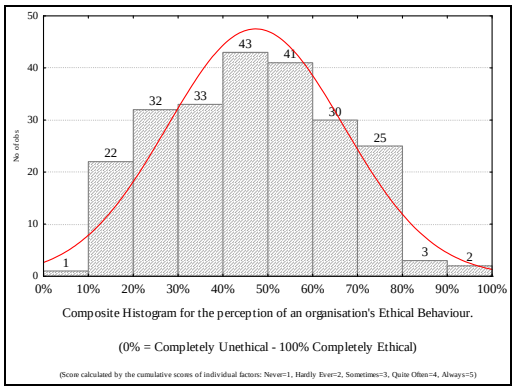
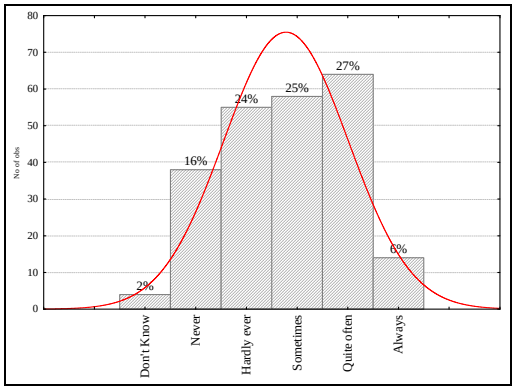
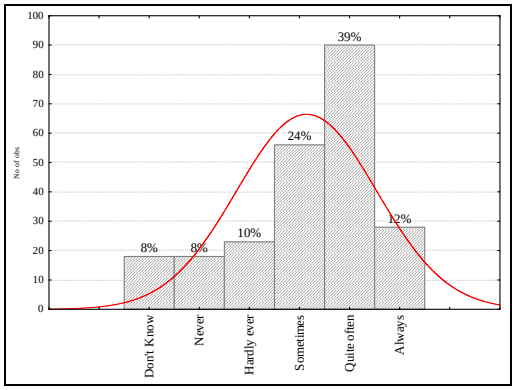


Figure 22: Composite Histogram for the perception of an organisation's Ethical Behaviour



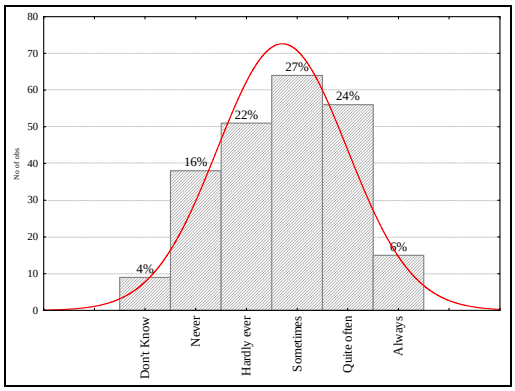
	Count	Percent
Do not Know	4	1.72
Never	38	16.31
Hardly ever	55	23.61
Sometimes	58	24.89
Quite often	64	27.47
Always	14	6.01
Missing	0	0.00

Figure 23: Piracy by employees at/for work



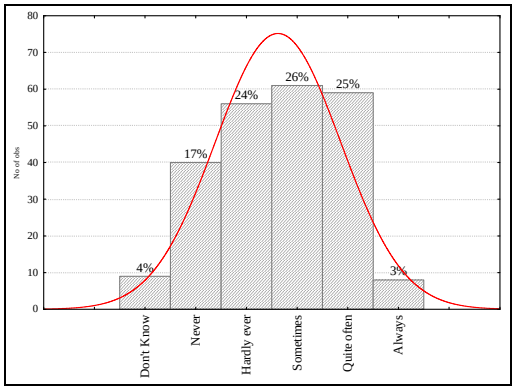
	Count	Percent
Do not Know	18	7.73
Never	18	7.73
Hardly ever	23	9.87
Sometimes	56	24.03
Quite often	90	38.63
Always	28	12.02
Missing	0	0.00

Figure 24: Piracy by employees at/for home



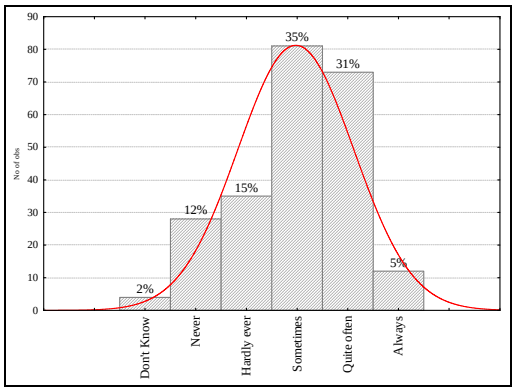
	Count	Percent
Do not Know	9	3.86
Never	38	16.31
Hardly ever	51	21.89
Sometimes	64	27.47
Quite often	56	24.03
Always	15	6.44
Missing	0	0.00

Figure 25: Misrepresentation of competence to internal/external clients



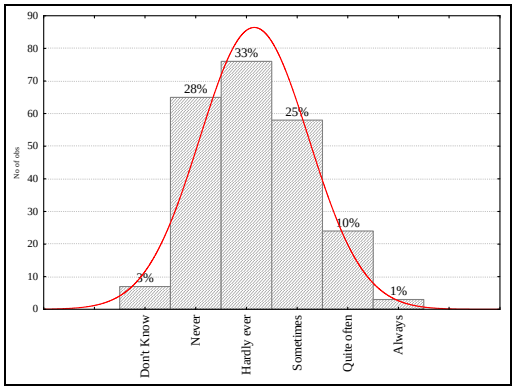
	Count	Percent
Do not Know	9	3.86
Never	40	17.17
Hardly ever	56	24.03
Sometimes	61	26.18
Quite often	59	25.32
Always	8	3.43
Missing	0	0.00

Figure 26: Misrepresentation of competence to employer



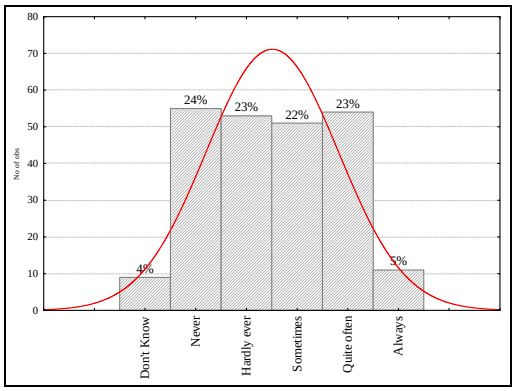
	Count	Percent
Do not Know	4	1.72
Never	28	12.02
Hardly ever	35	15.02
Sometimes	81	34.76
Quite often	73	31.33
Always	12	5.15
Missing	0	0.00

Figure 27: Producing "half-jobs" or work that is not the best possible



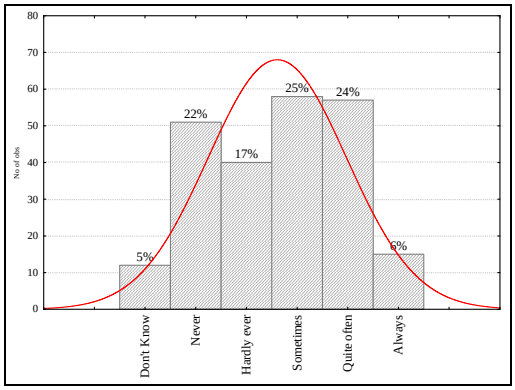
	Count	Percent
Do not Know	7	3.00
Never	65	27.90
Hardly ever	76	32.62
Sometimes	58	24.89
Quite often	24	10.30
Always	3	1.29
Missing	0	0.00

Figure 28: Abuse of confidential information



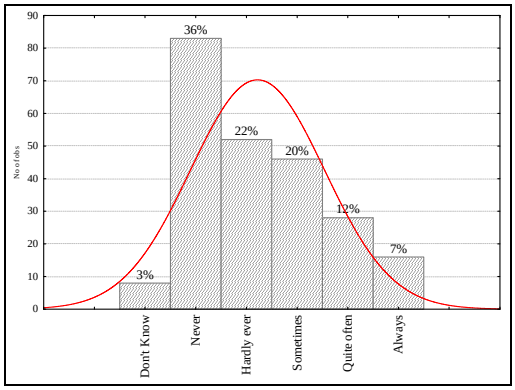
	Count	Percent
Do not Know	9	3.86
Never	55	23.61
Hardly ever	53	22.75
Sometimes	51	21.89
Quite often	54	23.18
Always	11	4.72
Missing	0	0.00

Figure 29: Failure to disclose conflicts of interest



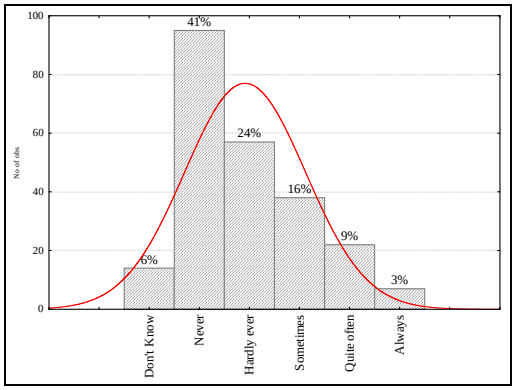
	Count	Percent
Do not Know	12	5.15
Never	51	21.89
Hardly ever	40	17.17
Sometimes	58	24.89
Quite often	57	24.46
Always	15	6.44
Missing	0	0.00

Figure 30: Intentionally over/under selling IT to internal/external clients in order to obtain contracts



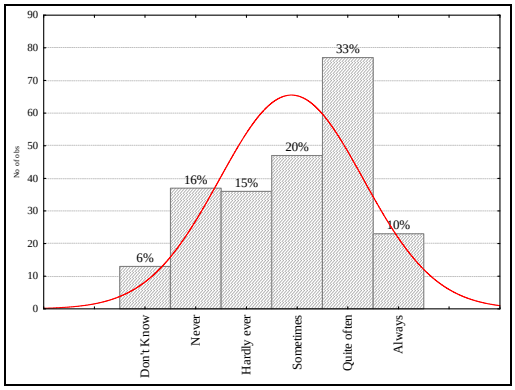
	Count	Percent
Do not Know	8	3.43
Never	83	35.62
Hardly ever	52	22.32
Sometimes	46	19.74
Quite often	28	12.02
Always	16	6.87
Missing	0	0.00

Figure 31: Abuse of employees privacy



	Count	Percent
Do not Know	14	6.01
Never	95	40.77
Hardly ever	57	24.46
Sometimes	38	16.31
Quite often	22	9.44
Always	7	3.00
Missing	0	0.00

Figure 32: Abuse of customers privacy



	Count	Percent
Do not Know	13	5.58
Never	37	15.88
Hardly ever	36	15.45
Sometimes	47	20.17
Quite often	77	33.05
Always	23	9.87
Missing	0	0.00

Figure 33: Employees are unaware of ethical issues involving IT

Actual Ethical Behaviour of individuals

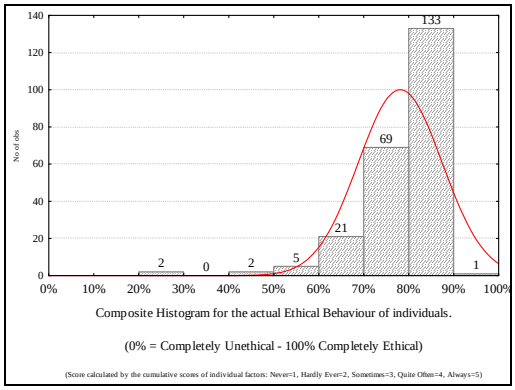
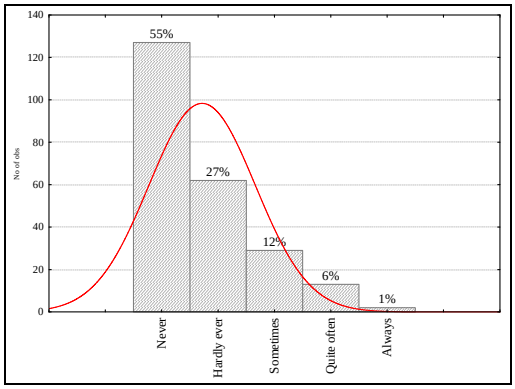
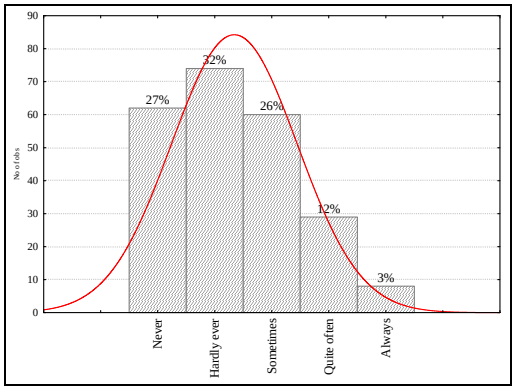


Figure 34: Composite Histogram for the actual Ethical Behaviour of Individuals



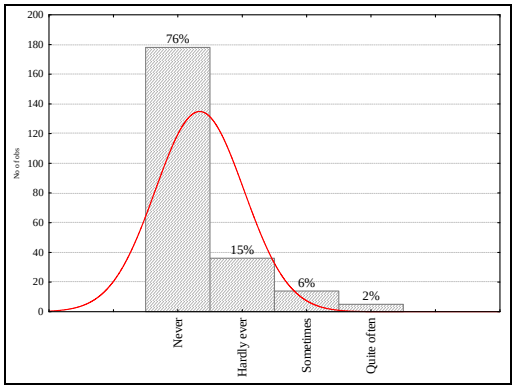
	Count	Percent
Never	127	54.51
Hardly ever	62	26.61
Sometimes	29	12.45
Quite often	13	5.58
Always	2	0.86
Missing	0	0.00

Figure 35: I have pirated software for work purposes



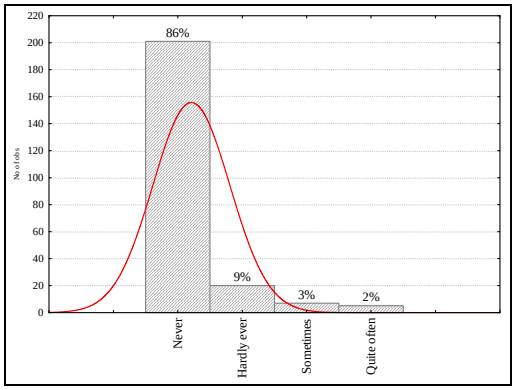
	Count	Percent
Never	62	26.61
Hardly ever	74	31.76
Sometimes	60	25.75
Quite often	29	12.45
Always	8	3.43
Missing	0	0.00

Figure 36: I have pirated software for personal purposes



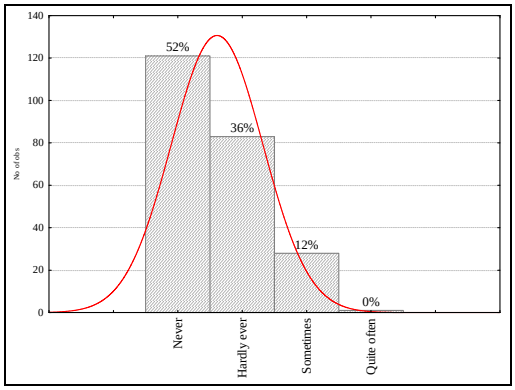
	Count	Percent
Never	178	76.39
Hardly ever	36	15.45
Sometimes	14	6.01
Quite often	5	2.15
Missing	0	0.00

Figure 37: I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients



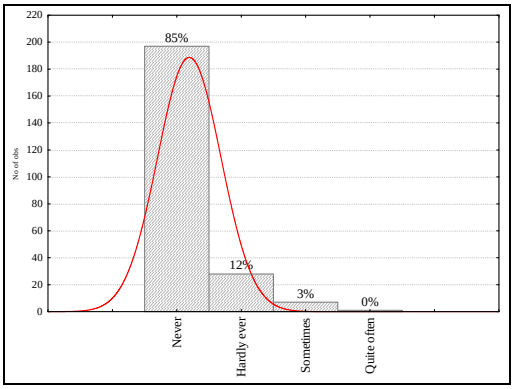
	Count	Percent
Never	201	86.27
Hardly ever	20	8.58
Sometimes	7	3.00
Quite often	5	2.15
Missing	0	0.00

Figure 38: I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment



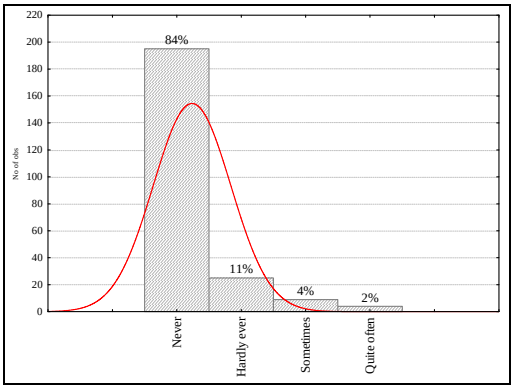
	Count	Percent
Never	121	51.93
Hardly ever	83	35.62
Sometimes	28	12.02
Quite often	1	0.43
Missing	0	0.00

Figure 39: I do "half-a-job", producing work that is not my best



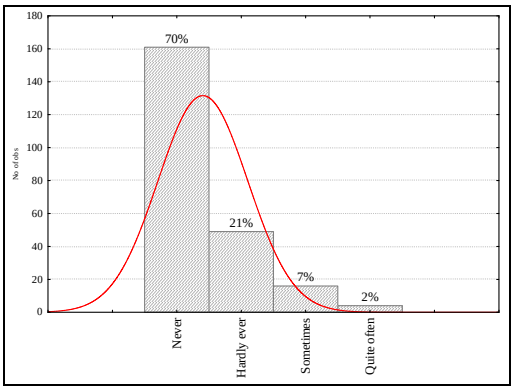
	Count	Percent
Never	197	84.55
Hardly ever	28	12.02
Sometimes	7	3.00
Quite often	1	0.43
Missing	0	0.00

Figure 40: I have abused confidential information entrusted to me



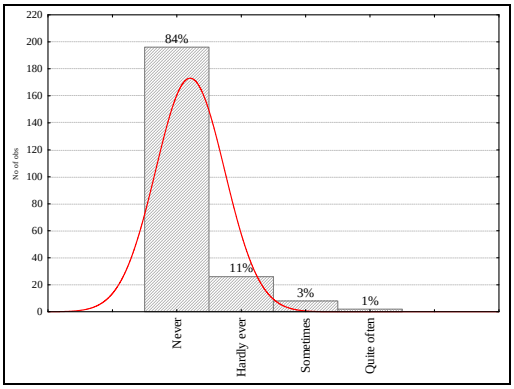
	Count	Percent
Never	195	83.69
Hardly ever	25	10.73
Sometimes	9	3.86
Quite often	4	1.72
Missing	0	0.00

Figure 41: I have, in the past, failed to disclose a conflict of interest



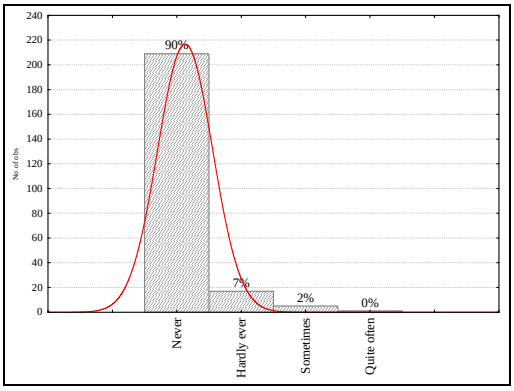
	Count	Percent
Never	161	69.10
Hardly ever	49	21.03
Sometimes	16	6.87
Quite often	4	1.72
Missing	3	1.29

Figure 42: I have intentionally over/under sold IT to internal/external clients



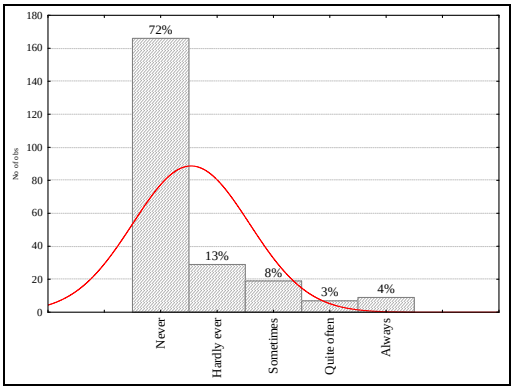
	Count	Percent
Never	196	84.12
Hardly ever	26	11.16
Sometimes	8	3.43
Quite often	2	0.86
Missing	1	0.43

Figure 43: I have violated employees privacy



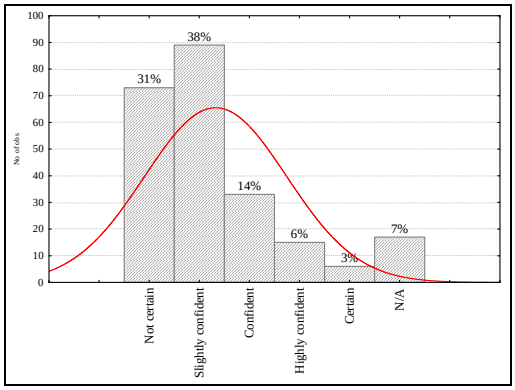
	Count	Percent
Never	209	89.70
Hardly ever	17	7.30
Sometimes	5	2.15
Quite often	1	0.43
Missing	1	0.43

Figure 44: I have violated customers privacy



	Count	Percent
Never	166	71.24
Hardly ever	29	12.45
Sometimes	19	8.15
Quite often	7	3.00
Always	9	3.86
Missing	3	1.29

Figure 45: I am unaware of the ethical issues involving IT



	Count	Percent
Not certain	73	31.33
Slightly confident	89	38.20
Confident	33	14.16
Highly confident	15	6.44
Certain	6	2.58
N/A	17	7.30
Missing	0	0.00

Figure 46: Level of confidence you have that your entry-level graduate employees are sufficiently aware of their ethical and professional responsibilities as they undertake their work.

