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Software piracy understanding, challenges, detection and prevention in higher education students of Ethiopia

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ABSTRACT

Software piracy is the unauthorized copying and distribution of software (Lee, 1994). According to Ping and Chang (2004), piracy is the unauthorized usage, transfer, copying and reproduction of copyrighted software. Piracy entails the violation of license agreements and transpires when you install, download, file share, issue or copy digitized data such as entertainment media and software programs with no consent from the owner or inventor. As software is getting more valuable, unauthorized users or malicious programmers illegally copies and distributes copyrighted software over online service provider (OSP) and P2P networks. Digital piracy as a continuing problem significantly impacts various stakeholders, including consumers, enterprises, and countries. The aim of this study is to understand student motives and drivers of piracy and provide insights into the ways individuals rationalize their behavior in regards to digital piracy. The increase of piracy has, of late, greatly affected the market for software applications (Andres, 2006). According to the International Planning Research Corporation (IPRC), the estimated world piracy rate for business software applications alone was 39% in 2002, leading to losses of $13.07 billion (IPRC, 2003). According to the first annual Business Software Alliance (BSA) & International Data Corporation (IDC) study in 2004, for every two dollars' worth of software purchased legitimately, one dollar's worth was obtained illegally.

Keywords: Software Piracy, Piracy detection, Piracy prevention

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1. INTRODUCTION

The widespread incidence of unauthorized use and copying of computer software has had a devastating impact on the software industry in recent years. Significantly costly time and effort is invested by software programmers in developing a program and with software piracy preventing these developers from recouping remuneration from users, the incentives existing to produce new software may not be sufficient enough for any further development, causing the industry to stagnate. This would be costly to not only computer programmers but also to the government who would miss out on a significant amount of taxation revenue and society as a whole, whose software choices would be diminished. The attitudes that students have regarding software piracy have been the subject of several studies. Christoph, Forcht and Bilbrey (1987) found that prior computer experience made no significant difference in their attitudes toward piracy. Cohen and Cornwell (1989a) replicated the study by Christoph et. al. and added additional questions asking respondents whether they themselves had engaged in software piracy and whether they consider it legal. Husted (2000) determined that several factors that comprise national culture influence the probability that someone will engage in software piracy; these factors includes level of economic development, income equity and cultural sense of individualism

The purpose of this study was to better understand and identify software piracy behaviors. The study begins with a discussion on software piracy followed by an overview of a survey conducted among students. The study mainly aims to answer the following questions.

1. What are the types of software piracy?
2. What are the key factors encouraging software piracy?
4. What measures can be taken to reduce software piracy?

Software piracy

Software is defined as a set of instructions which when incorporated in a machine readable form or in capable of causing a computer to perform a particular task. To put it simply, it is a series of commands which can be understood by the machine. There are three essential types of software which help to function the computer, micro code which is a program which controls the details of execution, the operating system software which controls the sources of a computer and manages routine tasks and which is a necessary requirement for a computer to function; application software which is designed to perform a particular task.

Piracy occurs when copyrighted software is made available to users to download without the express permission of the copyright owner. Such illegal software is offered over online sources such as online advertisements newsgroups bulletin board service and auction sites. Piracy hampers creativity, hinders the development of new software and local software industry and ultimately effects e-commerce. Piracy harms

consumers and has negative impact on local and national economy. Consumers run the risk of viruses and having corrupted and defective programs.

Software piracy is the unauthorized copying and distribution of software (Lee, 1994). Piracy takes place when individuals or groups of people make illegal copies of software with the intension of selling it for a profit. When someone installs a software application on a local area network (LAN) server, where employees can gain unlicensed access, that person makes him/herself guilty of committing corporate piracy. Reseller piracy, involves computer hardware, where companies sell computers with illegal copies of software preloaded onto their hard drives. Home piracy ranges from the distribution of illegal software, by trading disks with friends, family and colleagues, to running non-profit bulletin boards for distributing illegal software. Publisher patent and copyright infringement involve intellectual property theft, where one person copies material from another, without obtaining permission or acknowledging that they plan to profit from such action.

