

Information Technology Ethics: The Conceptual Model of Constructs, Actions and Control Measure

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Abstract— With high speed broadband connection and new technological breakthrough, there are increasing trend of information technology abuse amongst users. Users seem to neglect laws and guidelines with their intentionally or not committing to the unethical actions. This article presents the model of constructs, actions and control measure with regards to social and ethical use of Information Technology in Malaysia. This research was performed based on literature review in the field of information technology ethics. A total of fifty literature was synthesized and a conceptual model of constructs, actions and control measure in computer ethics was developed. This conceptual model contributes a systematic understanding for scholars in computer ethics, as it could be used as a reference for future research in computer ethics especially in the conversion of negative to positive action by the use of a set of control measure. The conceptual model offers clear view and relation in classifying the actions, constructs and control measure in table format in viewing the computer ethics issues.

Keywords- *Computer ethics, constructs, control measure, negative action, positive action, unethical behavior*

I. INTRODUCTION

The study of ethics has long been debated as it falls in the ‘grey’ area of law. With constant technological breakthrough in the area of information technologies, new ubiquitous devices are introduced to the market. Many times, they do not come equipped with guidelines nor new law on the dos and don’ts. As a result the society are the receiving end of the wrath of this misfortune ranging from indecent exposure of privacy to hefty loses in business.

Ethics is the philosophical study of morality, a rational examination into people’s moral beliefs and behavior [1]. Moor [2] defined computer ethics as a field concerned with “policy vacuums” and “conceptual muddles” with regards to social and ethical use of information technology. The term computer ethics describes more narrowly as a category of professional ethics, similar to medical, legal and accounting ethics according to Baase [3].

With the widespread use of internet easy access downloads, copy and paste functions made it easier to violate the ethics of computer. Given the strong correlation between personality traits and ethical behaviors, Nor Shahriza et al. [4] identified that there are five personality traits that correlates with unethical internet behavior among university students. The five personalities mentioned are (1) agreeableness, (2) conscientiousness, (3) emotional stability, (4) intellectual and (5) extraversion.

The aim of this study is to synthesize the negative actions that represent the unethical actions, the constructs that cause the actions and control measure that could be used to control the unethical actions or to educate so that negative actions could be change to positive actions, or in other words ethical activities could be practice. This paper has analyzed 50 journal articles from previous literature that exclusively discussed issues in computer ethics. The literature are synthesized and grouped into three areas, namely Actions, Constructs and Control Measure. Based from a constructed literature map, a conceptual model is proposed and this model could be used

as a reference for future research in further investigating and validating the constructs, actions and control measure.

II. ISSUES IN COMPUTER ETHICS

Academic dishonesty in the current technology-rich environment is considered as a critical issue for higher education said Underwood & Szabo [5]. Gan & Koh [6] discovered the underlying factors of the perceptions of software piracy by surveying 500 students and staffs from three universities in Singapore. Software piracy is also rampant amongst computing students in Brunei, according to Rahim [7]. Two-third of the students surveyed admitted to using pirated software. Interestingly, students who originally supported copy right policy continue with their unethical behavior. In Turkey, according to Akbulut, et. al. [8], the internet plays a major role in unethical behavior such as fraudulence, plagiarism, falsification, delinquency and unauthorized help. In addition, [9], develop a scale known as Unethical Computer Using Behavior Scale (UECUBS) to determine the unethical behavior in using computer involving 216 computer technology undergraduates. A research using UECUBS was also carried out by Akbulut et. al. [10], relates unethical behavior using computer emphasizing on gender.

Information technology and a whole array of digital devices, with their astounding increases in speed, storage space, and connectivity, make the collection, searching, analysis, storage, access, and distribution of huge amounts of information and images much easier, cheaper and faster than ever before. These are great benefits but when the information is about us, the same capabilities threaten our privacy, according to Baase [3]. Among the issues in ethics within the academic environment that can be triggered by the internet are fraudulence, plagiarism, falsification, delinquency, unauthorized help and facility misuse as pointed out by Nor Shahriza et. al. [4]. This behavior poses as a problem because upon graduating, these students will fill in the computer professional positions in the country's effort to build a knowledgeable society. When the students accept their unethical behavior as a norm in the society, it is almost a certainty that these practice will continue in their working environment.