Desired depth in a course module on Ethical Behaviour within IT

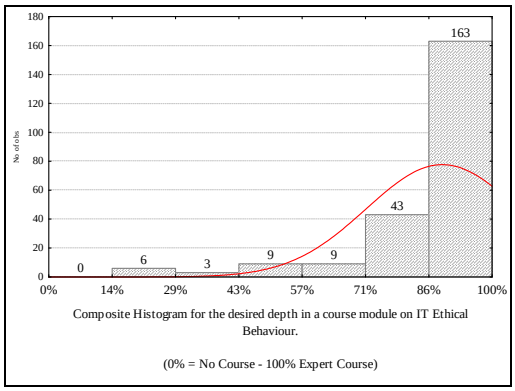
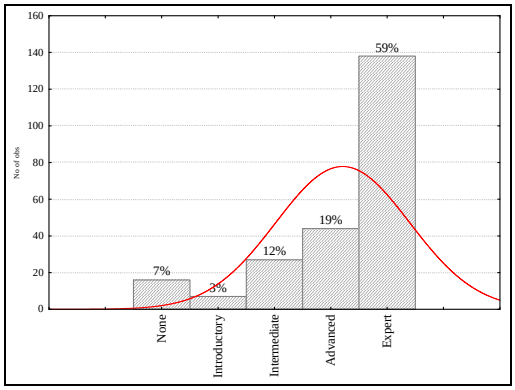
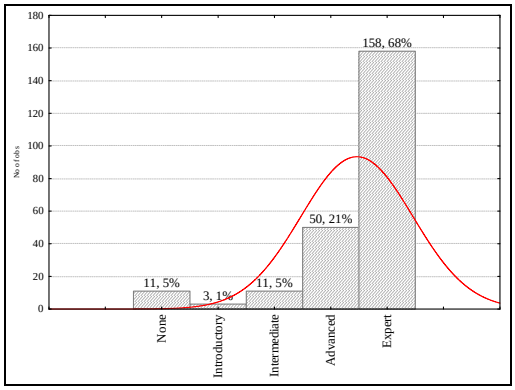


Figure 47: Composite Histogram for the desired depth in a course module on IT Ethical Behaviour



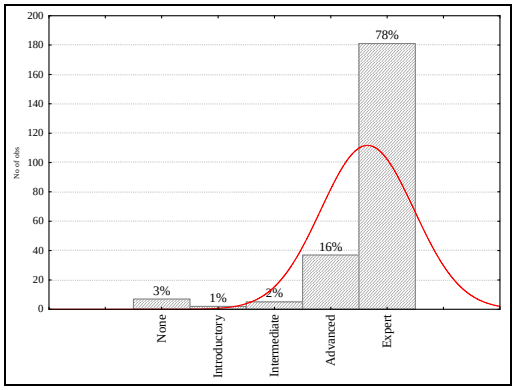
	Count	Percent
None	16	6.87
Introductory	7	3.00
Intermediate	27	11.59
Advanced	44	18.88
Expert	138	59.23
Missing	1	0.43

Figure 48: Level at which Piracy should be addressed within an Ethics course



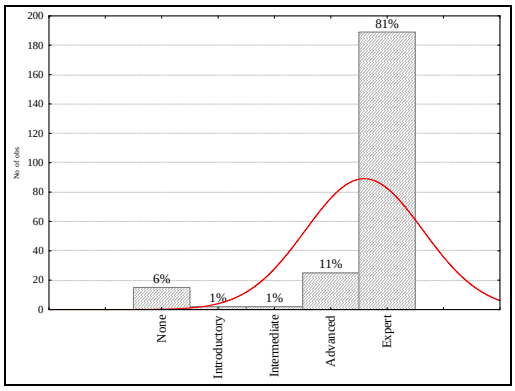
	Count	Percent
None	11	4.72
Introductory	3	1.29
Intermediate	11	4.72
Advanced	50	21.46
Expert	158	67.81
Missing	0	0.00

Figure 49: Level at which issues relating to misrepresentation of one's competence should be addressed within an Ethics course



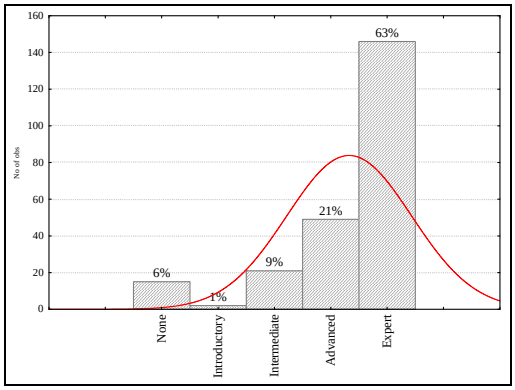
	Count	Percent
None	7	3.00
Introductory	2	0.86
Intermediate	5	2.15
Advanced	37	15.88
Expert	181	77.68
Missing	1	0.43

Figure 50: Level at which issues relating to the importance of producing one's best possible work should be addressed within an Ethics course



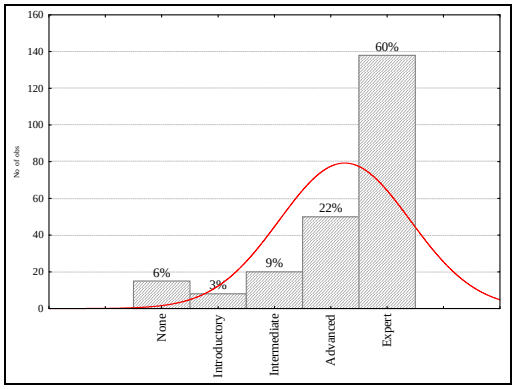
	Count	Percent
None	15	6.44
Introductory	2	0.86
Intermediate	2	0.86
Advanced	25	10.73
Expert	189	81.12
Missing	0	0.00

Figure 51: Level at which issues relating to the abuse of confidential information should be addressed within an Ethics course



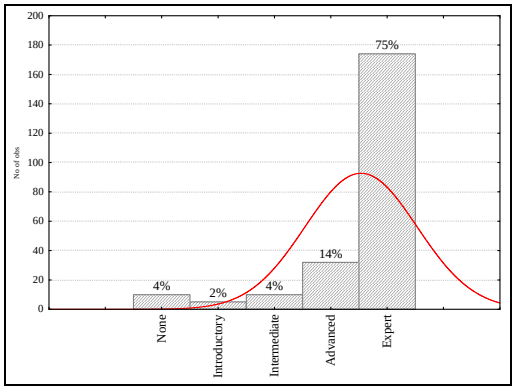
	Count	Percent
None	15	6.44
Introductory	2	0.86
Intermediate	21	9.01
Advanced	49	21.03
Expert	146	62.66
Missing	0	0.00

Figure 52: Level at which issues relating to conflicts of interest should be addressed within an Ethics course



	Count	Percent
None	15	6.44
Introductory	8	3.43
Intermediate	20	8.58
Advanced	50	21.46
Expert	138	59.23
Missing	2	0.86

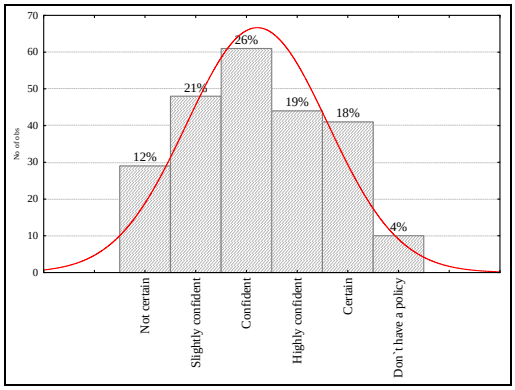
Figure 53: Level at which issues relating to over/under selling IT to internal/external clients should be addressed within an Ethics course



	Count	Percent
None	10	4.29
Introductory	5	2.15
Intermediate	10	4.29
Advanced	32	13.73
Expert	174	74.68
Missing	2	0.86

Figure 54: Level at which issues relating to privacy should be addressed within an Ethics course

Level of Confidence in an organisation's Code of Conduct / Ethics Policy



	Count	Percent
Not certain	29	12.45
Slightly confident	48	20.60
Confident	61	26.18
Highly confident	44	18.88
Certain	41	17.60
Don`t have a policy	10	4.29
Missing	0	0.00

Figure 55: Level of confidence one has in one's organisation's Code of Conduct / Ethics policy being capable of addressing ones concerns with regards to Ethics and Information Technology

Number of measures present within organisations to deal with Ethical Problems involving IT

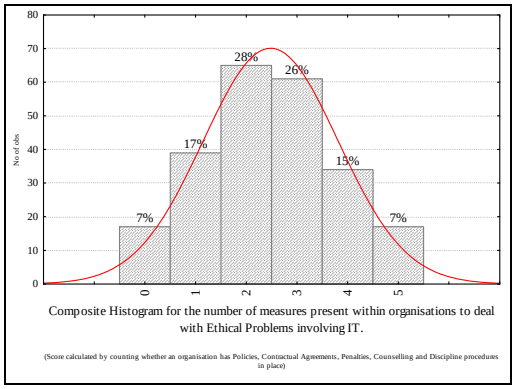
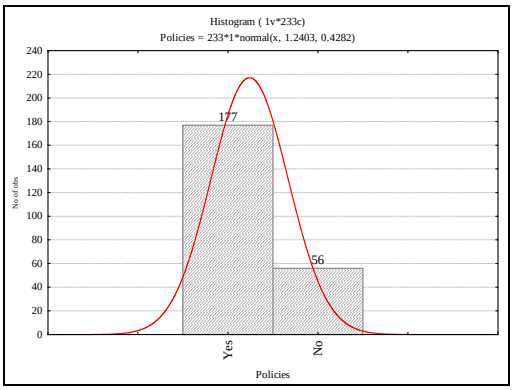
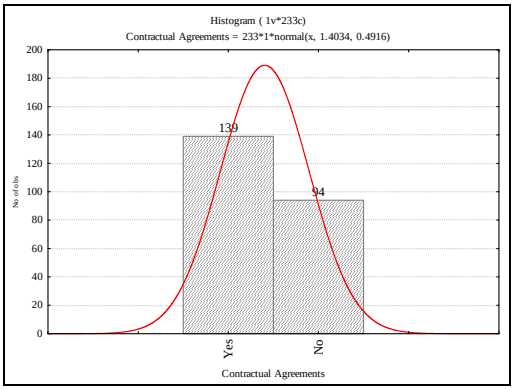


Figure 56: Composite Histogram for the number of measures present within organisations to deal with Ethical Problems involving IT



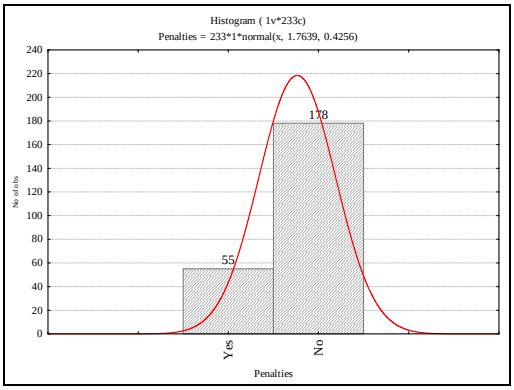
	Count	Percent
Yes	177	75.97
No	56	24.03
Missing	0	0.00

Figure 57: Number of respondents' organisations who use policies to govern the ethical behaviour of their employees



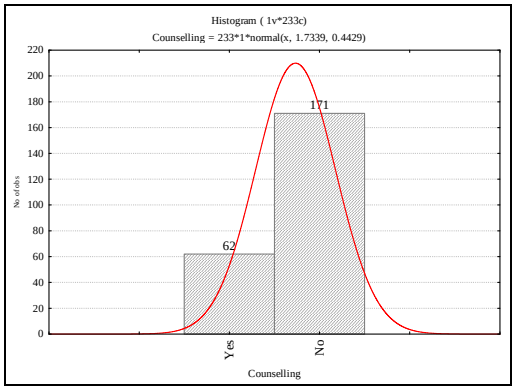
	Count	Percent
Yes	139	59.66
No	94	40.34

Figure 58: Number of respondents' organisations who use contractual agreements to govern the ethical behaviour of their employees



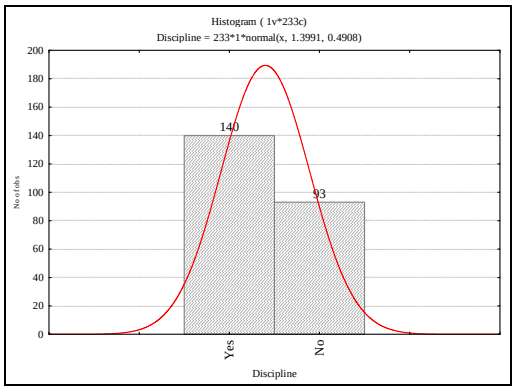
	Count	Percent
Yes	55	23.61
No	178	76.39
Missing	0	0.00

Figure 59: Number of respondent's organisations who use penalties to govern the ethical behaviour of their employees



	Count	Percent
Yes	62	26.61
No	171	73.39
Missing	0	0.00

Figure 60: Number of respondents' organisations who use counselling to govern the ethical behaviour of their employees



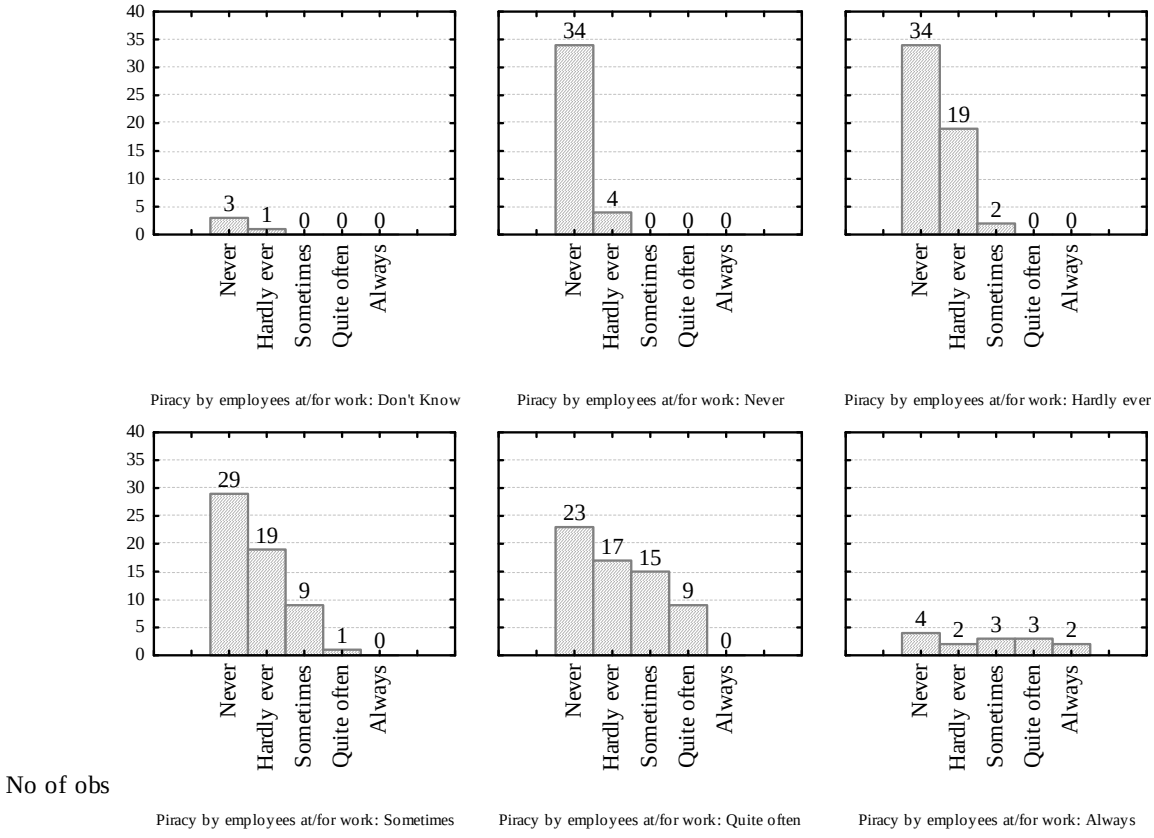
	Count	Percent
Yes	140	60.09
No	93	39.91
Missing	0	0.00

Figure 61: Number of respondents' organisations who use discipline to govern the ethical behaviour of their employees

Significant Cross-tabulations

Hypothesis Sub-Set 23

Piracy by employees at work vs. I have pirated software for work purposes

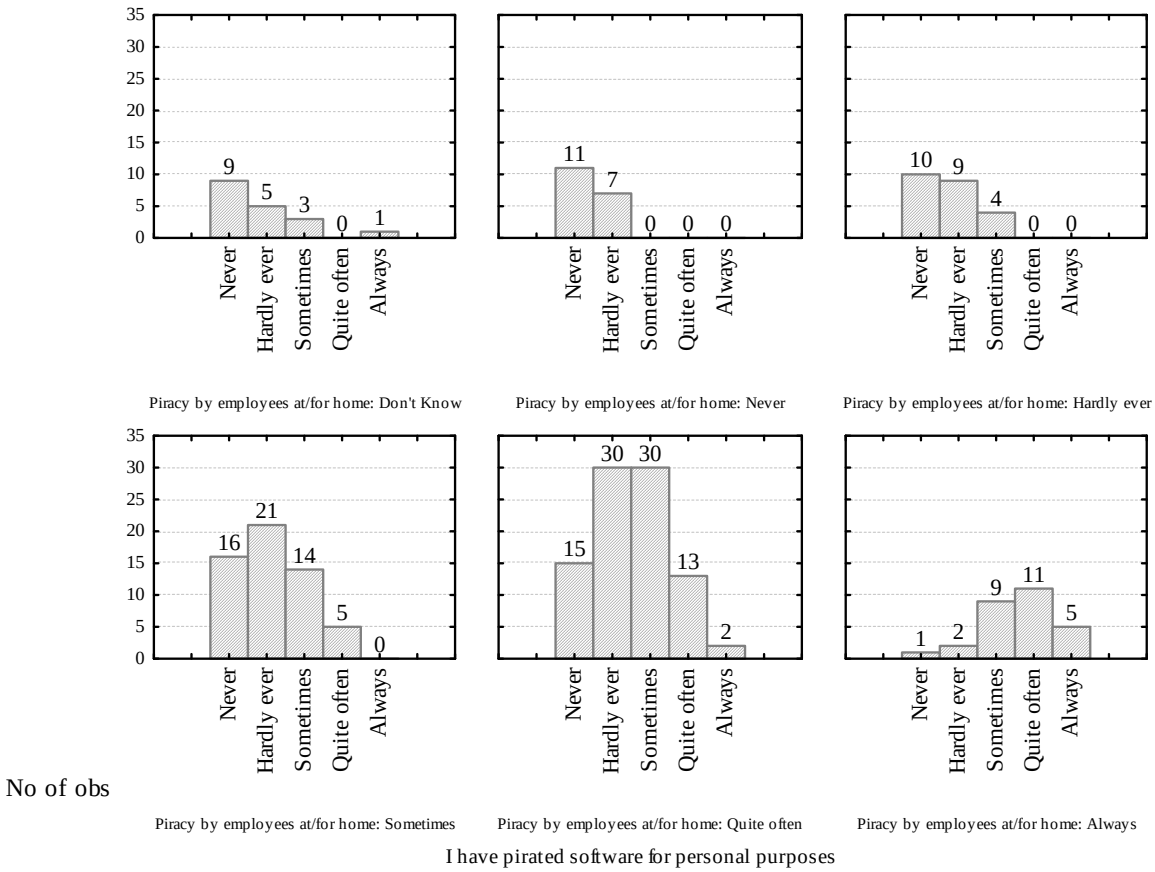


Combined Frequency Count:	**Do not Know**	**Never / Hardly ever**	**Some times / Quite often / Always**	**Totals**
Do not Know	0	4	0	**4**
Never / Hardly ever	0	91	2	**93**
Sometimes / Quite often / Always	0	94	42	**136**
Total	**0**	**189**	**44**	**233**

Fisher's Exact Test for Count Data: p= 0.0000001157 (Highly Significant)

Hypothesis Sub-Set 24:

Piracy by employees at home vs. I have pirated software for personal purposes

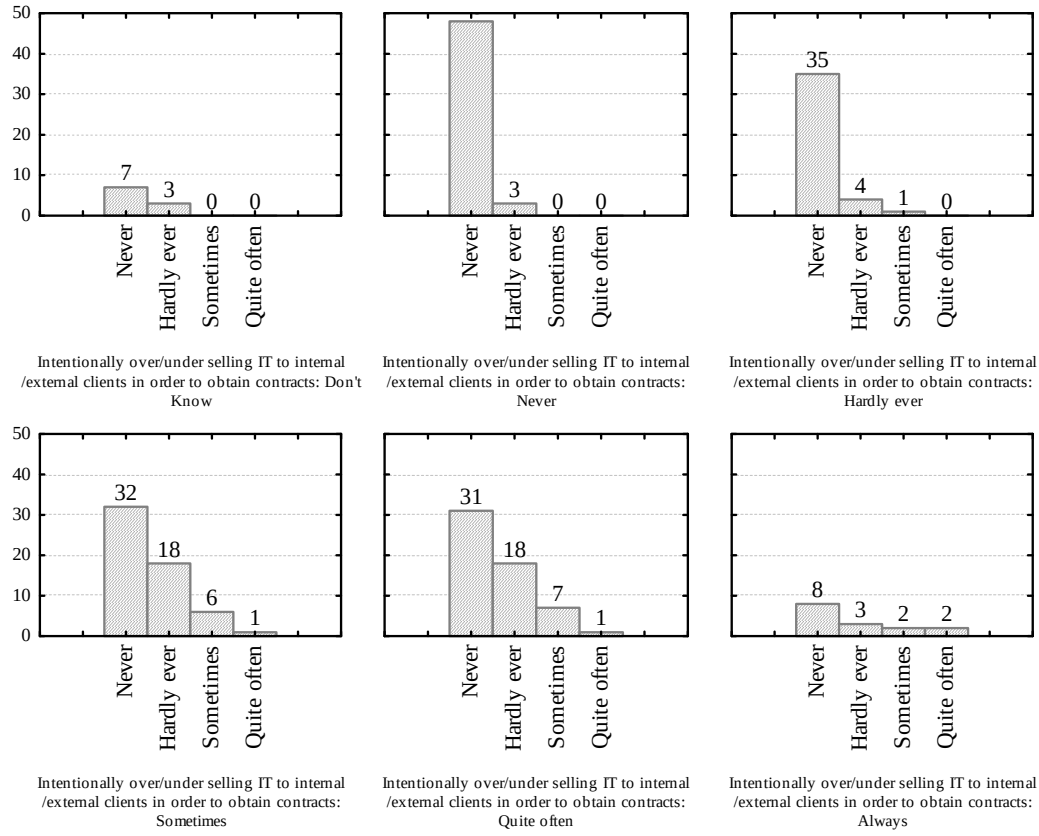


Combined Frequency Count:	**Do not Know**	**Never / Hardly ever**	**Some times / Quite often / Always**	**Total**
Do not Know	0	14	4	**18**
Never / Hardly ever	0	37	4	**41**
Sometimes / Quite often / Always	0	85	89	**174**
Total	**0**	**136**	**97**	**233**

Pearson's Chi-squared test: X-squared = 26.4208, df = 4 p= 0.00002603 (Highly Significant)

Hypothesis Sub-Set 30

Intentionally over/under selling IT to internal/external clients in order to obtain contracts vs. I have intentionally over/under sold IT to internal/external clients