History of software piracy

Software Copyright Act of 1980, software was not recognized as intellectual property, so there were no laws against theft or reproduction. When the Computer Software Copyright Act was implemented, software was defined as "literary work," thereby making programmers the equivalent of modern day literary authors. So, digital piracy is much younger. When personal computers first came on the public market in the late 70s, the notion of what role software would play was very different from what it is today. In late 1989, the U.S Patent Office began to issue patents to software developers, giving birth to the notion that all digital media is the intellectual property of the author; therefore, the author owned the rights to the compiled program and the underlying source code. Software piracy's origins are very innocent in nature. Before pirated material became hot property, before the widespread use of the Internet, and even before laptops and CDs, there were computer geeks. Computer geeks are universal and are the forefathers of software piracy. Piracy began in the 1980s when computer technology was still new. Computer software was either for extreme hobbyists or large corporations. The few computer geeks lucky enough to have their own computers at home were few and far between. Computer geeks loved their computers and were proud to own such a marvelous piece of technology. Owning a computer meant you had the ability to solve complex mathematical equations at home, or run one of some 20 available commercial software packages at any time. Computer geeks flocked to local universities, which held monthly computer clubs where computer geeks met to share ideas and talk about their computers. At this point in time, few very people even knew what a computer was, let alone held a conversation about one, so, meeting another computer geek was a real treat. These computer clubs offered a way for club members to share the software that they had written with other members. Some of the first games ever developed were first shown off in computer clubs. It was in the social computer club environment that piracy first appeared. Although computer geeks had already invested a substantial amount of money in their home computers, most computer owners were not wealthy.

2. MATERIALS AND METHODS

2.1 Description of the Study Area

The survey approach was used to investigate trends in software piracy. A survey was conducted on members of 285(two hundred eighty five) students of college of engineering and technology, which are taken from each department of the college. A questionnaire was prepared and distributed to some of the students of CET, of samara university, Ethiopia. The first part of the questionnaire captured the demographics of the participants who participated in the survey. The demographics section collected details about individuals' age, gender, income, education and whether they own computers. The second part of the questionnaire focused on the reasons for using pirated software, the tasks performed using pirated software and participants' consumer behavior. It also focused on their knowledge of software piracy, e.g. whether they could spot the difference between original software and illegal software, whether they were aware that their computers might have illegal software loaded onto them and also focusing on the easiest ways to obtain illegal software. A letter was included with the questionnaire explaining to participants what the questionnaire is about. The letter mentioned that the results would only be used for research purposes and that they would be treated confidentially. This ensured that participants would not shy away from participation.

2.2 Research questions

Even though a number of studies have investigated software piracy among students in several countries, little information is available about why and what proportion of the computing students in a South East Asian country like Brunei Darussalam, use pirated software. It is also not clear whether the factors as identified by past studies are applicable to explain software piracy among Bruneian students. It is because Brunei Darussalam is culturally very different from Europe, US and Hong Kong. Against this backdrop, this study was initiated to address the following research questions:

1. What proportion of computing students use pirated software?
2. What are the tasks that computing students perform with pirated software?
3. What are the reasons for using pirated software by computing students?
4. What are the factors that are related to computing students' use of pirated software?

3. RESULT AND DISCUSSION

3.1 Gender based usage of pirated software

Eighty eight percent (88%) of the population sample falls into the age group of between 18 and 23 years. Of this specified group, 55 per cent are illegal software users, 25 per cent are legitimate users and 20 per cent are unsure if they have illegal software on their computers.

TABLE 1 PROFILE OF PARTICIPANTS

Profile of participants	%
Gender	
Male	63.14
Female	36.86
Age	
18 years and younger	11.76
Between 18 and 23 years	88.24
23 years and older	0.00
Income	
200Birr or less	61.90
Between 200Birr-500Birr	23.81
Between 500Birr-1000Birr	9.52
More than 1000Birr	4.76
Education	
Education of any type in computer	100.00
No education of any type in computer	0.00
Computer ownership	
Own a computer	95.24
Does not own a computer	4.76
Pirated software	
Bought pirated software	98.95
Has not bought pirated software	1.05
Probability pirated software can fail	48%
Difference between illegal and original software	
Can spot difference	42.86
Cannot spot difference	57.14