III. THE PROCEDURE

Figure 1 graphically describes the research process on how the conceptual model was derived. Initially, fifty literatures pertaining to computer ethics were analyzed and sorted into three different areas, namely; Actions (A), Constructs (C) and Control Measure (CM) into a literature map as shown in Figure 2. From the literature map, a conceptual model of ACCM was constructed. Actions contains all the unethical behavior that the users to information technology committed. Upon locating the behavior the second group, the construct group which will gather the reasons of why the users behaved as they did, will be constructed. Finally in the Control Measure group, literatures pertaining to ways to reduce the unethical actions are gathered. The Control measure group gathers the Professional Code of Ethics from around the world and other literature pertaining to Control Measure.

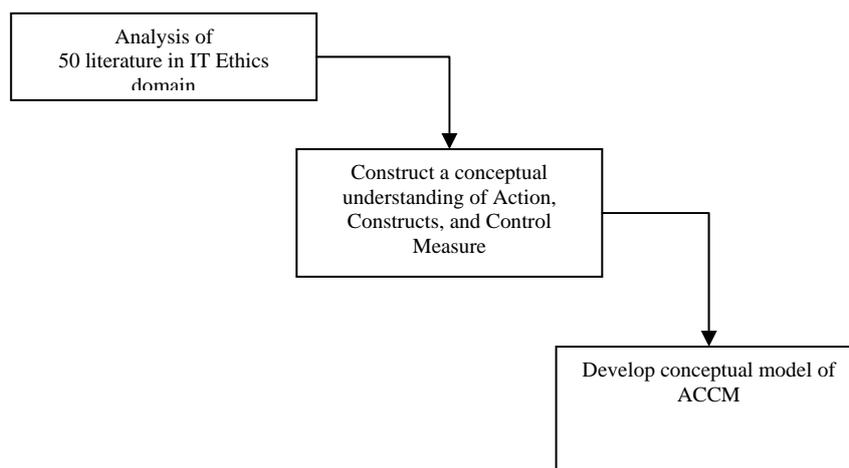


Figure 1. The Procedure.

I. CONCEPTUAL UNDERSTANDING OF COMPUTER ETHICS

As can be seen from the literature map in Figure 2, three significant areas in the study of computer ethics have been classified and grouped together. They are computer ethics actions, computer ethics constructs and control measure. The following sub-sections describe details of each classification.