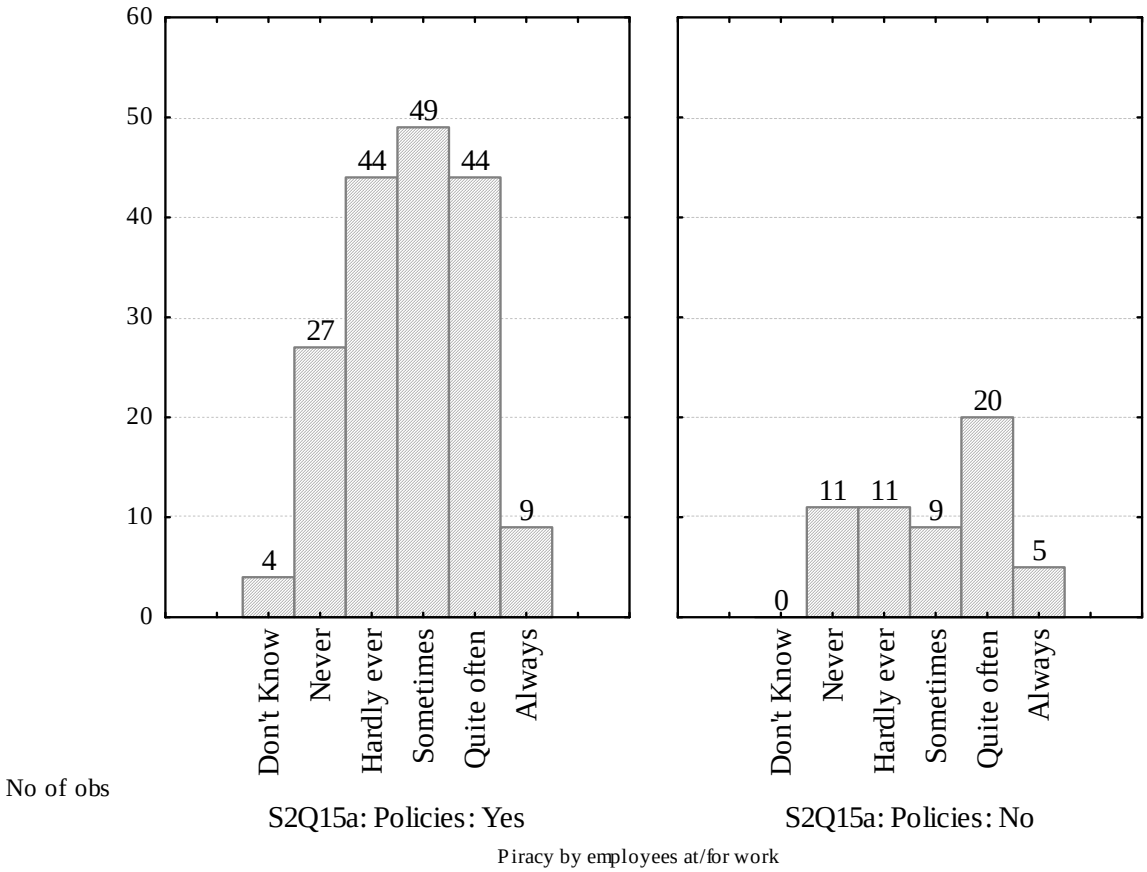


Combined Frequency Count:	**Never / Hardly ever**	**Sometimes / Quite often / Always**	**Total**
Do not Know	10	0	**10**
Never / Hardly ever	90	1	**91**
Sometimes / Quite often / Always	110	19	**129**
Total	**210**	**20**	**230**

Fisher's Exact Test for Count Data: p= 0.0005897 (Highly Significant)

Hypothesis Sub-Set 67

Piracy by employees at/for work vs. The effect of policies on ethical behaviour

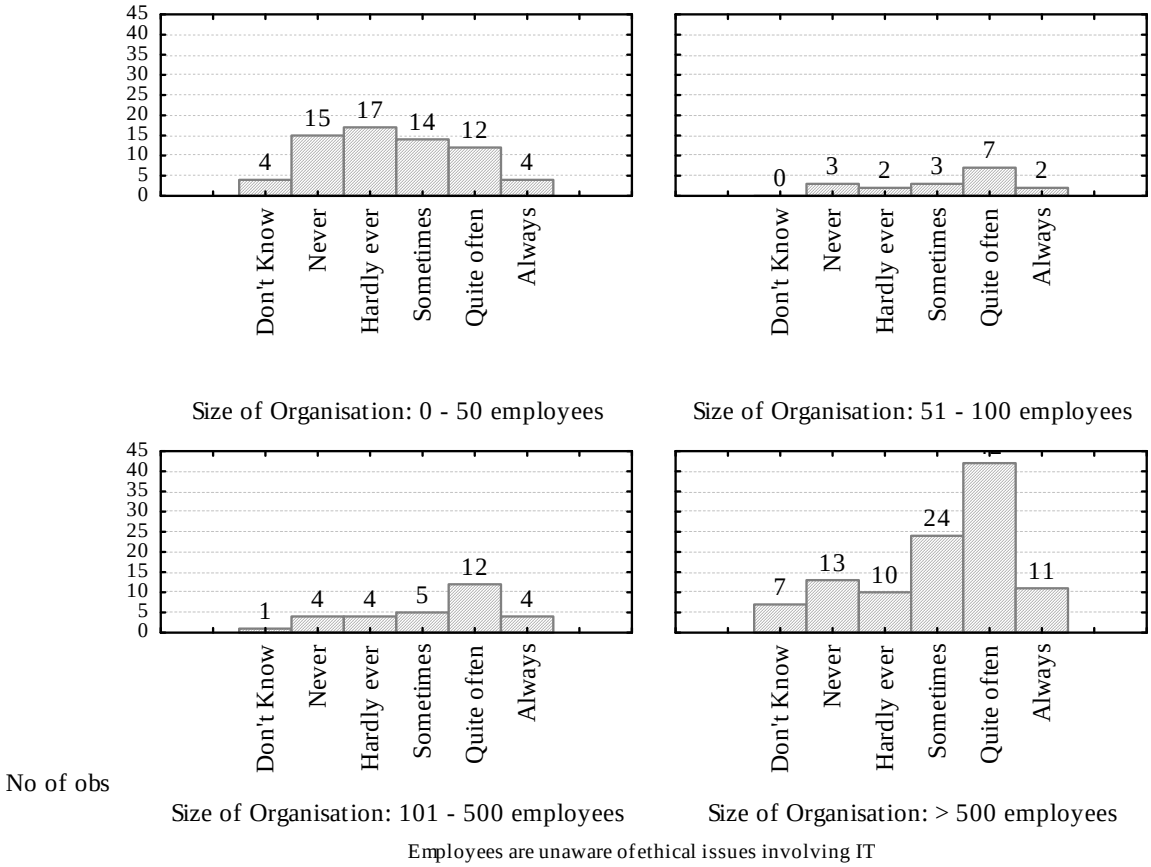


Combined Frequency Count:	Yes	No	Totals
Do not Know	4	0	**4**
Never / Hardly ever	71	22	**93**
Sometimes	49	9	**58**
Quite often / Always	53	25	**78**
Total	**177**	**56**	**233**

Fisher's Exact Test for Count Data: p= 0.0009536 (Highly Significant)

Hypothesis Sub-Set 22

Sizes of Organisation vs. Employees are unaware of ethical issues involving IT

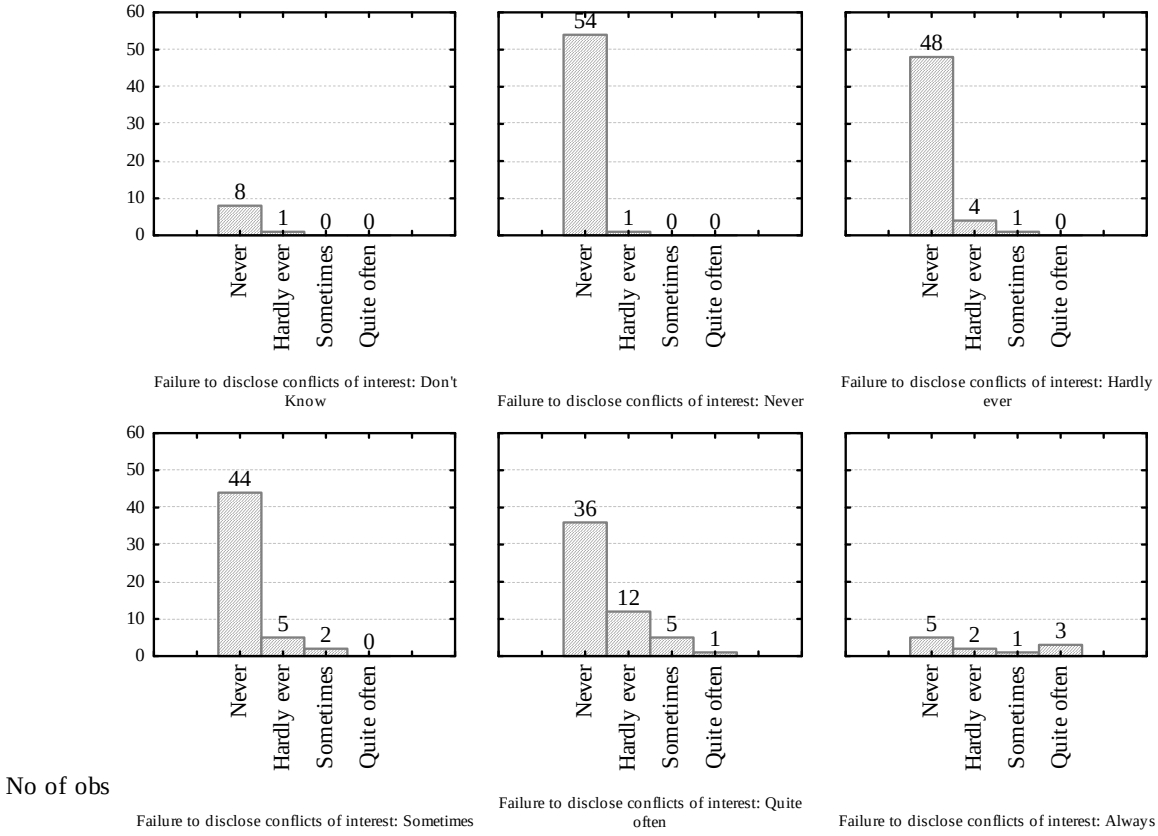


Combined Frequency Count:	**Do not Know**	**Never / Hardly ever**	**Some times / Quite often / Always**	**Totals**
0 - 50 employees / 51 - 100 employees	4	37	42	**83**
101 - 500 employees / > 500 employees	8	31	98	**137**
Totals	**12**	**68**	**140**	**220**

Fisher's Exact Test for Count Data: p= 0.002506 (Statistically Significant)

Hypothesis Sub-Set 29

Failure to disclose conflicts of interest vs. I have, in the past, failed to disclose a conflict of interest

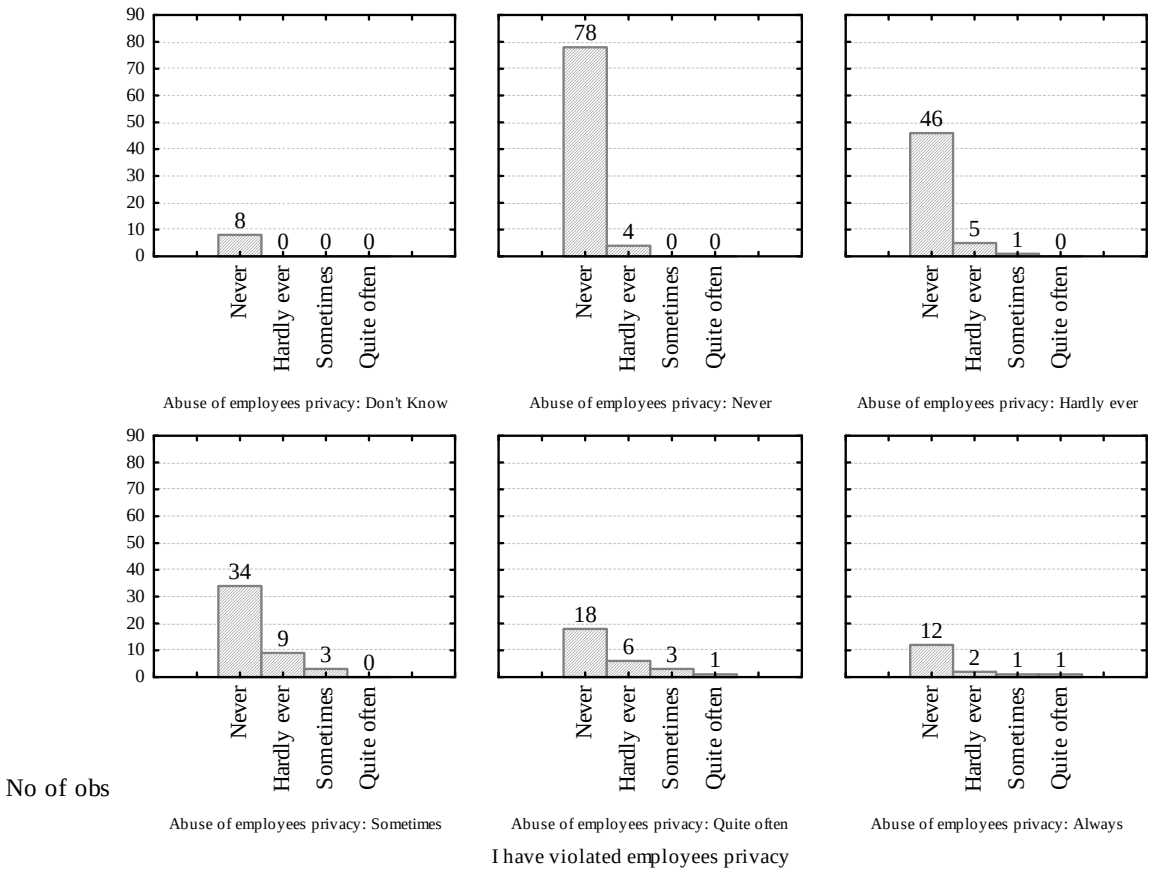


Combined Frequency Count:	**Never / Hardly ever**	**Sometimes / Quite often / Always**	**Total**
Do not Know	9	0	**9**
Never / Hardly ever	107	1	**108**
Sometimes / Quite often / Always	104	12	**116**
Total	**220**	**13**	**233**

Fisher's Exact Test for Count Data: p= 0.005523 (Statistically Significant)

Hypothesis Sub-Set 31

Abuse of employees privacy vs. I have violated employees privacy

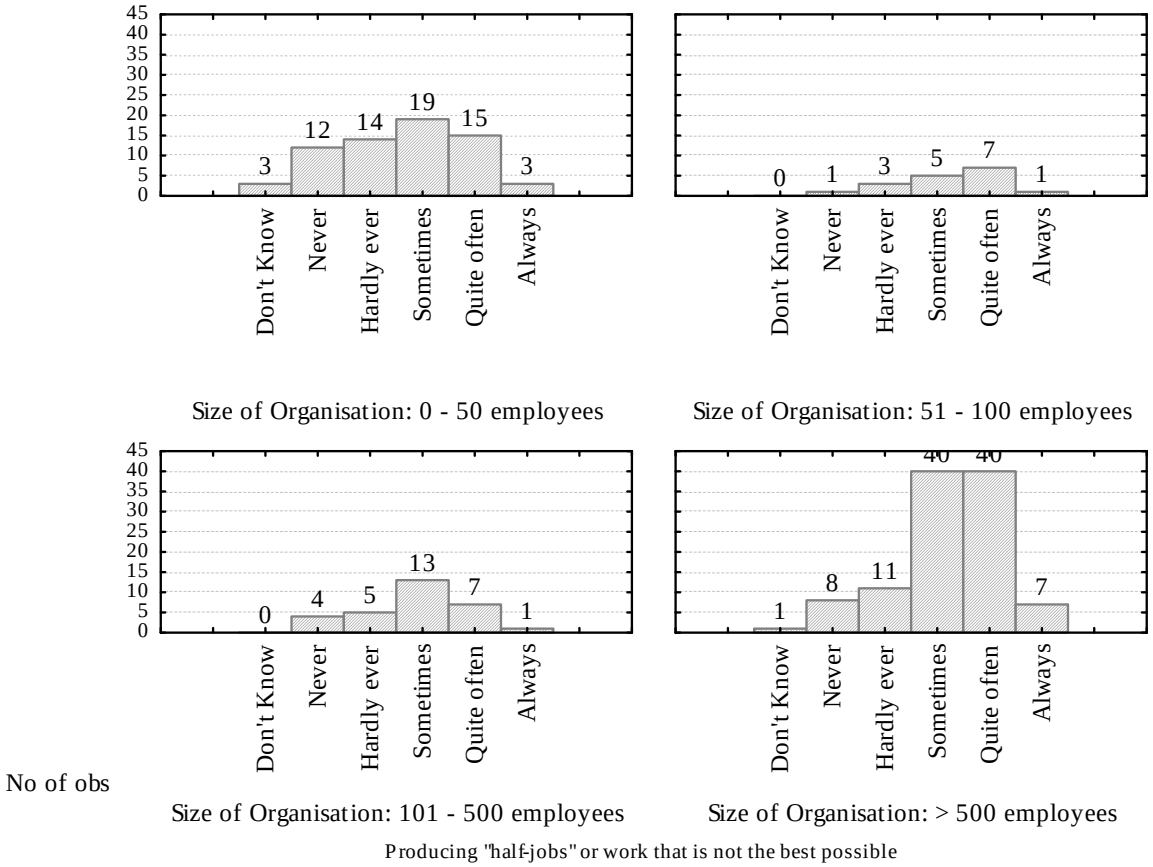


Combined Frequency Count:	**Never / Hardly ever**	**Sometimes / Quite often / Always**	**Total**
Do not Know	8	0	**8**
Never / Hardly ever	133	1	**134**
Sometimes / Quite often / Always	81	9	**90**
Total	**222**	**10**	**232**

Fisher's Exact Test for Count Data: p= 0.005627 (Statistically Significant)

Hypothesis Sub-Set 16

Size of Organisation vs. Producing "half-jobs" or work that is not the best possible

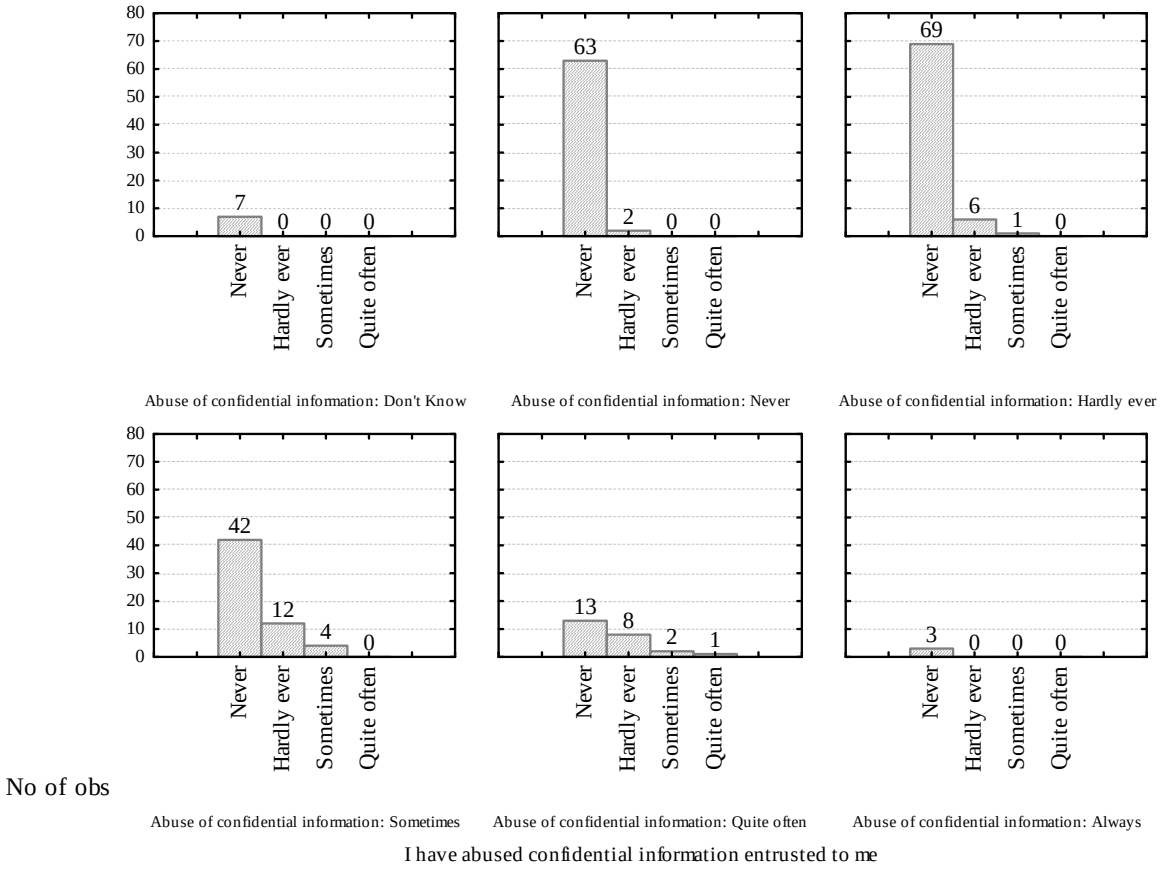


Combined Frequency Count:	**Do not Know**	**Never / Hardly ever**	**Some times / Quite often / Always**	**Totals**
0 - 50 employees / 51 - 100 employees	3	30	50	**83**
101 - 500 employees / > 500 employees	1	28	108	**137**
Totals	**4**	**58**	**158**	**220**

Fisher's Exact Test for Count Data: p= 0.00574 (Statistically Significant)

Hypothesis Sub-Set 28

Abuse of confidential information vs. I have abused confidential information entrusted to me

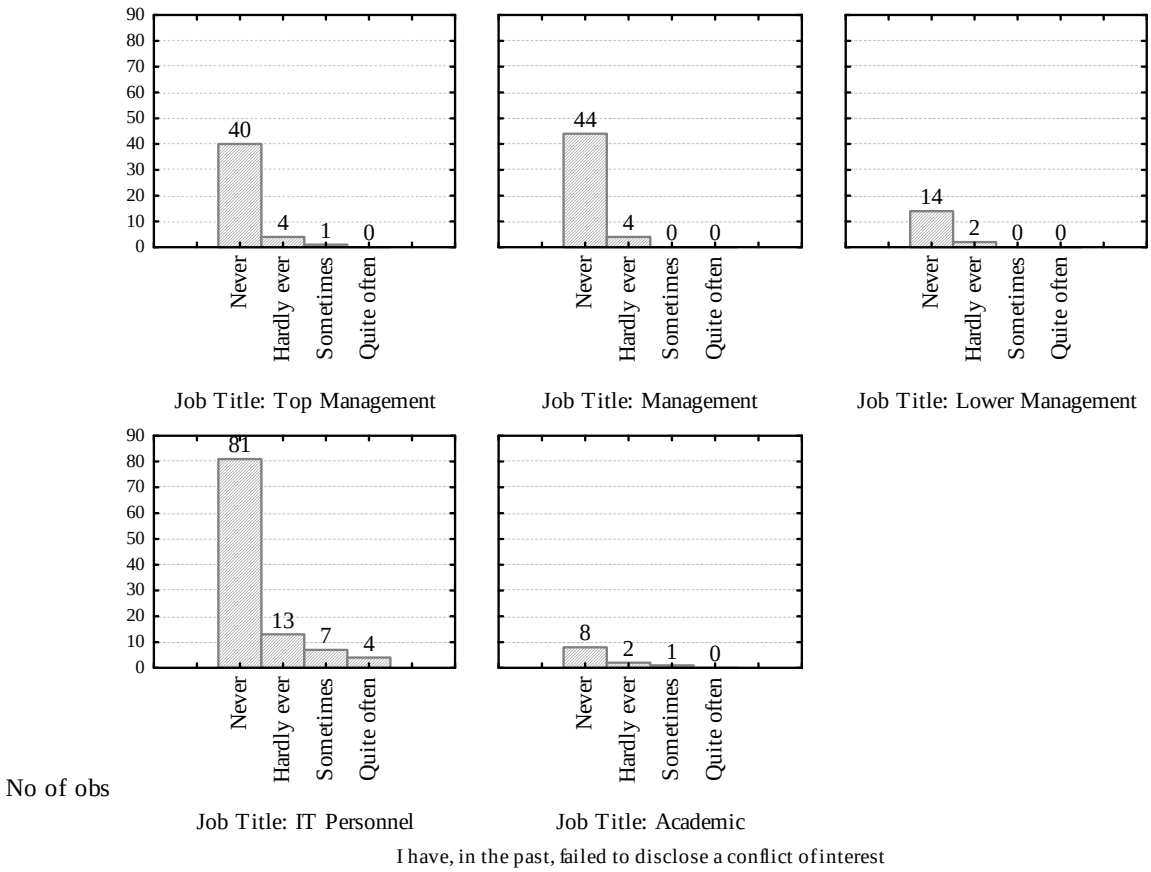


Combined Frequency Count:	**Never / Hardly ever**	**Sometimes / Quite often / Always**	**Total**
Do not Know	7	0	**7**
Never / Hardly ever	140	1	**141**
Sometimes / Quite often / Always	78	7	**85**
Total	**225**	**8**	**233**