TABLE 2 SURVEY OF PARTICIPANTS

	Percentage		
Age	**Legal**	**Illegal**	**Not sure**
18 years and younger	-	100.00	-
Between 18 and 23 years	5.00	79.00	11.00
23 years and older	-		-
Gender			
Male	4.5	86.77	8.73
Female	12	74.84	13.16
Income			
200Birr or less	3.18	93.5	3.32
Between 200Birr and 500Birr	10.00	80.00	10.00
Spot difference			
Can recognize difference	13.33	75.56	11.11
Cannot recognize difference	16	68.65	15.35
Believe that pirated software can fail	69.05	44.00	58.00
Past purchase behaviour			
Bought pirated software before	-	75.00	25.00
Haven't bought pirated software	19.41	62.94	17.65
No education in IT	50.00	50.00	-
Computer owner ship			
Own a computer	3.81	77.14	19.05
Do not own a computer	-	-	-
Education			
Education in IT	7.69	61.54	30.77
No education in IT	50.00		50.00 -

3.2 Income based usage of pirated software

According to the original results, 62 per cent of the population sample have a monthly income of 200Birr or less, 24 per cent have an income between 200Birr-R500Birr, 10 per cent between 500Birr -R1000Birr and 5 per cent earn more than 1000Birr (Table 1). It was decided to normalize income groups by removing the income group, "Between 500Birr - R1000Birr" and "More than R1000Birr" from the analysis for statistical purposes, because only two persons and one person, respectively, made up each category. This created two categories for the purposes of analysis. Of the normalized income group that earns 200Birr or less, 23 per cent are legitimate users, 54 per cent are illegitimate and 23 per cent are not sure whether they have pirated software on their computers. Of the income group that earns more than 2000Birr, 40 per cent are legitimate users, 40 per cent illegitimate users and 20 per cent are not sure whether they have illegal software on their computers. There appears to be a weak relationship between an individual's income and his/her use of pirated software (the correlation was measured as 50 per cent). There was a probability of 90 per cent that a person earning a low salary will use pirated software.

3.3 Computer Ownership Based Usage of Pirated Software

The results showed that just one person in the sample did not own a personal computer. According to the sample group, of those that own a computer, 4 per cent are legal users, 77 per cent are illegal users and 19 per cent are not sure whether they have illegal software on their computer (Table 2). It can be stated that there is a relationship between computer ownership and the use of pirated software. The probability that computer owners will use illegal software is nearly 96 per cent.

A person who owns a computer is likely to spend more time on a computer (Rahim *et al.*, 2000). Such a person will perform a wider variety of tasks than someone that does not own a computer. To obtain a wider variety of software, the person is likely to obtain software from various sources, some of which could be illegal software. It can be argued that there is also little or no supervision on the use of software when people are working in their own privacy. This could in turn encourage the use of pirated software. The theory is thus supported by the findings.

3.4 Education Based Usage of Pirated Software

Since the study is held at Higher Education College of engineering and technology, the results show that 100 per cent of the population sample had some form of IT education and 0 per cent no IT education (Table 1). Of the 100 per cent of computer literates in the sample, about 7 per cent are legal users of software, 62 per cent are illegal users of software, while 31 per cent of them are not sure whether they make use of pirated software. The results show that IT educated people make greater use of illegal software.

Tan (2002) *cites* Solomon and O'Brien, who note that educational background, amongst other demographics of consumers, is significantly correlated with their

attitude towards software piracy (Tan, 2002). People who have limited experience with computers are likely to perform routine tasks only and are unlikely to try a wider variety of software programmes (Rahim *et al.*, 2000). People who have more experience with computers have greater knowledge of software use. The frequency and duration of software use of these people will increase and therefore they will be more likely to use a wider variety of software. Computer-experienced people are more likely to use pirated software. The results in this study therefore support the theory, but not that significantly.