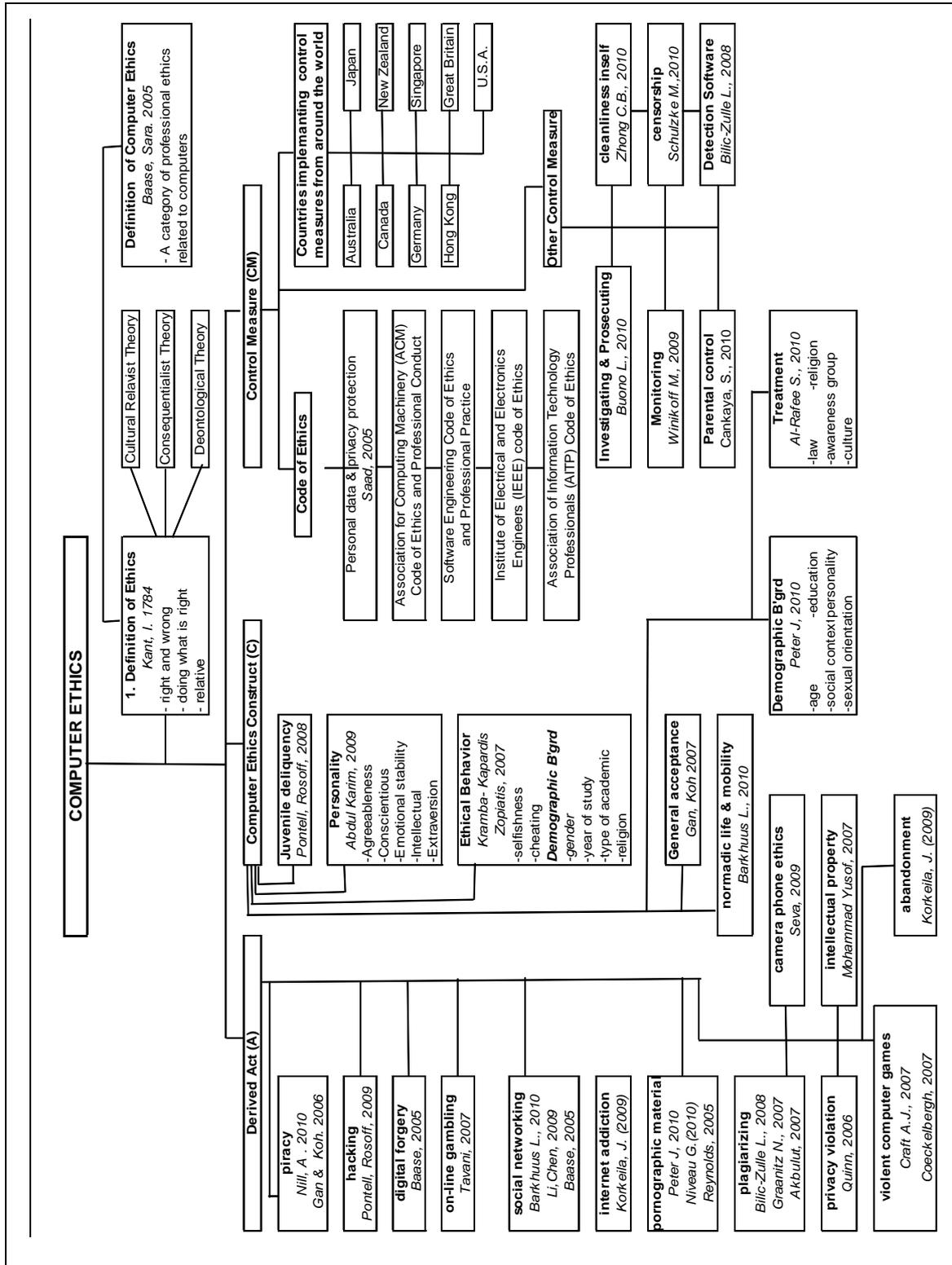


Figure 2. ACCM in Computer Ethics.

A. *Actions In Computer Ethics*

Actions is the behavior of users to information technology where action that they users performed deemed ethical. The action performed for example copying a disc without prior approval from the creator, is an unethical actions of piracy. From the literature, the actions in the domain of computer ethics is as the followings:

Shim and Taylor, as in Gan and Koh [6] discovered that about 90% of business school faculty members believed that their colleagues had duplicated software illegally. In the same study, the pirate profiles are defined by factors such as attitudes towards software publishers, software piracy acceptance, convenience, ethics and property rights protection. Thus piracy is one significant actions with regards to social and ethical use of information technology.

Several literature have also discussed on intellectual property. According to Baase[3] the key to understanding the intellectual-property is to understand the thing protected is the intangible creative work - not its particular physical form. Zawiyah et. al. [11] mentions that should the software are not pirated, the creator and the distributors are able to recover the capital rapidly thus encourages more upgrades for the future.

Much like piracy, with sophisticated computer hardware and software, digital forgery is now at an alarming rate. Desktop publishing systems, color printers and copiers, and image scanners enables crooks to make fakes with relative ease – fake checks, current passports, visas, stocks and bond. Photograph and video are evidence in legal proceedings said Baase [3]. These can be manipulated. Pontell & Rosoff [12] mentioned that with rapid technological transformations throughout the world, numerous opportunities for new form of crime have emerged, along with the acceleration of older forms.