Fisher's Exact Test for Count Data: p= 0.01106 (Borderline Statistically Significant)

Hypothesis Sub-Set 62

Job Title vs. I have, in the past, failed to disclose a conflict of interest

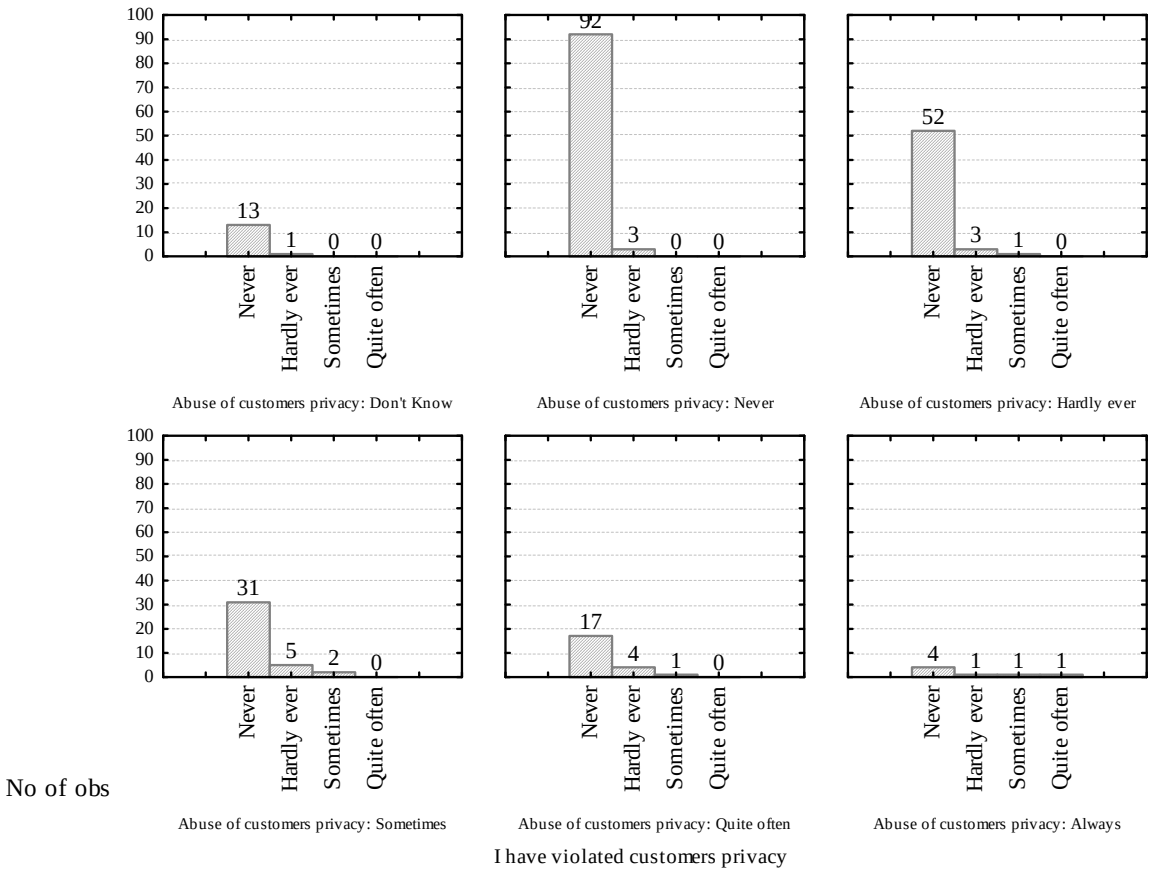


Combined Frequency Count:	**Never**	**Hardly ever / Sometimes / Quite often / Always**	**Total**
Top Management / Management / Lower Management	98	11	**109**
IT Personnel / Academic	89	27	**116**
Totals	**187**	**38**	**225**

Fisher's Exact Test for Count Data: p= 0.012 (Borderline Statistically Significant)

Hypothesis Sub-Set 32

Abuse of customers privacy vs. I have violated customers privacy

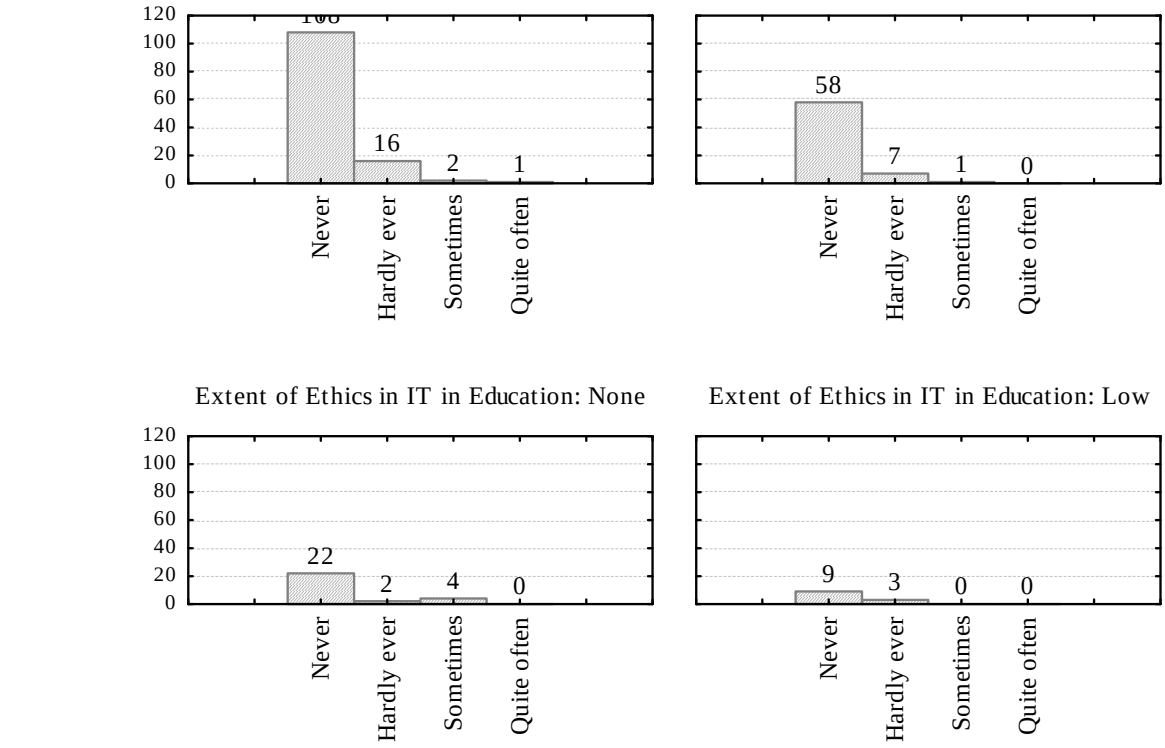


Combined Frequency Count:	**Never / Hardly ever**	**Sometimes / Quite often / Always**	**Total**
Do not Know	14	0	**14**
Never / Hardly ever	150	1	**151**
Sometimes / Quite often / Always	62	5	**67**
Total	**226**	**6**	**232**

Fisher's Exact Test for Count Data: p= 0.01511 (Borderline Statistically Significant)

Hypothesis Sub-Set 6

Extent of Ethics in IT in Education vs. I have abused confidential information entrusted to me

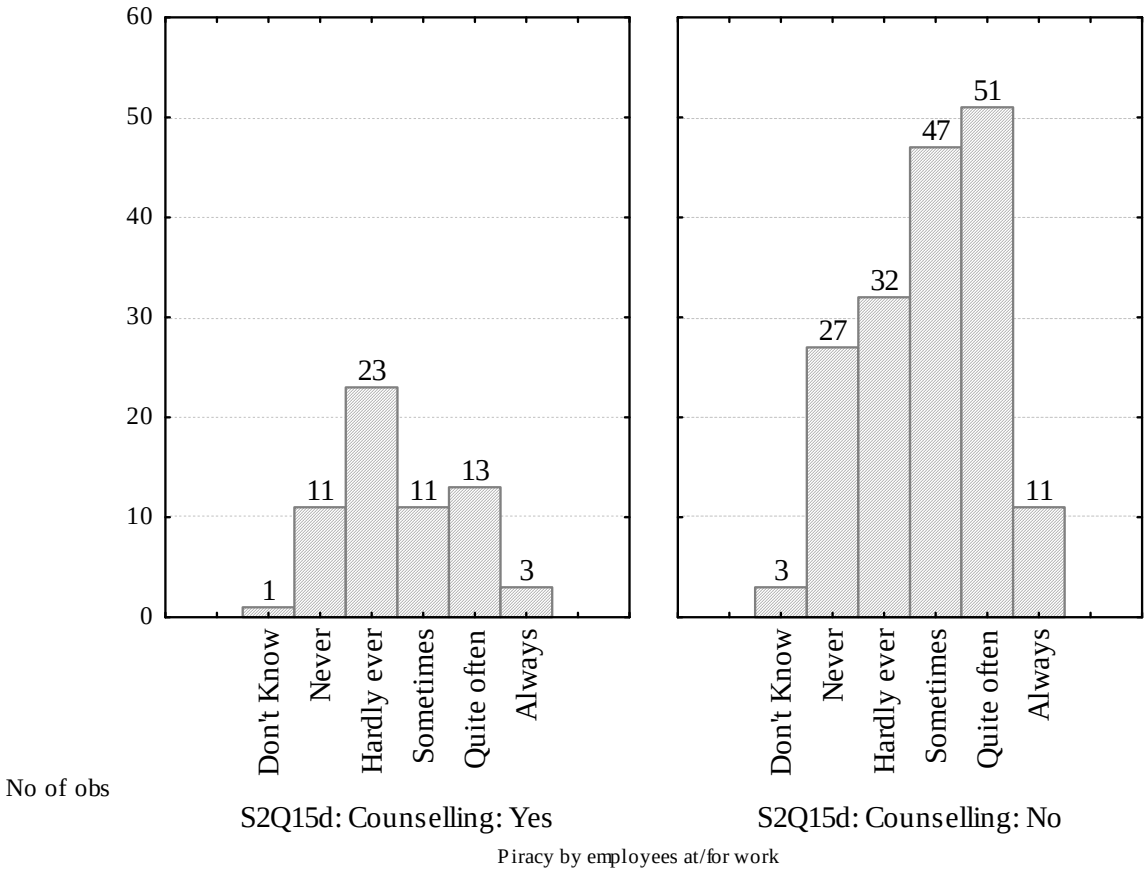


Combined Frequency Count:	**Never / Hardly ever**	**Some times / Quite often / Always**	**Totals**
None / Low	189	4	**193**
Moderate / High	36	4	**40**
Total	**225**	**8**	**233**

Fisher's Exact Test for Count Data: p= 0.0313 (Borderline Statistically Significant)

Hypothesis Sub-Set 100

Piracy by employees at/for work vs. The effect of counselling on ethical behaviour

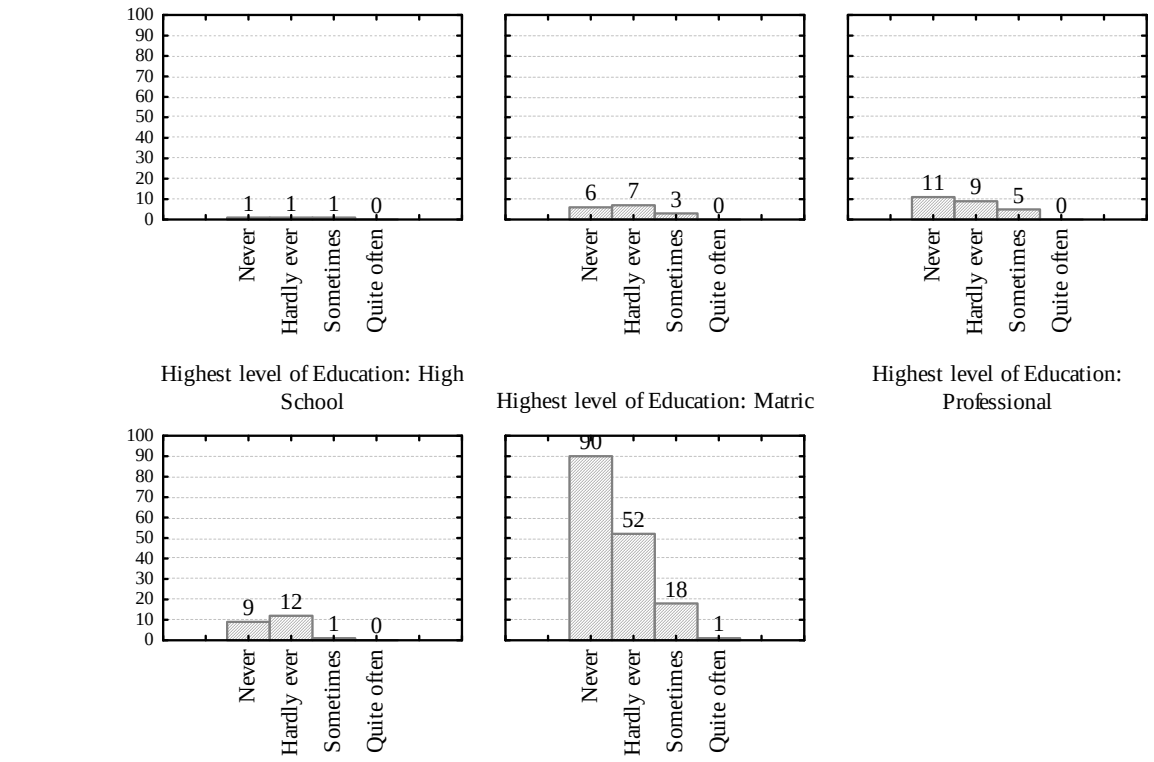


Combined Frequency Count:	Yes	No	Totals
Do not Know	1	3	**4**
Never / Hardly ever	34	59	**93**
Sometimes	11	47	**58**
Quite often / Always	16	62	**78**
Total	**62**	**171**	**233**

Fisher's Exact Test for Count Data: p= 0.04155 (Borderline Statistically Significant)

Hypothesis Sub-Set 49

Highest level of education vs. I do "half-a-job", producing work that is not my best

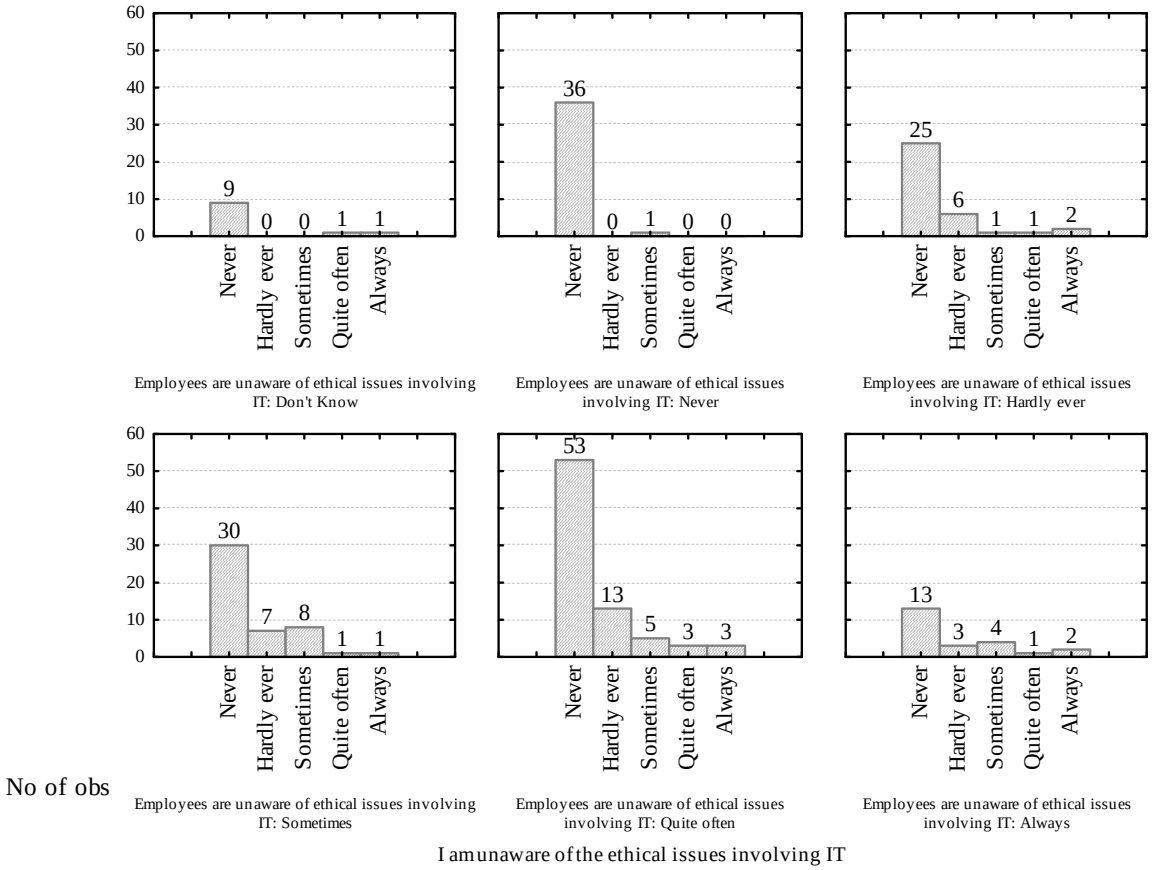


Combined Frequency Count:	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	27	39	**66**
HEI	90	71	**161**
Totals	**117**	**110**	**227**

Fisher's Exact Test for Count Data: p= 0.04223 (Borderline Statistically Significant)

Hypothesis Sub-Set 33

Employees are unaware of ethical issues involving IT vs. I am unaware of the ethical issues involving IT



Combined Frequency Count:	**Never / Hardly ever**	**Sometimes / Quite often / Always**	**Total**
Do not Know	9	2	**11**
Never / Hardly ever	67	5	**72**
Sometimes / Quite often / Always	119	28	**147**
Total	**195**	**35**	**230**

Fisher's Exact Test for Count Data: p= 0.04896 (Borderline Statistically Significant)

Detailed results for all hypotheses

This section contains the raw cross-tabulated data for each hypothesis and the combined values on which the test was performed. The type of test and the resultant p-value is listed below each table.

Hypothesis Sub-Set 1: Extent of Ethics in IT in Education vs. I have pirated software for work purposes

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	68	37	13	8	1	**127**
Low	36	16	11	3	0	**66**
Moderate	19	3	3	2	1	**28**
High	4	6	2	0	0	**12**
Always	0	0	0	0	0	**0**
All Groups	**127**	**62**	**29**	**13**	**2**	**233**

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	157	36	**193**
Moderate / High / Always	32	8	**40**
All Groups	**189**	**44**	**233**

Pearson's Chi-squared test with Yates' continuity correction: X-squared = 6e-04, df = 1, p-value = 0.981

Hypothesis Sub-Set 2: Extent of Ethics in IT in Education vs. I have pirated software for personal purposes

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	39	35	32	15	6	127
Low	12	22	22	10	0	66
Moderate	8	11	4	3	2	28
High	3	6	2	1	0	12
Always	0	0	0	0	0	0
All Groups	62	74	60	29	8	233

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	108	85	193
Moderate / High / Always	28	12	40
All Groups	136	97	233

Pearson's Chi-squared test with Yates' continuity correction: X-squared = 2.1416, df = 1, p-value = 0.1434

Hypothesis Sub-Set 3: Extent of Ethics in IT in Education vs. I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	98	19	7	3	0	127
Low	50	11	3	2	0	66
Moderate	19	6	3	0	0	28
High	11	0	1	0	0	12
Always	0	0	0	0	0	0
All Groups	178	36	14	5	0	233

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	178	15	193
Moderate / High / Always	36	4	40
All Groups	214	19	233

Fisher's Exact Test for Count Data: p-value = 0.7545

Hypothesis Sub-Set 4: Extent of Ethics in IT in Education vs. I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	108	11	4	4	0	127
Low	58	5	2	1	0	66
Moderate	24	3	1	0	0	28
High	11	1	0	0	0	12
Always	0	0	0	0	0	0
All Groups	201	20	7	5	0	233

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	182	11	193
Moderate / High / Always	39	1	40
All Groups	221	12	233

Fisher's Exact Test for Count Data: p-value = 0.6965

Hypothesis Sub-Set 5: Extent of Ethics in IT in Education vs. I do "half-a-job", producing work that is not my best

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	66	45	15	1	0	127
Low	30	29	7	0	0	66
Moderate	18	5	5	0	0	28

	Never	Hardly ever	Some times	Quite often	Always	Totals
High	7	4	1	0	0	12
Always	0	0	0	0	0	0
All Groups	121	83	28	1	0	233

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	170	23	193
Moderate / High / Always	34	6	40
All Groups	204	29	233

Fisher's Exact Test for Count Data: p-value = 0.6006

Hypothesis Sub-Set 6: Extent of Ethics in IT in Education vs. I have abused confidential information entrusted to me

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	108	16	2	1	0	127
Low	58	7	1	0	0	66
Moderate	22	2	4	0	0	28
High	9	3	0	0	0	12
Always	0	0	0	0	0	0
All Groups	197	28	7	1	0	233

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	189	4	193
Moderate / High / Always	36	4	40
All Groups	225	8	233

Fisher's Exact Test for Count Data: p-value = 0.0313

Hypothesis Sub-Set 7: Extent of Ethics in IT in Education vs. I have, in the past, failed to disclose a conflict of interest

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	110	11	2	4	0	127
Low	52	9	5	0	0	66
Moderate	24	4	0	0	0	28
High	9	1	2	0	0	12
Always	0	0	0	0	0	0
All Groups	195	25	9	4	0	233

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	182	11	193
Moderate / High / Always	38	2	40

All Groups	220	13	233

Fisher's Exact Test for Count Data: p-value = 1

Hypothesis Sub-Set 8: Extent of Ethics in IT in Education vs. I have intentionally over/under sold IT to internal/external clients

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	87	28	9	3	0	127
Low	44	14	5	1	0	64
Moderate	22	5	1	0	0	28
High	8	2	1	0	0	11
Always	0	0	0	0	0	0
All Groups	161	49	16	4	0	230

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	173	18	191
Moderate / High / Always	37	2	39
All Groups	210	20	230

Fisher's Exact Test for Count Data: p-value = 0.5402

Hypothesis Sub-Set 9: Extent of Ethics in IT in Education vs. I have violated customers privacy