4. RESEARCH FINDINGS

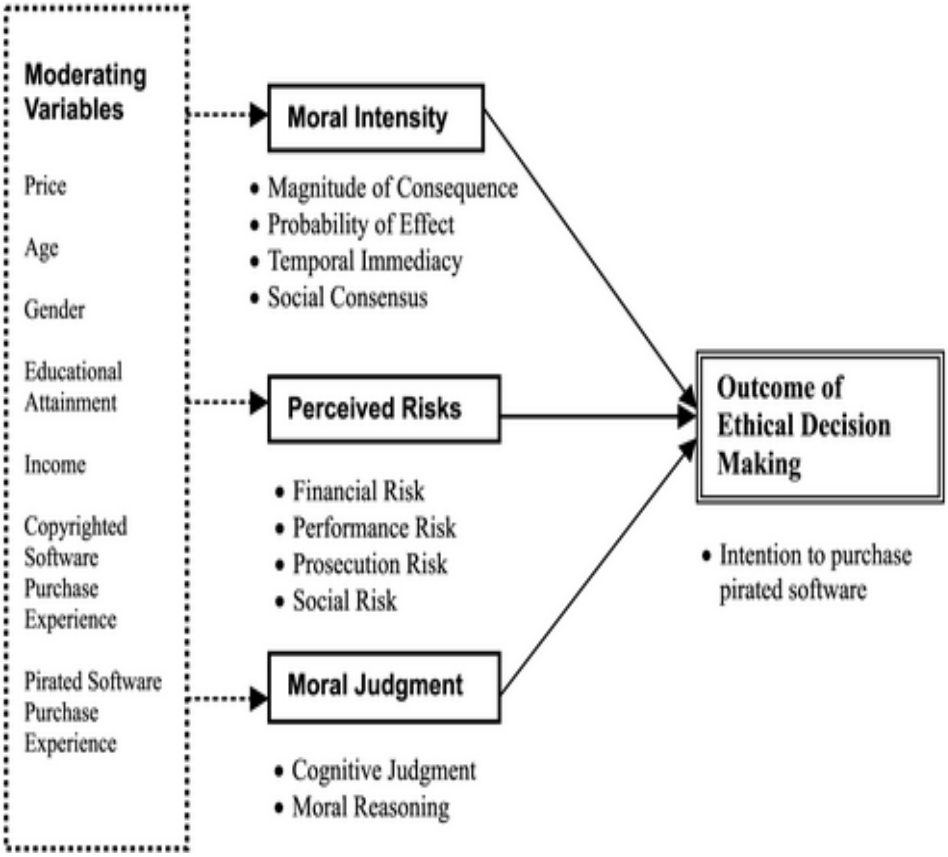
Students are likely to continue consuming pirated materials, even when they aware of their adverse effects on the economy, and links to organized crime. Consumption patterns for pirated products were not homogeneous. Different consumer profiles had different decision-making processes. Influencing factors included age, purchasing power, education and the perceptions of the environment.

Price was not a fundamental variable; it was only relevant to a group of consumers in certain contexts. Physical pirated products were mainly bought in flea markets and open markets. While pirated products might be marketed through all sales channels, they were less likely to penetrate highly centralized value chains and sales channels such as department stores, because of more rigorous quality controls.

The Internet and the rise of social networks have been crucial to the consumption of digital piracy in Ethiopia.

When the surveyed participants were presented with examples of illegal or unethical activities, they considered them all to be worse than piracy, including activities such as telling lies or stealing a loaf of bread or a sweet. This suggests that there is a fairly widespread social acceptance of piracy, even though most people know that it is illegal. The phrase "*it's illegal, but not serious*" probably best sums up the attitude towards piracy in Ethiopia. Also, the study also detected two reasons for illegal acts: they were believed to have **no consequences** or they were **not considered serious**. It is also important to mention the endogenous component in the answers about the reasons for consuming pirated products.

FIGURE 1: RESEARCH FINDINGS



5. CONCLUSION

Software piracy is the one of the serious issue in Ethiopia among students. Knowingly or unknowingly they are committing cybercrime. Following preventive measurements and recommendations can be used to stop the software piracy among students.

Preventive measures

This section focuses on several efforts that have been made to reduce worldwide software piracy. The following are some of the measures.

i. Understanding proper use of software and the law
ii. Increasing public awareness and education
iii. Open Source Software

6. RECOMMENDATION

i. Consumers are particularly receptive to deterrent messages that emphasize the **negative effects and risks** that consuming pirated products imposes on individual wellbeing, especially concerning health and safety risks.

ii. Consumers are also receptive to messages that make the connection between the sale of counterfeit or pirated products and the activities of **organized crime.**

iii. **Avoid oversimplifying the phenomenon** of piracy. It is a multifaceted problem of serious dimensions.

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