New technologies and constant upgrading in gadgets, games, internet tends to keep users glued to the computer and sometimes even during office hours. Various surveys revealed high percentages of employees at business and government uses the internet for non-work purposes (79.8% - 90%). These are known as cyberslacking or cyberloafing. Amongst the non-work activities are visit to chat rooms, sports, on-line gambling, and stock investment sites In accordance to [3].

Furthermore, being unable to prioritize work from leisure have resulted the computer users to be addicted to computer and the internet. Korkeila [13] mentioned that harmful use of the internet could be defined as uncontrolled preoccupation or symptoms and use despite the impairment and distress associated with it. Korkelia, [13], further added that intensive use of the internet is associated with neglect of other important areas of life such as sleep, educational and vocational achievement, a range of other interest and social relation.

Internet addiction tends to lead to abandonment when the user continues to use the computer despite spending too many hours on the machine and neglecting other priorities. Male adolescents spend more than four hours with computer at home in a day as pointed out by Shields, Behrman (2000) as in Cankaya [14]. The prolong internet addiction could lead to abandonment as the computer user tend to neglect other responsibility and priorities.

Being connected with friends at almost all the time despite the distance is simply just wonderful. However, on-line communities like Facebook, MySpace and Bebo reveals the darker side of internet because users in online communities can, under the shield of anonymity, engage in behavior that would not be tolerated in most physical communities, according to Tavani [15].

Despite the internet being the base to many useful applications to users, it too has been a boon to the pornography industry by providing fast, cheap and convenient access to over 60,000 web sex sites. More importantly, access via the internet enables pornography consumers to avoid offending others or being embarrassed by others observing the purchase as mentioned by Reynolds [16]. Peter [17] believed that sexual curiosity peaks at adolescence may result their intense interest in sex and sexuality making them more attracted to the material than adults making them use it more often. Peter also mentioned that the better educated used sexually explicit internet material (SEIM). It is also proven that males access to SEIM more than females do. Peter, further reported that gays and lesbians considered that the internet a protected, safe space to express their sexual orientation. Niveau [18] conducted a study on the frequent but little known phenomenon of internet child pornography using information and materials obtained during forensic investigation. Niveau's study revealed a high rate of addictive tendencies particularly in the field of internet use.

Aside from providing easy access to pornography, with today's technology computer games can now be played with true to life graphics, sound animation and played in real-time with on-line opponents. It is easy to see how users can easily get addicted to computer games. Not all games are beneficial. Coeckelbergh [19] explained that most computer games involve virtual violence, but some have caused public moral outrage and can be called violent. Violent computer games seem not only to provoke violent thoughts and feelings, but aggressive anti-social behavior as well. Craft [20], discuss the case of computer game program EVE as a massively multiplayer on-line role-playing games where in the game the players are encouraged to commit virtual-theft and virtual betrayal. With these negative elements and in addition scantily clad models and some games practically offer nudity in the games as attraction to gamers.

In addition to entertainment, the computers and internet has also played a major role to students in universities to cheat. Since the introduction of computer and internet, students' dishonesty has always been an on-going debate. Digitized material available on-line have always tempted the students to plagiarize. Bilic-Zulle [21] discovers that warning of stern action imposed among the medical students significantly reduced the proportion of students plagiarizing. The copying is made even easier with the source document being available on-line. Granitz [22], are concerned that students displaying unethical behavior in school can lead to unethical behavior in business. Granitz [22] applied ethical theories like Deontological, Utilitarian, Rational self-interest, Machiavellianism, Cultural relativism and Situational ethics on to the subjects. Akbulut [8] believes that a correlation between the ease of access to information resources through the internet and the instances of plagiarism is expected. Akbulut further added that the internet serves as a ground which facilitates the spreads academic dishonesty.

The computer and internet have also opens up channel for hacker to invade other user's privacy. By giving people privacy can result harm to society. Some people take advantage of privacy to plan and carry out illegal or immoral activities. Most wrong doings takes place under the cover of privacy Quinn [1]. In addition to that, Baase [3] says that cameras in cell phones obviously have many valuable uses, but the fact that many people carry them affects our privacy in public and non-public places. Despite mobile phone today has practically changes the lifestyle of users, almost all comes equipped with digital and movie camera. These cameras can be used to unsuspectingly capture the images of subjects without prior consent, thus, invading their privacy. With broadband mobile network the images will be disseminated in matter of seconds.