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	111	10	4	1	0	126
Low	60	5	1	0	0	66
Moderate	27	1	0	0	0	28
High	11	1	0	0	0	12
Always	0	0	0	0	0	0
All Groups	209	17	5	1	0	232

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	186	6	192
Moderate / High / Always	40	0	40
All Groups	226	6	232

Fisher's Exact Test for Count Data: p-value = 0.5933

Hypothesis Sub-Set 10: Extent of Ethics in IT in Education vs. I have violated customers privacy

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	111	10	4	1	0	126

Low	60	5	1	0	0	66
Moderate	27	1	0	0	0	28
High	11	1	0	0	0	12
Always	0	0	0	0	0	0
All Groups	209	17	5	1	0	232

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	186	6	192
Moderate / High / Always	40	0	40
All Groups	226	6	232

Fisher's Exact Test for Count Data: p-value = 0.5933

Hypothesis Sub-Set 11: Extent of Ethics in IT in Education vs. I am unaware of the ethical issues involving IT

	Never	Hardly ever	Some times	Quite often	Always	Totals
None	87	13	13	4	7	124
Low	46	11	5	3	1	66
Moderate	23	4	0	0	1	28
High	10	1	1	0	0	12
Always	0	0	0	0	0	0
All Groups	166	29	19	7	9	230

Combined Frequency Count:	Never / Hardly ever	Some times / Quite often / Always	Totals
None / Low	157	33	190
Moderate / High / Always	38	2	40
All Groups	195	35	230

Fisher's Exact Test for Count Data: p-value = 0.05282

Hypothesis Sub-Set 12: Size of Organisation vs. Piracy by employees at/for work

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	1	16	14	13	20	2	66
51 - 100 employees	0	1	3	3	8	2	17
101 - 500 employees	0	4	6	6	12	2	30
> 500 employees	2	14	29	34	21	7	107
Totals	3	35	52	56	61	13	220

Combined Frequency Count:	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	1	34	48	83

101 - 500 employees / > 500 employees	2	53	82	137
Totals	3	87	130	220

Fisher's Exact Test for Count Data: p-value = 0.9012

Hypothesis Sub-Set 13: Size of Organisation vs. Piracy by employees at/for home

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	5	8	5	18	24	6	66
51 - 100 employees	0	0	3	3	9	2	17
101 - 500 employees	3	0	4	8	10	5	30
> 500 employees	8	9	11	24	41	14	107
Totals	16	17	23	53	84	27	220

Combined Frequency Count:	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	5	16	62	83
101 - 500 employees / > 500 employees	11	24	102	137
Totals	16	40	164	220

Fisher's Exact Test for Count Data: p-value = 0.86

Hypothesis Sub-Set 14: Size of Organisation vs. Misrepresentation of competence to internal/external clients

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	2	15	18	15	11	5	66
51 - 100 employees	0	1	2	6	6	2	17
101 - 500 employees	0	5	6	7	10	2	30
> 500 employees	5	15	23	31	27	6	107
Totals	7	36	49	59	54	15	220

Combined Frequency Count:	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	2	36	45	83
101 - 500 employees / > 500 employees	5	49	83	137
Totals	7	85	128	220

Fisher's Exact Test for Count Data: p-value = 0.5697

Hypothesis Sub-Set 15: Size of Organisation vs. Misrepresentation of competence to internal/external clients

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	2	15	18	15	11	5	66
51 - 100 employees	0	1	2	6	6	2	17
101 - 500 employees	0	5	6	7	10	2	30
> 500 employees	5	15	23	31	27	6	107
Totals	7	36	49	59	54	15	220

	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	2	36	45	83
101 - 500 employees / > 500 employees	5	49	83	137
Totals	7	85	128	220

Fisher's Exact Test for Count Data: p-value = 0.5697

Hypothesis Sub-Set 16: Size of Organisation vs. Producing "half-jobs" or work that is not the best possible

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	3	12	14	19	15	3	66
51 - 100 employees	0	1	3	5	7	1	17
101 - 500 employees	0	4	5	13	7	1	30
> 500 employees	1	8	11	40	40	7	107
Totals	4	25	33	77	69	12	220

	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	3	30	50	83
101 - 500 employees / > 500 employees	1	28	108	137
Totals	4	58	158	220

Fisher's Exact Test for Count Data: p-value = 0.00574

Hypothesis Sub-Set 17: Size of Organisation vs. Abuse of confidential information

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	3	23	20	13	7	0	66
51 - 100 employees	0	5	3	6	2	1	17
101 - 500 employees	0	8	9	9	4	0	30
> 500 employees	4	25	39	27	10	2	107
Totals	7	61	71	55	23	3	220

	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	3	51	29	83
101 - 500 employees / > 500 employees	4	81	52	137
Totals	7	132	81	220

Fisher's Exact Test for Count Data: p-value = 0.839

Hypothesis Sub-Set 18: Size of Organisation vs. Failure to disclose conflicts of interest

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	4	23	14	8	14	3	66
51 - 100 employees	0	1	5	2	5	4	17
101 - 500 employees	3	6	6	6	9	0	30
> 500 employees	2	20	26	33	22	4	107
Totals	9	50	51	49	50	11	220

	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	4	43	36	83
101 - 500 employees / > 500 employees	5	58	74	137
Totals	9	101	110	220

Fisher's Exact Test for Count Data: p-value = 0.3026

Hypothesis Sub-Set 19: Size of Organisation vs. Intentionally over/under selling IT to internal/external clients in order to obtain contracts

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	3	24	8	13	13	5	66
51 - 100 employees	1	0	2	8	4	2	17
101 - 500 employees	0	8	7	6	8	1	30
> 500 employees	5	16	21	29	30	6	107
Totals	9	48	38	56	55	14	220

	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	4	34	45	83
101 - 500 employees / > 500 employees	5	52	80	137
Totals	9	86	125	220

Fisher's Exact Test for Count Data: p-value = 0.8015

Hypothesis Sub-Set 20: Size of Organisation vs. Abuse of an employee's privacy

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	2	31	15	8	7	3	66
51 - 100 employees	0	5	3	5	3	1	17
101 - 500 employees	0	10	4	9	5	2	30
> 500 employees	3	32	29	21	13	9	107
Totals	5	78	51	43	28	15	220

	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	2	54	27	83
101 - 500 employees / > 500 employees	3	75	59	137
Totals	5	129	86	220

Fisher's Exact Test for Count Data: p-value = 0.2961

Hypothesis Sub-Set 21: Size of Organisation vs. Abuse of a customer's privacy

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	3	33	16	8	5	1	66
51 - 100 employees	1	6	3	2	4	1	17
101 - 500 employees	0	12	7	7	4	0	30
> 500 employees	7	38	29	20	9	4	107
Totals	11	89	55	37	22	6	220

	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	4	58	21	83
101 - 500 employees / > 500 employees	7	86	44	137
Totals	11	144	65	220

Fisher's Exact Test for Count Data: p-value = 0.574

Hypothesis Sub-Set 22: Size of Organisation vs. Employees are unaware of ethical issues involving IT

	Do not Know	Never	Hardly ever	Some times	Quite often	Always	Totals
0 - 50 employees	4	15	17	14	12	4	66
51 - 100 employees	0	3	2	3	7	2	17
101 - 500 employees	1	4	4	5	12	4	30
> 500 employees	7	13	10	24	42	11	107
Totals	12	35	33	46	73	21	220

	Do not Know	Never / Hardly ever	Some times / Quite often / Always	Totals
0 - 50 employees / 51 - 100 employees	4	37	42	83
101 - 500 employees / > 500 employees	8	31	98	137
Totals	12	68	140	220

Fisher's Exact Test for Count Data: p-value = 0.002506

Hypothesis Sub-Set 23: Piracy by employees at work vs. I have pirated software for work purposes

	Never	Hardly ever	Some times	Quite often	Always	Totals
Do not Know	3	1	0	0	0	4
Never	34	4	0	0	0	38
Hardly ever	34	19	2	0	0	55
Sometimes	29	19	9	1	0	58
Quite often	23	17	15	9	0	64
Always	4	2	3	3	2	14
Total	127	62	29	13	2	233

	Never / Hardly ever	Some times / Quite often / Always	Totals
Do not Know	4	0	4
Never / Hardly ever	91	2	93
Sometimes / Quite often / Always	94	42	136
Total	189	44	233

Fisher's Exact Test for Count Data: p=0.0000001157

Hypothesis Sub-Set 24: Piracy by employees at home vs. I have pirated software for personal purposes

	Never	Hardly ever	Some times	Quite often	Always	Total
Do not Know	9	5	3	0	1	18
Never	11	7	0	0	0	18
Hardly ever	10	9	4	0	0	23
Sometimes	16	21	14	5	0	56
Quite often	15	30	30	13	2	90
Always	1	2	9	11	5	28
Total	62	74	60	29	8	233

	Never / Hardly ever	Some times / Quite often / Always	Total
Do not Know	14	4	18
Never / Hardly ever	37	4	41
Sometimes / Quite often / Always	85	89	174
Total	136	97	233

Pearson's Chi-squared test: X-squared = 26.4208, df = 4, p-value = 0.00002603

Hypothesis Sub-Set 25: Misrepresentation of competence to internal/external clients vs. I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	9	0	0	0	0	9
Never	37	0	1	0	0	38
Hardly ever	44	6	1	0	0	51
Sometimes	46	15	3	0	0	64
Quite often	36	11	5	4	0	56
Always	6	4	4	1	0	15
Total	178	36	14	5	0	233

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	9	0	9
Never / Hardly ever	87	2	89
Sometimes / Quite often / Always	118	17	135
Total	214	19	233

Fisher's Exact Test for Count Data: p-value = 0.07327

Hypothesis Sub-Set 26: Misrepresentation of competence to employer vs. I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	8	1	0	0	0	9
Never	40	0	0	0	0	40
Hardly ever	52	2	2	0	0	56
Sometimes	51	9	1	0	0	61
Quite often	46	6	4	3	0	59
Always	4	2	0	2	0	8
Total	201	20	7	5	0	233

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	9	0	9
Never / Hardly ever	94	2	96
Sometimes / Quite often / Always	118	10	128
Total	221	12	233

Fisher's Exact Test for Count Data: p-value = 0.4346

Hypothesis Sub-Set 27: Producing "half-jobs" or work that is not the best possible vs. I do "half-a-job", producing work that is not my best

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	2	1	1	0	0	4
Never	25	3	0	0	0	28
Hardly ever	26	6	3	0	0	35
Sometimes	37	36	8	0	0	81
Quite often	28	32	13	0	0	73
Always	3	5	3	1	0	12
Total	121	83	28	1	0	233

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	3	1	4
Never / Hardly ever	60	3	63
Sometimes / Quite often / Always	141	25	166
Total	204	29	233

Fisher's Exact Test for Count Data: p-value = 0.1787

Hypothesis Sub-Set 28: Abuse of confidential information vs. I have abused confidential information entrusted to me

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	7	0	0	0	0	7
Never	63	2	0	0	0	65
Hardly ever	69	6	1	0	0	76
Sometimes	42	12	4	0	0	58
Quite often	13	8	2	1	0	24
Always	3	0	0	0	0	3
Total	197	28	7	1	0	233

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	7	0	7
Never / Hardly ever	140	1	141
Sometimes / Quite often / Always	78	7	85
Total	225	8	233

Fisher's Exact Test for Count Data: p-value = 0.01106

Hypothesis Sub-Set 29: Failure to disclose conflicts of interest vs. I have, in the past, failed to disclose a conflict of interest

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	8	1	0	0	0	9
Never	54	1	0	0	0	55
Hardly ever	48	4	1	0	0	53
Sometimes	44	5	2	0	0	51
Quite often	36	12	5	1	0	54
Always	5	2	1	3	0	11
Total	195	25	9	4	0	233

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	9	0	9
Never / Hardly ever	107	1	108
Sometimes / Quite often / Always	104	12	116
Total	220	13	233

Fisher's Exact Test for Count Data: p-value = 0.005523

Hypothesis Sub-Set 30: Intentionally over/under selling IT to internal/external clients in order to obtain contracts vs. I have intentionally over/under sold IT to internal/external clients

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	7	3	0	0	0	10
Never	48	3	0	0	0	51
Hardly ever	35	4	1	0	0	40
Sometimes	32	18	6	1	0	57
Quite often	31	18	7	1	0	57
Always	8	3	2	2	0	15
Total	161	49	16	4	0	230

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	10	0	**10**
Never / Hardly ever	90	1	**91**
Sometimes / Quite often / Always	110	19	**129**
Total	**210**	**20**	**230**

Fisher's Exact Test for Count Data: p-value = 0.0005897

Hypothesis Sub-Set 31: Abuse of employees privacy vs. I have violated employees privacy

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	8	0	0	0	0	8
Never	78	4	0	0	0	82
Hardly ever	46	5	1	0	0	52
Sometimes	34	9	3	0	0	46
Quite often	18	6	3	1	0	28
Always	12	2	1	1	0	16
Total	196	26	8	2	0	232

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	8	0	8
Never / Hardly ever	133	1	134
Sometimes / Quite often / Always	81	9	90
Total	222	10	232

Fisher's Exact Test for Count Data: p-value = 0.005627

Hypothesis Sub-Set 32: Abuse of customers privacy vs. I have violated customers privacy

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	13	1	0	0	0	14
Never	92	3	0	0	0	95
Hardly ever	52	3	1	0	0	56
Sometimes	31	5	2	0	0	38
Quite often	17	4	1	0	0	22
Always	4	1	1	1	0	7
Total	209	17	5	1	0	232

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	14	0	14
Never / Hardly ever	150	1	151
Sometimes / Quite often / Always	62	5	67
Total	226	6	232

Fisher's Exact Test for Count Data: p-value = 0.01511

Hypothesis Sub-Set 33: Employees are unaware of ethical issues involving IT vs. I am unaware of the ethical issues involving IT

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Do not Know	9	0	0	1	1	11
Never	36	0	1	0	0	37
Hardly ever	25	6	1	1	2	35
Sometimes	30	7	8	1	1	47
Quite often	53	13	5	3	3	77
Always	13	3	4	1	2	23
Total	166	29	19	7	9	230

	Never / Hardly ever	Sometimes / Quite often / Always	Total
Do not Know	9	2	11
Never / Hardly ever	67	5	72
Sometimes / Quite often / Always	119	28	147
Total	195	35	230

Fisher's Exact Test for Count Data: p-value = 0.04896

Hypothesis Sub-Set 34: Number of people who report to you vs. I have pirated software for work purposes

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	46	19	11	4	2	82
1-10	46	32	14	5	0	97
11-20	11	5	1	3	0	20
> 20	17	6	2	0	0	25
Totals	120	62	28	12	2	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	46	36	82
1-10	46	51	97
11-20 / > 20	28	17	45
Totals	120	104	224

Fisher's Exact Test for Count Data: p-value = 0.2173

Hypothesis Sub-Set 35: Number of people who report to you vs. I have pirated software for personal purposes

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	17	30	19	11	5	82
1-10	24	30	30	12	1	97
11-20	7	5	4	3	1	20
> 20	10	9	3	2	1	25
Totals	58	74	56	28	8	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	17	65	82
1-10	24	73	97
11-20 / > 20	17	28	45
Totals	58	166	224

Fisher's Exact Test for Count Data: p-value = 0.1162

Hypothesis Sub-Set 36: Number of people who report to you vs. I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	64	12	6	0	0	82
1-10	70	18	7	2	0	97
11-20	16	2	1	1	0	20
> 20	22	2	0	1	0	25

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Totals	172	34	14	4	0	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	64	18	82
1-10	70	27	97
11-20 / > 20	38	7	45
Totals	172	52	224

Fisher's Exact Test for Count Data: p-value = 0.2752

Hypothesis Sub-Set 37: Number of people who report to you vs. I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	74	6	1	1	0	82
1-10	81	9	5	2	0	97
11-20	17	2	0	1	0	20
> 20	21	3	1	0	0	25
Totals	193	20	7	4	0	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	74	8	82
1-10	81	16	97
11-20 / > 20	38	7	45
Totals	193	31	224

Fisher's Exact Test for Count Data: p-value = 0.424

Hypothesis Sub-Set 38: Number of people who report to you vs. I do "half-a-job", producing work that is not my best

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	42	29	10	1	0	82
1-10	45	38	14	0	0	97
11-20	11	7	2	0	0	20
> 20	17	6	2	0	0	25
Totals	115	80	28	1	0	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	42	40	82
1-10	45	52	97
11-20 / > 20	28	17	45
Totals	115	109	224

Fisher's Exact Test for Count Data: p-value = 0.2084

Hypothesis Sub-Set 39: Number of people who report to you vs. I have abused confidential information entrusted to me

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	72	8	2	0	0	82
1-10	81	12	4	0	0	97
11-20	15	4	0	1	0	20
> 20	21	4	0	0	0	25
Totals	189	28	6	1	0	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	72	10	82
1-10	81	16	97
11-20 / > 20	36	9	45
Totals	189	35	224

Fisher's Exact Test for Count Data: p-value = 0.4739

Hypothesis Sub-Set 40: Number of people who report to you vs. I have, in the past, failed to disclose a conflict of interest

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	70	8	3	1	0	82
1-10	79	12	5	1	0	97
11-20	18	1	0	1	0	20
> 20	21	3	1	0	0	25
Totals	188	24	9	3	0	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	70	12	82
1-10	79	18	97
11-20 / > 20	39	6	45
Totals	188	36	224

Fisher's Exact Test for Count Data: p-value = 0.7063

Hypothesis Sub-Set 41: Number of people who report to you vs. I have intentionally over/under sold IT to internal/external clients

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	60	15	4	2	0	81

1-10	62	23	10	1	0	96
11-20	14	5	0	1	0	20
> 20	16	6	2	0	0	24
Totals	152	49	16	4	0	221

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	60	21	81
1-10	62	34	96
11-20 / > 20	30	14	44
Totals	152	69	221

Fisher's Exact Test for Count Data: p-value = 0.4004

Hypothesis Sub-Set 42: Number of people who report to you vs. I have violated an employee's privacy

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	68	11	1	1	0	81
1-10	78	12	7	0	0	97
11-20	19	0	0	1	0	20
> 20	22	3	0	0	0	25
Totals	187	26	8	2	0	223

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	68	13	81
1-10	78	19	97
11-20 / > 20	41	4	45
Totals	187	36	223

Fisher's Exact Test for Count Data: p-value = 0.2681

Hypothesis Sub-Set 43: Number of people who report to you vs. I have violated a customer's privacy

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	72	7	1	1	0	81
1-10	87	6	4	0	0	97
11-20	17	3	0	0	0	20
> 20	24	1	0	0	0	25
Totals	200	17	5	1	0	223

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	72	9	81

	Never	Hardly ever / Sometimes / Quite often / Always	Total
1-10	87	10	97
11-20 / > 20	41	4	45
Totals	200	23	223

Fisher's Exact Test for Count Data: p-value = 0.9597

Hypothesis Sub-Set 44: Number of people who report to you vs. I am unaware of the ethical issues involving IT

	Never	Hardly ever	Sometimes	Quite often	Always	Total
0	61	9	8	3	1	82
1-10	62	19	6	3	5	95
11-20	16	0	1	1	1	19
> 20	20	1	3	0	1	25
Totals	159	29	18	7	8	221

	Never	Hardly ever / Sometimes / Quite often / Always	Total
0	61	21	82
1-10	62	33	95
11-20 / > 20	36	8	44
Totals	159	62	221

Fisher's Exact Test for Count Data: p-value = 0.1116

Hypothesis Sub-Set 45: Highest level of education vs. I have pirated software for work purposes

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	2	1	0	0	0	3
Matric	9	4	3	0	0	16
Professional	13	7	2	3	0	25
FET	13	5	3	1	0	22
HEI	87	42	21	9	2	161
Totals	124	59	29	13	2	227

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	37	29	66
HEI	87	74	161
Totals	124	103	227

Fisher's Exact Test for Count Data: p-value = 0.8834

Hypothesis Sub-Set 46: Highest level of education vs. I have pirated software for personal purposes

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	2	1	0	0	0	3
Matric	6	3	5	2	0	16
Professional	6	9	4	5	1	25
FET	4	7	7	4	0	22
HEI	41	53	42	18	7	161
Totals	59	73	58	29	8	227

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	18	48	66
HEI	41	120	161
Totals	59	168	227

Fisher's Exact Test for Count Data: p-value = 0.8678

Hypothesis Sub-Set 47: Highest level of education vs. I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	2	1	0	0	0	3
Matric	12	3	1	0	0	16
Professional	16	5	3	1	0	25
FET	18	4	0	0	0	22
HEI	124	23	10	4	0	161
Totals	172	36	14	5	0	227

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	48	18	66
HEI	124	37	161
Totals	172	55	227

Fisher's Exact Test for Count Data: p-value = 0.4991

Hypothesis Sub-Set 48: Highest level of education vs. I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	3	0	0	0	0	3
Matric	15	1	0	0	0	16

Professional	20	3	1	1	0	25
FET	22	0	0	0	0	22
HEI	135	16	6	4	0	161
Totals	195	20	7	5	0	227

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	60	6	66
HEI	135	26	161
Totals	195	32	227

Fisher's Exact Test for Count Data: p-value = 0.2093

Hypothesis Sub-Set 49: Highest level of education vs. I do "half-a-job", producing work that is not my best

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	1	1	1	0	0	3
Matric	6	7	3	0	0	16
Professional	11	9	5	0	0	25
FET	9	12	1	0	0	22
HEI	90	52	18	1	0	161
Totals	117	81	28	1	0	227

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	27	39	66
HEI	90	71	161
Totals	117	110	227

Fisher's Exact Test for Count Data: p-value = 0.04223

Hypothesis Sub-Set 50: Highest level of education vs. I have abused confidential information entrusted to me

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	3	0	0	0	0	3
Matric	13	3	0	0	0	16
Professional	21	3	0	1	0	25
FET	20	2	0	0	0	22
HEI	134	20	7	0	0	161
Totals	191	28	7	1	0	227

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	57	9	66
HEI	134	27	161
Totals	191	36	227

Fisher's Exact Test for Count Data: p-value = 0.69

Hypothesis Sub-Set 51: Highest level of education vs. I have, in the past, failed to disclose a conflict of interest

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	3	0	0	0	0	3
Matric	10	3	3	0	0	16
Professional	22	1	1	1	0	25
FET	21	1	0	0	0	22
HEI	133	20	5	3	0	161
Totals	189	25	9	4	0	227

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	56	10	66
HEI	133	28	161
Totals	189	38	227

Fisher's Exact Test for Count Data: p-value = 0.845

Hypothesis Sub-Set 52: Highest level of education vs. I have intentionally over/under sold IT to internal/external clients

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	2	0	1	0	0	3
Matric	9	6	1	0	0	16
Professional	14	4	5	2	0	25
FET	17	4	0	0	0	21
HEI	115	33	9	2	0	159
Totals	157	47	16	4	0	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	42	23	65
HEI	115	44	159
Totals	157	67	224

Fisher's Exact Test for Count Data: p-value = 0.2640

Hypothesis Sub-Set 53: Highest level of education vs. I have violated employees privacy

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	2	0	0	0	0	2
Matric	13	2	1	0	0	16
Professional	20	4	0	1	0	25
FET	22	0	0	0	0	22
HEI	135	20	5	1	0	161
Totals	192	26	6	2	0	226

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	57	8	65
HEI	135	26	161
Totals	192	34	226

Fisher's Exact Test for Count Data: p-value = 0.5418

Hypothesis Sub-Set 54: Highest level of education vs. I have violated customers privacy

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	2	0	0	0	0	2
Matric	14	1	1	0	0	16
Professional	23	2	0	0	0	25
FET	22	0	0	0	0	22
HEI	142	14	4	1	0	161
Totals	203	17	5	1	0	226

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	61	4	65
HEI	142	19	161
Totals	203	23	226

Fisher's Exact Test for Count Data: p-value = 0.2348

Hypothesis Sub-Set 55: Highest level of education vs. I am unaware of the ethical issues involving IT

	Never	Hardly ever	Sometimes	Quite often	Always	Total
High School	3	0	0	0	0	3
Matric	11	3	0	0	0	14
Professional	18	3	2	1	0	24
FET	18	4	0	0	0	22
HEI	112	18	16	6	9	161
Totals	162	28	18	7	9	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
High School / Matric / Professional / FET	50	13	63
HEI	112	49	161
Totals	162	62	224

Fisher's Exact Test for Count Data: p-value = 0.1837

Hypothesis Sub-Set 56: Job Title vs. I have pirated software for work purposes

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	24	15	3	3	0	45
Management	31	13	3	1	0	48
Lower Management	7	3	6	0	0	16
IT Personnel	51	28	15	9	2	105
Academic	8	2	1	0	0	11
Totals	121	61	28	13	2	225

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	62	47	109
IT Personnel / Academic	59	57	116
Totals	121	104	225

Fisher's Exact Test for Count Data: p-value = 0.4225

Hypothesis Sub-Set 57: Job Title vs. I have pirated software for personal purposes

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	15	15	9	4	2	45
Management	14	19	9	5	1	48
Lower Management	3	4	6	2	1	16
IT Personnel	22	32	29	18	4	105

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Academic	5	3	3	0	0	11
Totals	59	73	56	29	8	225

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	32	77	109
IT Personnel / Academic	27	89	116
Totals	59	166	225

Fisher's Exact Test for Count Data: p-value = 0.3631

Hypothesis Sub-Set 58: Job Title vs. I have claimed expertise in an area that I am not competent / qualified in when dealing with internal / external clients

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	38	5	2	0	0	45
Management	38	6	2	2	0	48
Lower Management	10	5	1	0	0	16
IT Personnel	76	18	8	3	0	105
Academic	9	1	1	0	0	11
Totals	171	35	14	5	0	225

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	86	23	109
IT Personnel / Academic	85	31	116
Totals	171	54	225

Fisher's Exact Test for Count Data: p-value = 0.3516

Hypothesis Sub-Set 59: Job Title vs. I have claimed expertise in an area that I am not competent / qualified in, in order to gain employment

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	39	6	0	0	0	45
Management	40	3	5	0	0	48
Lower Management	14	1	1	0	0	16
IT Personnel	90	9	1	5	0	105
Academic	10	1	0	0	0	11
Totals	193	20	7	5	0	225

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	93	16	109
IT Personnel / Academic	100	16	116
Totals	193	32	225

Fisher's Exact Test for Count Data: p-value = 0.8514

Hypothesis Sub-Set 60: Job Title vs. I do "half-a-job", producing work that is not my best

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	30	12	3	0	0	45
Management	22	21	5	0	0	48
Lower Management	8	5	3	0	0	16
IT Personnel	48	43	13	1	0	105
Academic	8	1	2	0	0	11
Totals	116	82	26	1	0	225

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	60	49	109
IT Personnel / Academic	56	60	116
Totals	116	109	225

Fisher's Exact Test for Count Data: p-value = 0.3509

Hypothesis Sub-Set 61: Job Title vs. I have abused confidential information entrusted to me

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	41	4	0	0	0	45
Management	38	9	1	0	0	48
Lower Management	14	2	0	0	0	16
IT Personnel	87	12	5	1	0	105
Academic	10	1	0	0	0	11
Totals	190	28	6	1	0	225

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	93	16	109
IT Personnel / Academic	97	19	116
Totals	190	35	225

Fisher's Exact Test for Count Data: p-value = 0.8543

Hypothesis Sub-Set 62: Job Title vs. I have, in the past, failed to disclose a conflict of interest

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	40	4	1	0	0	45
Management	44	4	0	0	0	48
Lower Management	14	2	0	0	0	16
IT Personnel	81	13	7	4	0	105
Academic	8	2	1	0	0	11
Totals	187	25	9	4	0	225

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	98	11	109
IT Personnel / Academic	89	27	116
Totals	187	38	225

Fisher's Exact Test for Count Data: p-value = 0.012

Hypothesis Sub-Set 63: Job Title vs. I have intentionally over/under sold IT to internal/external clients

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	29	12	3	1	0	45
Management	36	7	5	0	0	48
Lower Management	10	5	1	0	0	16
IT Personnel	71	21	7	3	0	102
Academic	8	3	0	0	0	11
Totals	154	48	16	4	0	222

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	75	34	109
IT Personnel / Academic	79	34	113
Totals	154	68	222

Fisher's Exact Test for Count Data: p-value = 0.885

Hypothesis Sub-Set 64: Job Title vs. I have violated employees privacy

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	39	4	2	0	0	45
Management	43	4	1	0	0	48

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Lower Management	10	3	3	0	0	16
IT Personnel	87	13	2	2	0	104
Academic	10	1	0	0	0	11
Totals	189	25	8	2	0	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	92	17	109
IT Personnel / Academic	97	18	115
Totals	189	35	224

Fisher's Exact Test for Count Data: p-value = 1

Hypothesis Sub-Set 65: Job Title vs. I have violated customers privacy

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	39	5	1	0	0	45
Management	45	2	1	0	0	48
Lower Management	12	1	3	0	0	16
IT Personnel	95	8	0	1	0	104
Academic	10	1	0	0	0	11
Totals	201	17	5	1	0	224

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	96	13	109
IT Personnel / Academic	105	10	115
Totals	201	23	224

Fisher's Exact Test for Count Data: p-value = 0.511

Hypothesis Sub-Set 66: Job Title vs. I am unaware of the ethical issues involving IT

	Never	Hardly ever	Sometimes	Quite often	Always	Total
Top Management	36	3	4	1	1	45
Management	35	6	3	1	2	47
Lower Management	9	4	1	0	1	15
IT Personnel	73	15	7	4	5	104
Academic	6	1	3	1	0	11
Totals	159	29	18	7	9	222

	Never	Hardly ever / Sometimes / Quite often / Always	Total
Top Management / Management / Lower Management	80	27	107
IT Personnel / Academic	79	36	115
Totals	159	63	222

Fisher's Exact Test for Count Data: p-value = 0.3719

Hypothesis Sub-Set 67: Piracy by employees at/for work vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	4	0	4
Never	27	11	38
Hardly ever	44	11	55
Sometimes	49	9	58
Quite often	44	20	64
Always	9	5	14
Total	177	56	233

	Yes	No	Totals
Do not Know	4	0	4
Never / Hardly ever	71	22	93
Sometimes	49	9	58
Quite often / Always	53	25	78
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.0009536

Hypothesis Sub-Set 68: Piracy by employees at/for home vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	14	4	18
Never	12	6	18
Hardly ever	18	5	23
Sometimes	45	11	56
Quite often	72	18	90
Always	16	12	28
Total	177	56	233

	Yes	No	Totals
Do not Know	14	4	18
Never / Hardly ever	30	11	41

	Yes	No	Totals
Sometimes	45	11	56
Quite often / Always	88	30	118
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.8232

Hypothesis Sub-Set 69: Misrepresentation of competence to internal/external clients vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	7	2	9
Never / Hardly ever	70	19	89
Sometimes	50	14	64
Quite often / Always	50	21	71
Total	177	56	233

	Yes	No	Totals
Do not Know	7	2	9
Never / Hardly ever	70	19	89
Sometimes	50	14	64
Quite often / Always	50	21	71
Total	177	56	233

Pearson's Chi-squared test: X-squared = 1.7262, df = 6, p-value = 0.943

Hypothesis Sub-Set 70: Misrepresentation of competence to employer vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	7	2	9
Never / Hardly ever	74	22	96
Sometimes	49	12	61
Quite often / Always	47	20	67
Total	177	56	233

	Yes	No	Totals
Do not Know	7	2	9
Never / Hardly ever	74	22	96
Sometimes	49	12	61
Quite often / Always	47	20	67
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.5831

Hypothesis Sub-Set 71: Producing "half-jobs" or work that is not the best possible vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	2	2	4
Never	19	9	28
Hardly ever	31	4	35
Sometimes	67	14	81
Quite often	52	21	73
Always	6	6	12
Total	177	56	233

	Yes	No	Totals
Do not Know	2	2	4
Never / Hardly ever	50	13	63
Sometimes	67	14	81
Quite often / Always	58	27	85
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.06546

Hypothesis Sub-Set 72: Abuse of confidential information vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	4	3	7
Never	48	17	65
Hardly ever	64	12	76
Sometimes	40	18	58
Quite often	19	5	24
Always	2	1	3
Total	177	56	233

	Yes	No	Totals
Do not Know	4	3	7
Never / Hardly ever	112	29	141
Sometimes	40	18	58
Quite often / Always	21	6	27
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.2429

Hypothesis Sub-Set 73: Failure to disclose conflicts of interest vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	6	3	9
Never	38	17	55
Hardly ever	45	8	53
Sometimes	39	12	51
Quite often	43	11	54
Always	6	5	11
Total	177	56	233

	Yes	No	Totals
Do not Know	6	3	9
Never / Hardly ever	83	25	108
Sometimes	39	12	51
Quite often / Always	49	16	65
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.9047

Hypothesis Sub-Set 74: Intentionally over/under selling IT to internal/external clients in order to obtain contracts vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	9	3	12
Never	36	15	51
Hardly ever	35	5	40
Sometimes	47	11	58
Quite often	43	14	57
Always	7	8	15
Total	177	56	233

	Yes	No	Totals
Do not Know	9	3	12
Never / Hardly ever	71	20	91
Sometimes	47	11	58
Quite often / Always	50	22	72
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.4312

Hypothesis Sub-Set 75: Abuse of an employee's privacy vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	7	1	8
Never	65	18	83
Hardly ever	42	10	52
Sometimes	34	12	46
Quite often	19	9	28
Always	10	6	16
Total	177	56	233

	Yes	No	Totals
Do not Know	7	1	8
Never / Hardly ever	107	28	135
Sometimes	34	12	46
Quite often / Always	29	15	44
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.2835

Hypothesis Sub-Set 76: Abuse of a customer's privacy vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	11	3	14
Never	75	20	95
Hardly ever	43	14	57
Sometimes	29	9	38
Quite often	15	7	22
Always	4	3	7
Total	177	56	233

	Yes	No	Totals
Do not Know	11	3	14
Never / Hardly ever	118	34	152
Sometimes	29	9	38
Quite often / Always	19	10	29
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.557

Hypothesis Sub-Set 77: Employees are unaware of ethical issues involving IT vs. The effect of policies on ethical behaviour

	Yes	No	Totals
Do not Know	9	4	13
Never	28	9	37
Hardly ever	29	7	36
Sometimes	37	10	47
Quite often	57	20	77
Always	17	6	23
Total	177	56	233

	Yes	No	Totals
Do not Know	9	4	13
Never / Hardly ever	57	16	73
Sometimes	37	10	47
Quite often / Always	74	26	100
Total	177	56	233

Fisher's Exact Test for Count Data: p-value = 0.7223

Hypothesis Sub-Set 78: Piracy by employees at/for work vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	2	2	4
Never	21	17	38
Hardly ever	30	25	55
Sometimes	41	17	58
Quite often	38	26	64
Always	7	7	14
Total	139	94	233

	Yes	No	Totals
Do not Know	2	2	4
Never / Hardly ever	51	42	93
Sometimes	41	17	58
Quite often / Always	45	33	78
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.22

Hypothesis Sub-Set 79: Piracy by employees at/for home vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	12	6	18
Never	9	9	18
Hardly ever	15	8	23
Sometimes	32	24	56
Quite often	55	35	90
Always	16	12	28
Total	139	94	233

	Yes	No	Totals
Do not Know	12	6	18
Never / Hardly ever	24	17	41
Sometimes	32	24	56
Quite often / Always	71	47	118
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.913

Hypothesis Sub-Set 80: Misrepresentation of competence to internal/external clients vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	7	2	9
Never	23	15	38
Hardly ever	31	20	51
Sometimes	34	30	64
Quite often	38	18	56
Always	6	9	15
Total	139	94	233

	Yes	No	Totals
Do not Know	7	2	9
Never / Hardly ever	54	35	89
Sometimes	34	30	64
Quite often / Always	44	27	71
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.4962

Hypothesis Sub-Set 81: Misrepresentation of competence to employer vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	6	3	9
Never	22	18	40
Hardly ever	30	26	56
Sometimes	39	22	61
Quite often	39	20	59
Always	3	5	8
Total	139	94	233

	Yes	No	Totals
Do not Know	6	3	9
Never / Hardly ever	52	44	96
Sometimes	39	22	61
Quite often / Always	42	25	67
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.5648

Hypothesis Sub-Set 82: Producing "half-jobs" or work that is not the best possible vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	3	1	4
Never	15	13	28
Hardly ever	20	15	35
Sometimes	54	27	81
Quite often	41	32	73
Always	6	6	12
Total	139	94	233

	Yes	No	Totals
Do not Know	3	1	4
Never / Hardly ever	35	28	63
Sometimes	54	27	81
Quite often / Always	47	38	85
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.3744

Hypothesis Sub-Set 83: Abuse of confidential information vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	4	3	7
Never	34	31	65
Hardly ever	52	24	76
Sometimes	33	25	58
Quite often	14	10	24
Always	2	1	3
Total	139	94	233

	Yes	No	Totals
Do not Know	4	3	7
Never / Hardly ever	86	55	141
Sometimes	33	25	58
Quite often / Always	16	11	27
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.9545

Hypothesis Sub-Set 84: Failure to disclose conflicts of interest vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	5	4	9
Never	28	27	55
Hardly ever	41	12	53
Sometimes	27	24	51
Quite often	32	22	54
Always	6	5	11
Total	139	94	233

	Yes	No	Totals
Do not Know	5	4	9
Never / Hardly ever	69	39	108
Sometimes	27	24	51
Quite often / Always	38	27	65
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.5845

Hypothesis Sub-Set 85: Intentionally over/under selling IT to internal/external clients in order to obtain contracts vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	7	5	12
Never	27	24	51
Hardly ever	25	15	40
Sometimes	32	26	58
Quite often	40	17	57
Always	8	7	15
Total	139	94	233

	Yes	No	Totals
Do not Know	7	5	12
Never / Hardly ever	52	39	91
Sometimes	32	26	58
Quite often / Always	48	24	72
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.5188

Hypothesis Sub-Set 86: Abuse of an employee's privacy vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	5	3	8
Never	52	31	83
Hardly ever	30	22	52
Sometimes	24	22	46
Quite often	19	9	28
Always	9	7	16
Total	139	94	233

	Yes	No	Totals
Do not Know	5	3	8
Never / Hardly ever	82	53	135
Sometimes	24	22	46
Quite often / Always	28	16	44
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.6964

Hypothesis Sub-Set 87: Abuse of a customer's privacy vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	7	7	14
Never	56	39	95
Hardly ever	35	22	57
Sometimes	22	16	38
Quite often	16	6	22
Always	3	4	7
Total	139	94	233

	Yes	No	Totals
Do not Know	7	7	14
Never / Hardly ever	91	61	152
Sometimes	22	16	38
Quite often / Always	19	10	29
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.796

Hypothesis Sub-Set 88: Employees are unaware of ethical issues involving IT vs. The effect of contractual agreements regarding ethical behaviour

	Yes	No	Totals
Do not Know	10	3	13
Never	18	19	37
Hardly ever	18	18	36
Sometimes	31	16	47
Quite often	49	28	77
Always	13	10	23
Total	139	94	233

	Yes	No	Totals
Do not Know	10	3	13
Never / Hardly ever	36	37	73
Sometimes	31	16	47
Quite often / Always	62	38	100
Total	139	94	233

Fisher's Exact Test for Count Data: p-value = 0.1254

Hypothesis Sub-Set 89: Piracy by employees at/for work vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	1	3	4
Never	10	28	38
Hardly ever	11	44	55
Sometimes	17	41	58
Quite often	13	51	64
Always	3	11	14
Total	55	178	233

	Yes	No	Totals
Do not Know	1	3	4
Never / Hardly ever	21	72	93
Sometimes	17	41	58
Quite often / Always	16	62	78
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.6495

Hypothesis Sub-Set 90: Piracy by employees at/for home vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	3	15	18
Never	4	14	18
Hardly ever	9	14	23
Sometimes	11	45	56
Quite often	21	69	90
Always	7	21	28
Total	55	178	233

	Yes	No	Totals
Do not Know	3	15	18
Never / Hardly ever	13	28	41
Sometimes	11	45	56
Quite often / Always	28	90	118
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.5209

Hypothesis Sub-Set 91: Misrepresentation of competence to internal/external clients vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	3	6	9
Never	7	31	38
Hardly ever	8	43	51
Sometimes	20	44	64
Quite often	14	42	56
Always	3	12	15
Total	55	178	233

	Yes	No	Totals
Do not Know	3	6	9
Never / Hardly ever	15	74	89
Sometimes	20	44	64
Quite often / Always	17	54	71
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.1604

Hypothesis Sub-Set 92: Misrepresentation of competence to employer vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	3	6	9
Never	7	33	40
Hardly ever	11	45	56
Sometimes	14	47	61
Quite often	17	42	59
Always	3	5	8
Total	55	178	233

	Yes	No	Totals
Do not Know	3	6	9
Never / Hardly ever	18	78	96
Sometimes	14	47	61
Quite often / Always	20	47	67
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.3266

Hypothesis Sub-Set 93: Producing "half-jobs" or work that is not the best possible vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	0	4	4
Never	6	22	28
Hardly ever	10	25	35
Sometimes	19	62	81
Quite often	16	57	73
Always	4	8	12
Total	55	178	233

	Yes	No	Totals
Do not Know	0	4	4
Never / Hardly ever	16	47	63
Sometimes	19	62	81
Quite often / Always	20	65	85
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.8638

Hypothesis Sub-Set 94: Abuse of confidential information vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	0	7	7
Never	14	51	65
Hardly ever	24	52	76
Sometimes	10	48	58
Quite often	5	19	24
Always	2	1	3
Total	55	178	233

	Yes	No	Totals
Do not Know	0	7	7
Never / Hardly ever	38	103	141
Sometimes	10	48	58
Quite often / Always	7	20	27
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.2489

Hypothesis Sub-Set 95: Failure to disclose conflicts of interest vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	2	7	9
Never	10	45	55
Hardly ever	16	37	53
Sometimes	11	40	51
Quite often	13	41	54
Always	3	8	11
Total	55	178	233

	Yes	No	Totals
Do not Know	2	7	9
Never / Hardly ever	26	82	108
Sometimes	11	40	51
Quite often / Always	16	49	65
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.9805

Hypothesis Sub-Set 96: Intentionally over/under selling IT to internal/external clients in order to obtain contracts vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	1	11	12
Never	9	42	51
Hardly ever	9	31	40
Sometimes	17	41	58
Quite often	14	43	57
Always	5	10	15
Total	55	178	233

	Yes	No	Totals
Do not Know	1	11	12
Never / Hardly ever	18	73	91
Sometimes	17	41	58
Quite often / Always	19	53	72
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.3315

Hypothesis Sub-Set 97: Abuse of an employee's privacy vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	1	7	8
Never	19	64	83
Hardly ever	9	43	52
Sometimes	14	32	46
Quite often	7	21	28
Always	5	11	16
Total	55	178	233

	Yes	No	Totals
Do not Know	1	7	8
Never / Hardly ever	28	107	135
Sometimes	14	32	46
Quite often / Always	12	32	44
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.4738

Hypothesis Sub-Set 98: Abuse of a customer's privacy vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	2	12	14
Never	20	75	95
Hardly ever	14	43	57
Sometimes	11	27	38
Quite often	5	17	22
Always	3	4	7
Total	55	178	233

	Yes	No	Totals
Do not Know	2	12	14
Never / Hardly ever	34	118	152
Sometimes	11	27	38
Quite often / Always	8	21	29
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.6693

Hypothesis Sub-Set 99: Employees are unaware of ethical issues involving IT vs. The effect of penalties on ethical behaviour

	Yes	No	Totals
Do not Know	4	9	13
Never	5	32	37
Hardly ever	9	27	36
Sometimes	9	38	47
Quite often	19	58	77
Always	9	14	23
Total	55	178	233

	Yes	No	Totals
Do not Know	4	9	13
Never / Hardly ever	14	59	73
Sometimes	9	38	47
Quite often / Always	28	72	100
Total	55	178	233

Fisher's Exact Test for Count Data: p-value = 0.4172

Hypothesis Sub-Set 100: Piracy by employees at/for work vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	1	3	4
Never	11	27	38
Hardly ever	23	32	55
Sometimes	11	47	58
Quite often	13	51	64
Always	3	11	14
Total	62	171	233

	Yes	No	Totals
Do not Know	1	3	4
Never / Hardly ever	34	59	93
Sometimes	11	47	58
Quite often / Always	16	62	78
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.04155

Hypothesis Sub-Set 101: Piracy by employees at/for home vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	8	10	18
Never	2	16	18
Hardly ever	7	16	23
Sometimes	15	41	56
Quite often	24	66	90
Always	6	22	28
Total	62	171	233

	Yes	No	Totals
Do not Know	8	10	18
Never / Hardly ever	9	32	41
Sometimes	15	41	56
Quite often / Always	30	88	118
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.339

Hypothesis Sub-Set 102: Misrepresentation of competence to internal/external clients vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	1	8	9
Never	12	26	38
Hardly ever	19	32	51
Sometimes	14	50	64
Quite often	14	42	56
Always	2	13	15
Total	62	171	233

	Yes	No	Totals
Do not Know	1	8	9
Never / Hardly ever	31	58	89
Sometimes	14	50	64
Quite often / Always	16	55	71
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.1255

Hypothesis Sub-Set 103: Misrepresentation of competence to employer vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	1	8	9
Never	10	30	40
Hardly ever	17	39	56
Sometimes	20	41	61
Quite often	13	46	59
Always	1	7	8
Total	62	171	233

	Yes	No	Totals
Do not Know	1	8	9
Never / Hardly ever	27	69	96
Sometimes	20	41	61
Quite often / Always	14	53	67
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.3627

Hypothesis Sub-Set 104: Producing "half-jobs" or work that is not the best possible vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	1	3	4
Never	6	22	28
Hardly ever	12	23	35
Sometimes	22	59	81
Quite often	20	53	73
Always	1	11	12
Total	62	171	233

	Yes	No	Totals
Do not Know	1	3	4
Never / Hardly ever	18	45	63
Sometimes	22	59	81
Quite often / Always	21	64	85
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.935

Hypothesis Sub-Set 105: Abuse of confidential information vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	2	5	7
Never	13	52	65
Hardly ever	26	50	76
Sometimes	14	44	58
Quite often	5	19	24
Always	2	1	3
Total	62	171	233

	Yes	No	Totals
Do not Know	2	5	7
Never / Hardly ever	39	102	141
Sometimes	14	44	58
Quite often / Always	7	20	27
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.9763

Hypothesis Sub-Set 106: Failure to disclose conflicts of interest vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	2	7	9
Never	15	40	55
Hardly ever	15	38	53
Sometimes	13	38	51
Quite often	14	40	54
Always	3	8	11
Total	62	171	233