From the above-mentioned literature, the actions in the domain of computer ethics could be concluded as piracy, intellectual property violation, hacking, digital forgery, on-line gambling, chatting, pornographic material, plagiarizing, privacy violation, violent computer games, internet addiction, abandonment and camera phone ethics.

B. Computer Ethics Constructs

This paper has also synthesized the constructs that contributes to the unethical actions by the computer users. Constructs is the combining the parts that builds up the actions, which explain the human behavior. From the literature, the followings have been synthesized as the computer ethics constructs:

To begin with, scholars have discussed on the demographic background being the most common constructs. Zopiatis & Kramba-Kapardis [23] investigated that in ethical behavior, the relationship between four retrained factors and variables such as gender, year of study, type of academic discipline and religion. Software piracy has led to significance dollar losses especially to developed countries such as U.S., France and Germany with high PC usage. According to Nili [24], there are six factors that influence software piracy in Germany. They are;

- i) Knowledge of external consequences of software piracy
- ii) Fear of personal legal consequences
- iii) Access to illegal software
- iv) Attitudes towards software piracy
- v) Social Norms
- vi) Demographics

Aside from demographic background as discussed in the previous paragraph, juvenile delinquency is a neglected category of lawbreaking has evolved in the computer age that both challenges and mimics characteristics and social patterns associated with the traditional white-collar offences. It involves the commission of computer crimes by youthful offenders, or what can be termed as "white-collar delinquency" as described by Pontell [12].

Personality plays a vital role in as a constructs as Nor Shahrizah [4] discovered the big five personality model in the relationship between internet ethics in university students. The big five factor, proposes that the individual characteristics, patterns of thinking, feeling, behaving and responding to environmental demands can be described in the term of their score on the five personality domains which are:

- i) Extraversion, refers to high activity, assertiveness and tendency towards social behavior.
- ii) Agreeableness or sociability refers to friendly, considerate and modest behavior.
- iii) Conscientiousness indicates an individual degree of organization, persistence, hard work and motivation in the pursuit of goal accomplishment.
- iv) Emotional stability person will possess values, morality, sense of direction, loyalty, duty bound, obedience to cultural norms, sense of altruism and emphatic.

v) Intellectualness. Individual with high intellect or openness to experience are characterized by being intelligent, creative, curious, having more perceptual ability and insightful.

In today's society general acceptance by the community as Gan and Koh [6] was able to identify the three groups that had been influenced by attitudes towards software publishers are general acceptance, convenience and ethics.

Another construct with regards to digital piracy, losses due to digital piracy have been growing at an alarming rate. Al-Rafee [25] suggests using different treatments in the effect of religion, law and awareness. Al-Rafee includes culture to be part of a construct.

Finally in constructs, juvenile delinquency, personality, general acceptance and treatment serves as constructs to computer ethics.

C. Control Measure In Computer Ethics

In order to curb the unethical behavior and action, several control measures have to be introduced. This area of literature analysis looks into areas that enable certain control be imposed on unethical behaviors that discourage the users from carrying out the actions. Among them are the guidelines on how to ethically use the information technology infrastructure.

Firstly, countries such as United States of America, Canada, Great Britain, Germany, Australia, New Zealand, Japan, Hong Kong and Singapore have specific Computer Code of Ethics for their country according to MacDonald [26]. These countries have code of ethics. These code of have been specifically designed to suit each country uniquely.

Secondly, there is Professional Code of Ethics which is universally meant for business and places that uses computer in their operations. These codes of ethics are able to spell out more common issues. Professional Code of Ethics such as Association for Computing Machinery (ACM) Code of Ethics and Professional Conduct, Software Engineering Code of Ethics and Professional Practice, Institute of Electrical and Electronics Engineers (IEEE) Code of Ethics and Association of Information Technology Professionals (AITP) Code of Ethics will be studied in order to recommend a guideline for the study.