	Yes	No	Totals
Do not Know	2	7	9
Never / Hardly ever	30	78	108
Sometimes	13	38	51
Quite often / Always	17	48	65
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.9884

Hypothesis Sub-Set 107: Intentionally over/under selling IT to internal/external clients in order to obtain contracts vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	1	11	12
Never	14	37	51
Hardly ever	12	28	40
Sometimes	16	42	58
Quite often	16	41	57
Always	3	12	15
Total	62	171	233

	Yes	No	Totals
Do not Know	1	11	12
Never / Hardly ever	26	65	91
Sometimes	16	42	58
Quite often / Always	19	53	72
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.5732

Hypothesis Sub-Set 108: Abuse of an employee's privacy vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	0	8	8
Never	24	59	83
Hardly ever	16	36	52
Sometimes	10	36	46
Quite often	7	21	28
Always	5	11	16
Total	62	171	233

	Yes	No	Totals
Do not Know	0	8	8
Never / Hardly ever	40	95	135
Sometimes	10	36	46
Quite often / Always	12	32	44
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.2704

Hypothesis Sub-Set 109: Abuse of a customer's privacy vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	1	13	14
Never	24	71	95
Hardly ever	15	42	57
Sometimes	13	25	38
Quite often	7	15	22
Always	2	5	7
Total	62	171	233

	Yes	No	Totals
Do not Know	1	13	14
Never / Hardly ever	39	113	152
Sometimes	13	25	38
Quite often / Always	9	20	29
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.2338

Hypothesis Sub-Set 110: Employees are unaware of ethical issues involving IT vs. The effect of counselling on ethical behaviour

	Yes	No	Totals
Do not Know	6	7	13
Never	9	28	37
Hardly ever	10	26	36
Sometimes	12	35	47
Quite often	20	57	77
Always	5	18	23
Total	62	171	233

	Yes	No	Totals
Do not Know	6	7	13
Never / Hardly ever	19	54	73
Sometimes	12	35	47
Quite often / Always	25	75	100
Total	62	171	233

Fisher's Exact Test for Count Data: p-value = 0.4552

Hypothesis Sub-Set 111: Piracy by employees at/for work vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	3	1	4
Never	19	19	38
Hardly ever	38	17	55
Sometimes	34	24	58
Quite often	38	26	64
Always	8	6	14
Total	140	93	233

	Yes	No	Totals
Do not Know	3	1	4
Never / Hardly ever	57	36	93
Sometimes	34	24	58
Quite often / Always	46	32	78
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.9487

Hypothesis Sub-Set 112: Piracy by employees at/for home vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	10	8	18
Never	8	10	18
Hardly ever	15	8	23
Sometimes	35	21	56
Quite often	54	36	90
Always	18	10	28
Total	140	93	233

	Yes	No	Totals
Do not Know	10	8	18
Never / Hardly ever	23	18	41
Sometimes	35	21	56
Quite often / Always	72	46	118
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.888

Hypothesis Sub-Set 113: Misrepresentation of competence to internal/external clients vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	6	3	9
Never	22	16	38
Hardly ever	32	19	51
Sometimes	39	25	64
Quite often	32	24	56
Always	9	6	15
Total	140	93	233

	Yes	No	Totals
Do not Know	6	3	9
Never / Hardly ever	54	35	89
Sometimes	39	25	64
Quite often / Always	41	30	71
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.9584

Hypothesis Sub-Set 114: Misrepresentation of competence to employer vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	6	3	9
Never	21	19	40
Hardly ever	32	24	56
Sometimes	38	23	61
Quite often	37	22	59
Always	6	2	8
Total	140	93	233

	Yes	No	Totals
Do not Know	6	3	9
Never / Hardly ever	53	43	96
Sometimes	38	23	61
Quite often / Always	43	24	67
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.635

Hypothesis Sub-Set 115: Producing "half-jobs" or work that is not the best possible vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	1	3	4
Never	13	15	28
Hardly ever	23	12	35
Sometimes	48	33	81
Quite often	50	23	73
Always	5	7	12
Total	140	93	233

	Yes	No	Totals
Do not Know	1	3	4
Never / Hardly ever	36	27	63
Sometimes	48	33	81
Quite often / Always	55	30	85
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.4017

Hypothesis Sub-Set 116: Abuse of confidential information vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	4	3	7
Never	28	37	65
Hardly ever	57	19	76
Sometimes	33	25	58
Quite often	15	9	24
Always	3	0	3
Total	140	93	233

	Yes	No	Totals
Do not Know	4	3	7
Never / Hardly ever	85	56	141
Sometimes	33	25	58
Quite often / Always	18	9	27
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.8614

Hypothesis Sub-Set 117: Failure to disclose conflicts of interest vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	3	6	9
Never	27	28	55
Hardly ever	37	16	53
Sometimes	34	17	51
Quite often	34	20	54
Always	5	6	11
Total	140	93	233

	Yes	No	Totals
Do not Know	3	6	9
Never / Hardly ever	64	44	108
Sometimes	34	17	51
Quite often / Always	39	26	65
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.3201

Hypothesis Sub-Set 118: Intentionally over/under selling IT to internal/external clients in order to obtain contracts vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	8	4	12
Never	29	22	51
Hardly ever	26	14	40
Sometimes	39	19	58
Quite often	29	28	57
Always	9	6	15
Total	140	93	233

	Yes	No	Totals
Do not Know	8	4	12
Never / Hardly ever	55	36	91
Sometimes	39	19	58
Quite often / Always	38	34	72
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.3919

Hypothesis Sub-Set 119: Abuse of an employee's privacy vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	4	4	8
Never	44	39	83
Hardly ever	36	16	52
Sometimes	34	12	46
Quite often	15	13	28
Always	7	9	16
Total	140	93	233

	Yes	No	Totals
Do not Know	4	4	8
Never / Hardly ever	80	55	135
Sometimes	34	12	46
Quite often / Always	22	22	44
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.107

Hypothesis Sub-Set 120: Abuse of a customer's privacy vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	8	6	14
Never	52	43	95
Hardly ever	39	18	57
Sometimes	25	13	38
Quite often	12	10	22
Always	4	3	7
Total	140	93	233

	Yes	No	Totals
Do not Know	8	6	14
Never / Hardly ever	91	61	152
Sometimes	25	13	38
Quite often / Always	16	13	29
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.8303

Hypothesis Sub-Set 121: Employees are unaware of ethical issues involving IT vs. The effect of discipline on ethical behaviour

	Yes	No	Totals
Do not Know	9	4	13
Never	21	16	37
Hardly ever	25	11	36
Sometimes	27	20	47
Quite often	49	28	77
Always	9	14	23
Total	140	93	233

	Yes	No	Totals
Do not Know	9	4	13
Never / Hardly ever	46	27	73
Sometimes	27	20	47
Quite often / Always	58	42	100
Total	140	93	233

Fisher's Exact Test for Count Data: p-value = 0.8121

Appendix F Detailed Results of Survey to Academic Institutions

This section reports the raw data from the survey to academic institutions.

F. Detailed Results of Survey to Academic Institutions

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Institution	**Border Technikon**	**Mangosutho Technikon**	**Technikon Free State**	**Technikon SA**	**RAU**	**RhodesCS**	**RhodesIS**	**Stellenbosch**	**UCT-IS**	**UniversityOfZululand**	**UP-CS**	**UP-IS**	**UWC**	**UPE**	**WitsCS**
Ethics in Curriculum: Stand-alone vs. Integrated	Integrated	Integrated	Integrated	Integrated	Both	Stand-Alone	Integrated	Stand-Alone	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Both
Lecturer's Background	IS	Another	Management	CS	IS / Philosophy	CS	IS	Philosophy	IS	Management	CS	IS	IS		CS
Qualification	No	Yes		Yes	No		No	Yes	No	No	Yes	Yes	No		No
Piracy															
None							None			None				None	
1st Year	Integrated	Integrated	Both		Integrated	Stand-Alone		Stand-Alone	Integrated			Integrated	Integrated		Stand-Alone

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2nd Year	Integrated	Integrated	Integrated		Integrated							Integrated			
3rd Year	Integrated	Integrated	Integrated		Integrated				Integrated			Integrated			
Honours			Integrated	Integrated				Stand-Alone	Integrated			Integrated			
Masters/PhD			Integrated												
Misrepresentation of Competence															
None	None	None		None			None							None	
1st Year			Both		Integrated	Stand-Alone		Stand-Alone	Integrated			Integrated	Integrated		Stand-Alone
2nd Year			Integrated									Integrated			
3rd Year			Integrated					Stand-Alone	Integrated			Integrated			Integrated

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Honours			Integrated					Stand-Alone	Integrated			Integrated			Integrated
Masters/PhD			Integrated					Stand-Alone							
Importance of producing the best possible work															
None						None				None				None	
1st Year	Integrated	Integrated		Integrated	Integrated			Stand-Alone	Integrated			Integrated	Integrated		Stand-Alone
2nd Year	Integrated	Integrated	Integrated	Integrated			Integrated					Integrated	Integrated		
3rd Year	Integrated	Integrated	Integrated	Integrated			Integrated	Stand-Alone	Integrated			Integrated			
Honours			Integrated	Integrated				Stand-Alone	Integrated			Integrated			
Masters/PhD			Integrated												

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Abuse of Confidential information															
None														None	
1st Year	Integrated	Integrated	Both						Integrated		Integrated	Integrated	Integrated		Stand-Alone
2nd Year	Integrated	Integrated	Integrated		Integrated	Stand-Alone	Integrated					Integrated			
3rd Year	Integrated	Integrated	Integrated		Integrated				Integrated			Integrated			Integrated
Honours			Integrated	Integrated	Integrated			Stand-Alone	Integrated			Integrated			Integrated
Masters/PhD			Integrated												
Conflicts of interest															
None						None				None				None	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1st Year	Integrated	Integrated	Both						Integrated			Integrated			Stand-Alone
2nd Year		Integrated					Integrated					Integrated			
3rd Year		Integrated							Integrated			Integrated	Integrated		
Honours				Integrated	Integrated			Stand-Alone	Integrated			Integrated			
Masters/PhD															
Over/Under selling IT to internal/external clients															
None	None	None				None		None					None	None	
1st Year			Both						Integrated						Stand-Alone
2nd Year															

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3rd Year									Integrated						
Honours				Integrated	Integrated		Integrated		Integrated						
Masters/PhD															
Privacy															
None										None				None	
1st Year		Integrated	Both		Integrated	Stand-Alone		Stand-Alone	Integrated		Integrated	Integrated	Integrated		Stand-Alone
2nd Year	Integrated	Integrated	Integrated		Integrated		Integrated					Integrated			
3rd Year		Integrated	Integrated		Integrated				Integrated			Integrated			Integrated
Honours			Integrated	Integrated	Integrated			Stand-Alone	Integrated			Integrated			Integrated

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Masters/PhD			Integrated												
Whistle-Blowing															
None	None				None	None	None			None			None	None	
1st Year		Integrated	Stand-Alone						Integrated						Stand-Alone
2nd Year															
3rd Year									Integrated						
Honours				Integrated				Stand-Alone	Integrated						
Masters/PhD															
Course Requirement	No	No	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	Yes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Treatment of topic															
Readings	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No	Yes	Yes
Lectures	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tutorial / Practicals	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	Yes	Yes
Essays	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes
Tests	No	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Other	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
Proportion of total curriculum															
1st Year	5	5	25	5		5			5		5	5	10		15

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2nd Year	10	5	10	5	5		5			10		5	0		5
3rd Year	10	5	10	5	10		5		5	5		10	0		5
Honours			10	5	10		5	5	5			5	0		5
Masters/PhD			20				0					10	0		
Degree of emphasis desired in curriculum															
1st Year	Similar	Less	Similar	Less	Less	Similar	Less	Less		None	Less	Less	Less	Less	Similar
2nd Year	Similar	Less	Less	Less	Less		Less	Less		Similar	Less	Less	Less	Less	Similar
3rd Year	Similar	Less	Less	Similar	Less		Less	Less		Similar	Less	Less	Similar	Less	Similar
Honours			Less	Similar	Less		Less	Less		None	Less	Less	Less	Less	Similar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Masters/PhD			Less				None			None		Similar	Less	Less	Similar
Most successful teaching methodologies															
1st Year															
Readings	No	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	No	No
Case-Studies	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No
Tutorial / Practicals	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No
Essays	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Role-playing	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Lectures	No	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes	No	Yes	Yes	No

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2nd Year															
Readings	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No
Case-Studies	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
Tutorial / Practicals	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
Essays	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Role-playing	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
Lectures	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
3rd Year															
Readings	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Case-Studies	No	Yes	No	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	No	No
Tutorial / Practicals	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Essays	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
Role-playing	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No
Lectures	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
Honours															
Readings	No	No	No	No	No	No	No	Yes	No	No	No	Yes	No	No	No
Case-Studies	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No
Tutorial / Practicals	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Essays	No	No	No	Yes	No	No	No	Yes	No	No	No	No	No	No	No
Role-playing	No	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No	No
Lectures	No	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No	Yes	No
Masters / PhD															
Readings	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No
Case-Studies	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
Tutorial / Practicals	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Essays	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No
Role-playing	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Lectures	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No
Degree of noticeable change in individuals	Couple		Couple	One or Two	Couple		One or Two	Couple		Couple		Lot	No Change		Couple
Objective of Course															
To achieve a general awareness of ethics surrounding IT	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
To enable students to justify their decisions as 'right' in terms of ethics	No	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes
To teach students a process of making decisions that will take ethics into account	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes
To develop an understanding of a wide spectrum of behaviour that is, and is not, ethical	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	No	Yes

Appendix G Knowledge Area Document for Proposed Course in Ethics

The proposed Knowledge Area Document for teaching an undergraduate course on the ethical aspects of Information Systems.

G. Knowledge Area Document for Proposed Course in Ethics

Department of information systems

ISYXX (INFYXX)

2005

COURSE CURRICULUM

Prepared by: Matthew Charlesworth

RHODES UNIVERSITY

Ethics in Information Systems	
Knowledge Area name	Ethics in Information Systems
General Description	An understanding of the importance of Ethics within Information Systems
Overall Objective	▪ The student must be able to distinguish between the basic cultural, social, legal, and ethical issues inherent in the discipline of computing. ▪ They should understand where the discipline has been, where it is, and where it is heading. ▪ Students should also be able to identify their individual roles in this process, as well as appreciate the philosophical questions, technical problems, and aesthetic values that play an important part in the development of the discipline. ▪ Students also need to develop the ability to ask serious questions about the social impact of computing and to evaluate proposed answers to those questions. ▪ Future practitioners must be able to anticipate the impact of introducing a given product into a given environment. ▪ Students must be able to ascertain whether that product enhances or degrades the quality of life? ▪ Students should appreciate the product's impact upon individuals, groups,

	and institutions? ▪ Students need to be aware of the basic legal rights of software and hardware vendors and users, and they also need to appreciate the ethical values that are the basis for those rights. ▪ Future practitioners must understand the responsibility that they will bear, and the possible consequences of failure. ▪ They must understand their own limitations as well sa the limitations of their tools. ▪ All practitioners must make a long-term commitment ot remiaining current in their chosen specialties and in the discipline of computing as a whole. ▪ Students must be able to identify the ethical issues surrounding their decisions.
Critical Outcomes	• Identify and solve problems • Organise and manage themselves • Collect, analyse and evaluate information • To achieve a general awareness of ethics surrounding IT • To enable students to justify their decisions as 'right' in terms of ethics • To teach students a process of making decisions that will take ethics into account • To develop an understanding of a wide spectrum of behaviour that is, and is not, ethical
Learning Outcomes	• To present and discuss the professional and ethical responsibilities of the IS practitioner • To explain the use of a professional code of ethics to evaluate specific IS actions • To introduce the societal implications of IS and related ethical issues • To introduce and explore ethical concepts and issues relating to personal and professional behaviour • To introduce compare and contrast ethical models and approaches to explore • To discuss and explain ethical and legal principles and issues; to discuss and explain ethical considerations of information systems development, planning, implementation, usage, sales, distribution, operation and maintenance • To present and explain ethical, contractual, and regulatory issues involving domestic and trans-border interactions involving interorganizational business relationships
Overall Knowledge	• The student needs to understand the basic cultural, social, legal, and ethical issues inherent in the discipline of computing. • A knowledge of where the discipline has been, where it is, and where it is

	heading. • Students should also understand their individual roles in this process, as well as appreciate the philosophical questions, technical problems, and aesthetic values that play an important part in the development of the discipline. • Students will have the ability to ask serious questions about the social impact of computing and to evaluate proposed answers to those questions. • As future practitioners students will be able to anticipate the impact of introducing a given product into a given environment. • Students will be able to ascertain whether that product enhances or degrades the quality of life? • Students will be able to identify the product's impact upon individuals, groups, and institutions? • Students will have knowledge of the basic legal rights of software and hardware vendors and users, and will also appreciate the ethical values that are the basis for those rights. • Future practitioners must understand the responsibility that they will bear, and the possible consequences of failure. • Students will be aware of their own limitations as well as the limitations of their tools. • Students will make a long-term commitment ot remiaining current in their chosen specialties and in the discipline of computing as a whole. • Students will be able to identify the ethical issues surrounding their decisions.				
Overall Skills	• Students will be able to identify the ethical dimensions to their actions and act accordingly. • Students will be able to justify their behaviour in ethical terms.				
Overall Attitudes	• Information Systems Practitioners whilst crafting systems and looking after data have a responsibility to Society and the individuals therein and not just to their company's bottom line. • Ethical issues are always present and cannot be ignored.				
Prior knowledge	No specific prior/concurrent knowledge is required.				
Teaching Methods	• Lectures. • Practical classes with 3 scheduled Practical lectures.				
Number of lectures	34	**Number of practicals**	4	**Type**	Theory Lectures / Practical

Module General Outline

Topic No	Lecture Topic	No of Lectures	No of Practicals
First Year			
1	History of Computing	1	
2	Social context of computing	3	
3	Methods and tools of analysis	2	
4	Professional and ethical responsibilities	3	1
	Sub-Total	**9**	**1**
Second Year			
5	Risks and liabilities of copmuter-based systems	2	
6	Intellectual property	3	
7	Privacy and civil liberties	2	
8	Computer crime	3	
9	Economic issues in computing	2	
10	Ethically responsible decision-making	3	2
	Sub-Total	**15**	**2**
Third Year			
11	IS Professional Code of Ethics	2	1
12	IS Society and Ethics	2	
13	Ethics and Legal Issues	2	
14	Interorganizational Ethical Issues	2	
15	Philosophical frameworks	2	
	Sub-Total	**10**	**1**
Total Number of Theory Lectures Required		**34**	**4**
Total Number of Practical Lectures Required		**4**	
Total Number of Lectures		**38**	

Lecture Number	**Title** ***Topic(s)*** ▪ **Learning Objectives / Goals**	Year
1	**History of Computing** *Prehistory—the world before 1946* *History of computer hardware, software, networking* *Pioneers of computing* ▪ List the contributions of several pioneers in the computing field. ▪ Compare daily life before and after the advent of personal	1

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Year
	computers and the Internet. ▪ Identify significant continuing trends in the history of the computing field.	
2	**Social Content of Computing** *Introduction to the social implications of computing* *Social implications of networked communication* *Growth of, control of, and access to the Internet* *Gender-related issues* *International issues* ▪ Interpret the social context of a particular implementation. ▪ Identify assumptions and values embedded in a particular design. ▪ Evaluate a particular implementation through the use of empirical data. ▪ Describe positive and negative ways in which computing alters the modes of interaction between people. ▪ Explain why computing/network access is restricted in some countries.	1
3	**Methods and tools of analysis** *Making and evaluating ethical arguments* *Identifying and evaluating ethical choices* *Understanding the social context of design* *Identifying assumptions and values* ▪ Analyze an argument to identify premises and conclusion. ▪ Illustrate the use of example, analogy, and counter-analogy in ethical argument. ▪ Detect use of basic logical fallacies in an argument. ▪ Identify stakeholders in an issue and our obligations to them. ▪ Articulate the ethical tradeoffs in a technical decision.	1
4	**Professional and Ethical Responsibilities** *Community values and the laws by which we live* *The nature of professionalism* *Various forms of professional credentialing and the advantages and disadvantages* *The role of the professional in public policy* *Maintaining awareness of consequences* *Ethical dissent and whistle-blowing*	1

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Year
	Codes of ethics, conduct, and practice (IEEE, ACM, SE, AITP, and so forth) *Dealing with harassment and discrimination "Acceptable use" policies for computing in the workplace* ▪ Identify progressive stages in a whistle-blowing incident. ▪ Specify the strengths and weaknesses of relevant professional codes as expressions of professionalism and guides to decision-making. ▪ Identify ethical issues that arise in software development and determine how to address them technically and ethically. ▪ Develop a computer use policy with enforcement measures. ▪ Analyze a global computing issue, observing the role of professionals and government officials in managing the problem. ▪ 6. Evaluate the professional codes of ethics from the ACM, the IEEE Computer Society, and other organizations.	
5	**Risks and liabilities of computer-based systems** *Historical examples of software risks (such as the Therac-25 case)* *Implications of software complexity* *Risk assessment and management* ▪ Explain the limitations of testing as a means to ensure correctness. ▪ Describe the differences between correctness, reliability, and safety. ▪ Discuss the potential for hidden problems in reuse of existing components. ▪ 4. Describe current approaches to managing risk, and characterize the strengths and shortcomings of each.	2
6	**Intellectual property** *Foundations of intellectual property* *Copyrights, patents, and trade secrets* *Software piracy* *Software patents* *Transnational issues concerning intellectual property* ▪ Distinguish among patent, copyright, and trade secret protection. ▪ Discuss the legal background of copyright in national and international law.	2

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Year
	▪ Explain how patent and copyright laws may vary internationally. ▪ Outline the historical development of software patents. ▪ Discuss the consequences of software piracy on software developers and the role of relevant enforcement organizations.	
7	**Privacy and civil liberties** *Ethical and legal basis for privacy protection* *Privacy implications of massive database systems* *Technological strategies for privacy protection* *Freedom of expression in cyberspace* *International and intercultural implications* ▪ Summarize the legal bases for the right to privacy and freedom of expression in one's own nation and how those concepts vary from country to country. ▪ Describe current computer-based threats to privacy. ▪ Explain how the Internet may change the historical balance in protecting freedom of expression. ▪ Explain both the disadvantages and advantages of free expression in cyberspace. ▪ Describe trends in privacy protection as exemplified in technology.	2
8	**Computer crime** *History and examples of computer crime* *"Cracking" ("hacking") and its effects* *Viruses, worms, and Trojan horses* *Crime prevention strategies* ▪ Outline the technical basis of viruses and denial-of-service attacks. ▪ Enumerate techniques to combat "cracker" attacks. ▪ Discuss several different "cracker" approaches and motivations. ▪ Identify the professional's role in security and the tradeoffs involved.	2
9	**Economic issues in computing** *Monopolies and their economic implications* *Effect of skilled labour supply and demand on the quality of computing products* *Pricing strategies in the computing domain*	2

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Year
	Differences in access to computing resources and the possible effects thereof ▪ Summarize the rationale for antimonopoly efforts. ▪ Describe several ways in which the information technology industry is affected by shortages in the labour supply. ▪ Suggest and defend ways to address limitations on access to computing. ▪ Outline the evolution of pricing strategies for computing goods and services.	
10	**Ethics and the IS Professional** to present and discuss the professional and ethical responsibilities of the IS practitioner ▪ use professional code of ethics to evaluate specific IS actions ▪ describe ethical and legal issues ▪ discuss and explain ethical considerations of software usage, sales, distribution, operation and maintenance	2
11	**Ethically responsible decision-making** to explain Kallman & Grillo's Guide to Ethical Decision Making ▪ Examine the legal issues. ▪ Consult guidelines. ▪ Discover applicable ethical principles. ▪ Make a defensible ethical choice based on your conclusions from the preceding steps.	2
12	**IS Professional Code of Ethics** to explain the use of a professional code of ethics to evaluate specific IS actions ▪ identify and describe professional organizations ▪ explain setting an ethical standard ▪ explain and examine ethical issues and arguments and failed approaches as a function of power and social context ▪ identification of stakeholders in a given IS development context, and the effect of development on these individuals ▪ describe use of the codes of ethics and ensure that project actions are consistent with these prescriptions	3
12	**IS Society and Ethics** to introduce the societal implications of IS and related ethical issues; to introduce and explore ethical concepts and issues	3

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Year
	relating to personal and professional behaviour; to introduce compare and contrast ethical models and approaches to explore ▪ discuss and explain ethics and principled behaviour and the concept of ethical practice in IS ▪ discuss major ethical models and discuss the reasons for being ethical ▪ explain the use of professional codes of ethics; explain the burden of professionalism resulting from trust associated with computing knowledge and skills ▪ discuss and explain the basis and nature of questionable ethical approaches ▪ discuss and explain the ethical and social analysis of IS development ▪ discuss and explain the issues of power and its social impact in the development life cycle	
13	**Ethics and Legal Issues** to discuss and explain ethical and legal principles and issues; to discuss and explain ethical considerations of information systems development, planning, implementation, usage, sales, distribution, operation and maintenance ▪ list and explain ethical and legal issues in development, ownership, sales, acquisition, use and maintenance of computer systems and software ▪ explain the utilization of ethical models, for example principle centred leadership to IS life cycle stages ▪ give examples of the effects of social context on technology development	3
14	**Interorganizational Ethical Issues** to present and explain ethical, contractual, and regulatory issues involving domestic and trans-border interactions involving interorganizational business relationships	3
15	**Philosophical frameworks** *Philosophical frameworks, particularly utilitarianism and deontological theories* *Problems of ethical relativism* *Scientific ethics in historical perspective* *Differences in scientific and philosophical approaches* *Explanation of Floridi's Innovative Approach to Computer Ethics and the importance of Information Ethics*	3

Lecture Number	Title *Topic(s)* ▪ **Learning Objectives / Goals**	Year
	▪ Summarize the basic concepts of relativism, utilitarianism, and deontological theories. ▪ Recognize the distinction between ethical theory and professional ethics, in the context of Information Ethics. ▪ Identify the weaknesses of the various approaches to Computer Ethics according to Floridi	

Assessment

	Type	Description	Time
1	Test	Theory	90 minutes
2	Practical	Practical	90 minutes

Appendix H Guide to Ethical Decision-Making

Kallman and Grillo (1993:20) provide a guide to ethical decision-making.

H. A guide to Ethical Decision-Making

(Taken from Kallman and Grillo 1993:20)

To approach an ethical choice logically:

2. Examine the legal issues.
3. Consult guidelines.
4. Discover applicable ethical principles.
5. Make a defensible ethical choice based on your conclusions from the preceding steps.

1. **Examine the legal issues. Actions can be:**
    - *A. Ethical and legal*
    - *B. Ethical but not legal*
    - *C. Not ethical but legal*
    - *D. Not ethical and not legal*
2. **Consult guidelines**
    - a. *Formal guidelines*

      Formal guidelines include corporate policies, codes of ethics, and other lists of decision-making criteria. Such guidelines usually call for asking the following questions:
        - i. Is the act consistent with corporate policy?
        - ii. Does the act violate corporate or professional codes of conduct or ethics?
        - iii. Does the act violate the Golden Rule?
        - iv. Does it serve the majority rather than a minority?
    - b. *Informal guidelines*

      Tests for rightness or wrongness
        - i. *Mom test*: Would you tell her?
        - ii. *TV Test*: Would you tell a nationwide audience?
        - iii. *Smell Test*: Does the situation "smell"?
        - iv. *Other Person's Shoes Test*: What if the roles were reversed?
        - v. *Market Test*: Could you advertise the act to gain a marketing edge?
3. **Discover the applicable ethical principles**
    - *a. The principle of harm minimization*

i. Choose the action that minimizes actual and potential harm.

b. Principles involving rights and duties (deontology)

i. Rights include

1. The right to know
2. The right to privacy
3. The right to property

ii. Duties

1. Personal Duties

a. Trust
b. Integrity
c. Truthfulness
d. Justice
e. Beneficence and nonmaleficence
f. Gratitude and reparation
g. Self-improvement

2. Professional Responsibilities

a. For all professionals:

i. Maintain appropriate professional relationships.
ii. Maintain professional efficacy.

b. For information professionals in particular:

i. Maintain confidentiality.
ii. Maintain impartiality.

c. Principles involving consequentialism (teleology)

i. Egoism
ii. Utilitarianism

d. Kant's categorical imperative

i. The principle of consistency
ii. The principle of respect

4. **Make a defensible ethical choice**

Review the conclusions reached in the preceding steps and ask:

a. Does the action serve the public interest or, at least, not cause unnecessary social harm?

b. Are any basic human rights violated?

c. Are any commonly accepted duties abridged?

Appendix I Matrix of Case-Studies

This section contains an analysis of how certain Case-Studies can be incorporated into the IS Curriculum. It is an extract from Charlesworth and Sewry 2002:163--171.

I. Matrix of Case-Studies

(This is an extract from: Charlesworth et al 2002:163--171)

In 1997, Granger *et al* (1997:38) released a report that provided "an organisational approach for classifying exercises, based on the issue each one addresses and the course or courses in which it may fit". Since the publication of that report there have been two major curriculum recommendations released for the information systems discipline. Using the latest recommended courses from IS 2002 (Gorgone *et al* 2002) the author has attempted to use the organisational approach from Granger *et al* to recommend case studies that may be used in various courses to illustrate ethical dilemmas and allow the students to exercise ethical decision making in the context of that course.

The author has taken the major ethical issues as described in that report and used them as "super-categories". Granger *et al* define these issues as:

> "*Individual responsibility* includes those responsibilities held in common with other people, regardless of technical expertise or position, and are often the result of one's group membership, including family, political entities, cultures and employment.
>
> *Professional responsibility* includes those responsibilities that professionals should undertake because of their special knowledge and skill, their association with others who share that knowledge and skill, and the trust that society places in them because of that knowledge and skill. Typically professional behaviour conforms to the guidelines and aspirations delineated by various codes of professional practice set forth by professional associations or employers.

Access & equity includes concerns about equal access to technology, whether the use of technology is biased with respect to gender, socio-economic status, ethnicity or race, and whether there is equitable access for all groups, including those with disabilities.

Quality of life covers issues that impact human life. Areas of concern include impact on environment, effects on social and cultural interactions, changes in work environment, and comfort levels of individuals and groups. The technical professional needs to consider whether a technological innovation improves or denigrates the quality of life. A specific example is the ability of anyone with access to email to communicate instantaneously with people anywhere in the world. Another is the ability of professionals to perform their normal office functions at home by using the technology.

System quality includes consideration of the reliability, accuracy, timeliness, and safety of the system itself, as well as of the outputs from the system and the way the system contributes to the quality of life.

Intellectual property includes consideration of the conflicts between society's right to know and the individual's right to privacy.

Privacy includes consideration of the conflicts between society's right to know and the individual's right to privacy.

Risk and reliability includes consideration of the reliability and vulnerability of the software produced, the risks associated with the use of a system, and the integrity of the information contained within and manipulated by the system. This also includes any risks "to others" associated with the use of a system.

Use of power includes consideration of the manner in which computer professionals exercise their knowledge and skill, design systems, and interact with each other and with technically unsophisticated individuals and with groups. This also includes how power is used in situations of conflict of

interest and in establishing policies and systems that uphold standards of equity and fairness.

Integrity includes consideration of the honesty of computer professionals and end users. This includes consideration of the accuracy of statements to end users and clients regarding the capability and feasibility of software or hardware as well as those regarding representation of their professional credentials."(Granger, Little, Adams, Björkman, Gotterbarn, Juettner, Martin, and Young 1997:40).

Table 81 illustrates how some ethical issues that were identified by Kallman and Grillo were then assigned to the super-categories defined above (some categories may appear in more than one super-category):

Super-Categories from Granger *et al.*	Individual Responsibility	Professional Responsibility	Access and equity	Quality of life	System quality	Intellectual property	Privacy	Risks and reliability	Use of power	Integrity
Categories from Kallman & Grillo										
Accountability for actions	X									
Accuracy										X
Arrogance of IS Professionals		X								
Artificial intelligence					X			X		
Breaking trust	X	X							X	
Consulting responsibilities	X	X								
Copyrights						X				
Credit Bureaus									X	
Data access			X		X					
Data recombination									X	

Super-Categories from Granger *et al.*	Individual Responsibility	Professional Responsibility	Access and equity	Quality of life	System quality	Intellectual property	Privacy	Risks and reliability	Use of power	Integrity
Deception	X	X								
Duty	X	X					X			
E-Mail				X						
Ethical impact study										X
Ethics of development					X					
Expert systems					X					
Gray market						X				X
Inappropriate use of resources		X							X	X
Info Rich vs. Info Poor									X	
International policy						X				
International trade						X				
Keeping quiet										X
Knowledge engineering					X					
Lack of respect	X	X								
Misuse of authority and power									X	
Misuse of company resources		X							X	X
Offensive start-up screen							X			
Overdependence on computers				X						
Password theft							X			
Poor school vs. rich engineering firm									X	
Power in society									X	
Premature software release		X								X
Privacy							X			
Protectionist measures						X				
Respect										X
Sexual harassment									X	
Software piracy						X				
Technical limitations								X		
The "dark side"										X
Unauthorised access			X				X			

Super-Categories from Granger *et al.*	Individual Responsibility	Professional Responsibility	Access and equity	Quality of life	System quality	Intellectual property	Privacy	Risks and reliability	Use of power	Integrity
Unprofessional behaviour		X								
Virtual reality				X						
Virus released in retribution								X		
Whistle blowing	X									

Table 81: Mapping of Categories to Super-Categories

Ethical Instruction in IS curricula

Kallman and Grillo state that "most of the unethical activity that does occur has resulted because individuals did not realise an act was unethical or did not know how to make ethical decisions 1993." Over a decade ago it was reported that "the inclusion of ethical instruction in IS curricula at academic institutions should be an urgent objective of the IS profession" (Morris, Jones, and Rubinsztein 1993:8). Since then the relevant Curriculum Bodies (ACM, AIS, AITP (DPMA) and IEEE) have sought to include this aspect in their various recommendations. The two latest recommendations, IS'97 and IS'02, make explicit reference in their identification of the Body of Knowledge to the legal, ethical and professional aspects of information systems. The recent Ethics Survey (KPMG, 2001:8) revealed that only 5% of individuals responsible for ethics within an organisation had had any training in the area at a tertiary level. Given all of this, there does seem to be an urgent need for such education – and given the time between the various publications, that is 1993-2001, it does seem as if educators have been a little slow off the mark.

The Computing Curricula for 2001 (CC2001) recommends that "this knowledge area is best covered through a combination of one required course along with short modules in other courses". One way of introducing the topic of ethics in other courses is through using case studies. The author has, using the categories described above, and the recently proposed courses from IS'02, tried to classify case studies into appropriate course areas. This allows us to examine where there is an abundance of ethical emphasis and where there is not.

The author then sought to use the latest curriculum recommendation available, that is IS'02 and considered the recommended courses to map the applicable case studies onto:

> *IS'02.P0 Personal Productivity with IS Technology*: The prerequisite course enables students to improve their skills as knowledge workers. The emphasis is on personal productivity concepts through using functions and features in computer software such as databases, presentation graphics, and Web authoring.
> *IS'02.1 - Fundamentals of Information Systems*: This course provides an introduction to systems and development concepts, information technology, and application software. It explains how information is used in organisations and how IT enables improvement in quality, timeliness, and competitive advantage.
> *IS'02.2 - Electronic Business Strategy, Architecture and Design*: This course examines the linkage of organisation strategy and electronic methods of delivering products, services and exchanges in inter-organisational, national, and global environments.
> *IS'02.3 - Information Systems Theory and Practice*: This course provides an understanding of organisational systems, planning, and decision process, and how information is used for decision support in organisations. It covers quality and decision theory, information theory, and practice.
> *IS'02.4 - Information Technology Hardware and Systems Software*: This course provides the hardware / system software fundamentals for various computer / network architectures used in the design, development and implementation of contemporary information systems.
> *IS'02.5 - Programming, Data, File and Object Structures*: This course provides an exposure to algorithm development, programming, computer concepts and the design and application of data and file structures. It includes the use of logical and physical structures for both programs and data.
> *IS'02.6 - Networks and Telecommunication*: This course provides an in-depth knowledge of data communications and networking requirements including networking and telecommunications technologies, hardware, and software. Emphasis is placed upon the analysis and design of networking applications in organisations.
> *IS'02.7 - Analysis and Logical Design*: This course examines the system development and modification process. It emphasizes the factors for effective communication and integration with users and user systems. It encourages interpersonal skill development with clients, users and team members.

IS'02.8 - Physical Design and Implementation with DBMS: This course covers information systems design and implementation within a database management system environment. Students will demonstrate their mastery of the design process acquired in earlier courses by designing and constructing a physical system.
IS'02.9 - Physical Design and Implementation in Emerging Environments: This course covers physical design and implementation of information systems applications. Implementation in emerging distributed computing environments using traditional and contemporary development environments.
IS'02.10 - Project Management and Practice: This course covers the factors necessary for successful management of information systems development or enhancement projects. Both technical and behavioural aspects of project management are applied within the context of an information systems development."

(Longenecker, Jr., Davis, Feinstein, Gorgone, and Valacich 2001)

The author has used 32 case studies that were taken from the Internet and from an excellent collection of case studies by Kallman & Grillo (1993:20). These case studies were then matched to categories and super-categories and their applicability to be included in a specific course was mapped onto the matrix contained in Table 83. The author has therefore re-positioned the case studies that highlight previously identified ethical issues onto the relevant particular course or curriculum area in the new curriculum.

A summary of Table 83 is listed in Table 82 below:

	Super-Category Total	**Category Total**	**Case Study Total**
IS'02.P0 Personal Productivity with IS Technology	*0 (0%)*	*0 (0%)*	*0 (0%)*
IS'02.1 - Fundamentals of Information Systems	10 (100%)	69 (100%)	84 (100%)
IS'02.2 - Electronic Business Strategy, Architecture and Design	10 (100%)	68 (99%)	81 (96%)
IS'02.3 - Information Systems Theory and Practice	9 (90%)	32 (46%)	30 (36%)
IS'02.4 - Information Technology Hardware and Systems Software	7 (70%)	*22 (32%)*	*15 (18%)*
IS'02.5 - Programming, Data, File and Object Structures	*2 (20 %)*	*4 (6%)*	*2 (2%)*

IS'02.6 - Networks and Telecommunication	8 (80%)	29 (42%)	*25 (30%)*
IS'02.7 - Analysis and Logical Design	8 (80%)	30 (43%)	*22 (26%)*
IS'02.8 - Physical Design and Implementation with DBMS	*3 (30%)*	*7 (10%)*	*4 (5%)*
IS'02.9 - Physical Design and Implementation in Emerging Environments	*5 (50%)*	*16 (23%)*	*11 (13%)*
IS'02.10 - Project Management and Practice	*0 (0%)*	*0 (0%)*	*0 (0%)*
Average Score	**6.2**	**27.7**	**27.4**

Table 82: Summary of how Case Studies considered can be used within courses of IS'01
(Items in italicised text indicate that the number of Case Studies in this area is below average)

Super-Categories	Categories	#	Case Title	A	B	C	D	E	F	G	H	I	J	K
Individual Responsibility					**X**	**X**		**X**		**X**	**X**			
	Accountability for actions				X	X				X				
		1	Levity of Libel		x	x				x				
	Breaking trust				X	X					X			
		13	Test Data		x	x					x			
	Deception				X	X					X			
		30	Car Sales Case		x	x					x			
	Duty				X	X		X			X			
		6	A Job on the Side		x	x					x			
		9	Charades		x	x		x						
	Lack of respect				X	X		X						
		9	Charades		x	x		x						
	Whistle blowing				X	X		X						
		4	Abort, Retry, Ignore		x	x		x						
Professional Responsibility					**X**	**X**	**X**	**X**		**X**	**X**		**X**	
	Arrogance of IS Professionals				X	X					X			
		16	Downtime		x	x					x			
	Breaking trust				X	X					X			
		13	Test Data		x	x					x			
	Consulting responsibilities				X	X					X			
		6	A Job on the Side		x	x					x			
	Deception				X	X					X			
		30	Car Sales Case		x	x					x			
	Duty				X	X		X			X			
		6	A Job on the Side		x	x					x			
		9	Charades		x	x		x						
	Inappropriate use of resources				X	X	X			X			X	
		5	Messages from All Over		x	x	x			x				
		7	The New Job		x	x							x	

Super-Categories	Categories	#	Case Title	A	B	C	D	E	F	G	H	I	J	K
	Lack of respect				X	X		X						
		9	Charades		x	x		x						
	Misuse of company resources				X	X		X		X				
		1	Levity of Libel?		x	x				x				
		19	Fingering Ethical Problem		x	x		x		x				
	Premature software release				X	X	X			X	X			
		11	Taking Bad with Good		x	x	x			x	x			
	Unprofessional behaviour				X	X	X			X	X			
		11	Taking Bad with Good		x	x	x			x	x			
Access and equity					**X**	**X**	**X**	**X**						
	Data access				X	X	X	X						
		4	Abort, Retry, Ignore		x	x		x						
		8	The Buyout		x	x	x							
	Unauthorised access				X	X		X						
		4	Abort, Retry, Ignore		x	x		x						
Quality of life					**X**	**X**	**X**			**X**	**X**			
	E-Mail				X	X	X			X				
		5	Messages from All Over		x	x	x			x				
		22	Email addresses issues		x	x								
	Overdependence on computers				X	X					X			
		16	Downtime		x	x					x			
	Virtual reality				X	X				X				
		18	Virtual Success		x	x				x				
System quality					**X**	**X**	**X**	**X**		**X**	**X**			
	Artificial intelligence				X	X				X				
		18	Virtual Success		x	x				x				
	Data access				X	X	X	X						
		4	Abort, Retry, Ignore		x	x		x						
		8	The Buyout		x	x	x							
	Ethics of development				X	X					X			
		13	Test Data		x	x					x			
	Expert systems				X	X				X				
		18	Virtual Success		x	x				x				
	Knowledge engineering				X	X	X			X				
		14	The Brain Pick		x	x	x			x				
Intellectual property					**X**	**X**	**X**						**X**	
	Copyrights				X	X	X						X	
		15	Trouble in Sardonia		x	x	x							
		23	Free Software Case		x	x	x						x	
		28	Allowing Access to Information		x		x							
		32	Risks of academic cheating by computer		x	x								
	Gray market				X	X	X						X	
		10	Laccaria and Eagle		x	x	x						x	

Super-Categories	Categories	#	Case Title	A	B	C	D	E	F	G	H	I	J	K
	International policy				X	X	X							
		15	Trouble in Sardonia		x	x	x							
		29	The Case of Borrowed Hardware		x	x	x							
	International trade				X	X	X						X	
		10	Laccaria and Eagle		x	x	x						x	
	Protectionist measures				X	X	X						X	
		10	Laccaria and Eagle		x	x	x						x	
	Software piracy				X	X	X						X	
		12	The Engineer and the Teacher		x	x								
		23	Free Software Case		x	x	x						x	
Privacy					**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	
	Duty				X	X		X			X			
		6	A Job on the Side		x	x					x			
		9	Charades		x	x		x						
	Offensive start-up screen				X	X							X	
		7	The New Job		x	x							x	
	Password theft				X	X		X						
		9	Charades		x	x		x						
	Privacy				X	X	X		X	X	X	X		
		3	Something for Everyone?		x	x			x			x		
		8	The Buyout		x	x	x							
		17	Code Blue		x	x	x				x			
		24	Culture Clash		x	x	x							
		26	Injured Administrator Issues		x	x	x			x				
		27	Deceased student issues		x	x	x			x				
	Unauthorised access				X	X		X						
		4	Abort, Retry, Ignore		x	x		x						
Risks and reliability					**X**	**X**	**X**			**X**	**X**			
	Artificial intelligence				X	X				X				
		18	Virtual Success		x	x				x				
	Technical limitations				X	X	X				X			
		17	Code Blue		x	x	x				x			
	Virus released in retribution				X	X	X			X	X			
		11	Taking Bad with Good		x	x	x			x	x			
Use of power					**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	
	Breaking trust				X	X					X			
		13	Test Data		x	x					x			
	Credit Bureaus				X	X						X		
		2	Credit Woes		x	x						x		
	Data recombination				X	X	X		X	X		X		
		3	Something for Everyone?		x	x			x			x		
		21	Chain letter		x	x	x			x				
	Inappropriate use of resources				X	X	X			X			X	

Super-Categories	Categories	#	Case Title	A	B	C	D	E	F	G	H	I	J	K
		5	Messages from All Over		x	x	x			x				
		7	The New Job		x	x							x	
	Info Rich vs. Info Poor				X		X							
		28	Allowing Access to Information		x		x							
	Misuse of authority and power				X	X		X						
		9	Charades		x	x		x						
	Misuse of company resources				X	X		X		X				
		1	Levity of Libel?		x	x				x				
		19	Fingering Ethical Problem		x	x		x		x				
	Poor school vs. rich engineering firm				X	X								
		12	The Engineer and the Teacher		x	x								
	Power in society				X	X					X			
		12	The Engineer and the Teacher		x	x								
		31	The Computer goes to Court		x						x			
	Sexual harassment				X	X							X	
		7	The New Job		x	x							x	
Integrity					**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	
	Accuracy				X	X	X			X		X		
		2	Credit Woes		x	x						x		
		20	Administrator Ethical Dilemma		x	x	x			x				
	Ethical impact study				X	X					X			
		16	Downtime		x	x					x			
	Gray market				X	X	X						X	
		10	Laccaria and Eagle		x	x	x						x	
	Inappropriate use of resources				X	X	X			X			X	
		5	Messages from All Over		x	x	x			x				
		7	The New Job		x	x							x	
	Keeping quiet				X	X					X			
		13	Test Data		x	x					x			
	Misuse of company resources				X	X		X		X				
		1	Levity of Libel?		x	x				x				
		19	Fingering Ethical Problem		x	x		x		x				
	Premature software release				X	X	X			X	X			
		11	Taking Bad with Good		x	x	x			x	x			
	Respect				X	X					X			
		6	A Job on the Side		x	x					x			
	The "dark side"				X	X				X				
		18	Virtual Success		x	x				x				

Table 83: How the Case Studies considered can be used within courses of IS'02

More resources regarding Case Studies can be found at:

http://www.computingcases.org/ and Pretorius and Barnard 2004:123

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