Finally, other control measures are control measures synthesized from journals that offer solution to the unethical actions. To begin with is investigating and prosecuting with regards to cybercrime. Buono ([27] realize the need to train judges and prosecutors for the European Union as the author believes that the traditional legal assistance tools are highly ineffective and inadequate to combat cybercrime.

Among others, Cankaya [14] realized that the computers are vital tools for children to learn and as a source of entertainment. Despite the importance of computer there is a number of growing threats that youngsters should be shielded from. Therefore, Cankaya stresses the importance of parental control in order to protect the children from the malice of computer.

Another control measure that has been synthesized, as Zhong [28] believes ultimate cleanliness is the association between cleanliness and moral purity, which mean morally untainted. With cleanliness, one should be hindered from committing unethical actions.

A common and effective way to combat unethical actions is employee monitoring. This topic has been long debated as it tramples with employees' privacy, Baase [3]. Electronic monitoring capability and surveillance camera are debated as privacy invasion but they represent the best tool in supervising and evaluating employee.

In cases when one cannot be monitored, for instance gamers playing computer or video games at home, another solution is sought after. Violent video games and illicit material from the internet should be filtered by censorship board, Schulzke [29]. There are violence, sex and drug use of video games are all simulated to make the games appealing to the gamers. The games are labeled as 'violent games' and 'ultra violent games'.

Lastly, as a final control measure, Bilic-Zulle [21] discovered that the rate of plagiarism dropped drastically to the group of students who were warned that the essay will be checked for plagiarism by special detection software. The software mentioned here was WCopyfind.

From the above, it can be summarized that as for control measure, the list of Professional Code of Ethics and Code of Ethics from other countries can be use as example to combat violation of ethics. Other control measures are investigating and prosecuting, parental control, cleanliness in self, employee monitoring, censorship and detection software as illustrated in Figure 2, the control measure plays a vital role in changing the negative computer ethics behavior to a positive behavior.

II. DEVELOPING CONCEPTUAL MODEL ACCM IN IT ETHICS

Based from the literature map, a conceptual model of computer ethics is derived. As shown in Figure 3, the conceptual model consists of behavior and action, constructs and control measure. From the model, it is clear the

students are prone to conduct the unethical behavior and reason for their behavior is clearly shown by the constructs. How to overcome the problem is by adding the control measure. By introducing the control measure, it is hoped that the negative behavior would now be ethical behavior.

The novelty of the conceptual model is that it offers a researcher a clear idea in table form of what the problem is about (Actions), why the problem occurs (Constructs) and finally, how to curb the action (Control Measure). The conceptual model in Figure 3 clearly identifies and listed these in their respective table showing the relationship of unethical behavior. The table made it clear for the next research to pick out the constructs and apply each behavior constructs into a technology perceive behavior and observe the attitude for changes. The novelty of the model here is that most constructs are already listed along with its control measures.

For example, referring to the conceptual model, the actions of digital piracy, which takes into consideration of any digital piracy; movie, music or software piracy. The actions of copying without permission is a felony. To investigate why a person commits such crime is by referring to the table constructs. In constructs, a person may be of different demographic background, for example, by gender, male student commits more piracy compare to female student. As for age, the literature has highlighted that highest number of piracy committed is in the teenage years. Laws of the country emphasized that piracy is a crime and punishable by fine and jail term. However, if laws are not enforced, these actions will be more rampant. The public agreeableness may concur with the actions of piracy as they seemed to see that buying of pirated disc is not stealing. What the public see is the purchase of the tangible plastic disc. What they fail to see is the intangible content of the disc is not yet paid to the creator. Finally control measure that can be applied to curb the actions will be harsher laws and penalty.

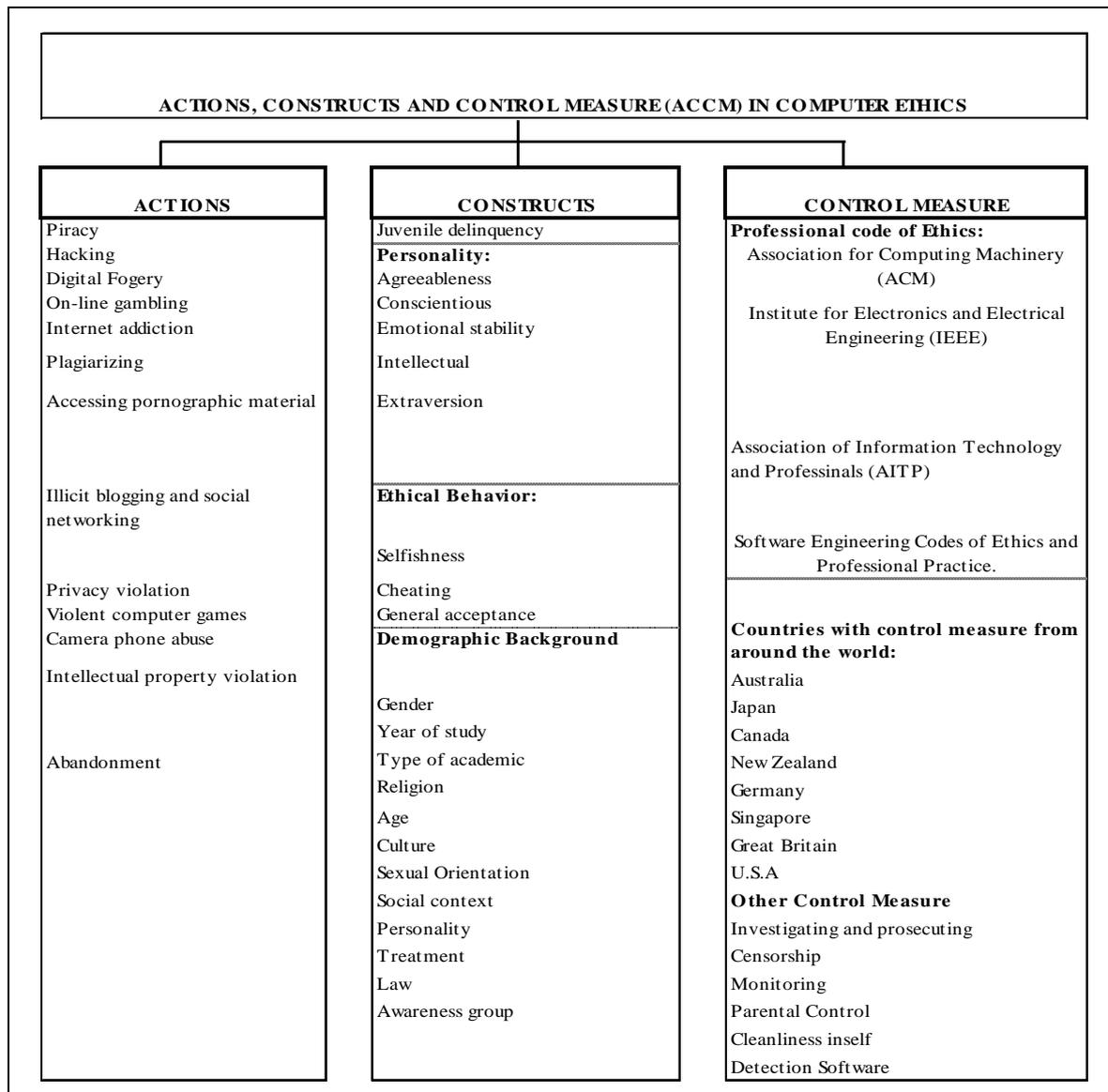


Figure 3. Conceptual Model of ACCM.

III. CONCLUSION

The constructs obtained from the conceptual model will be the basis of where more research in the area of behavior towards computer ethics should be based on. The constructs could be applied with for instance, the technology perceived behavior (TPB) and observe each constructs for response from subject. Upon identifying the unethical behavior, the proper control measure should be applied in order to turn the negative behavior to a more positive attitude in order to build a knowledgeable society. This enables the creation of code of computer ethics specifically for countries with deficiencies in computer ethics.

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