The Demographic Factors Affecting University Students' Intention to Pirate Software

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Abstract: As the requirement to use computers increases, software piracy is increasing, yet little research has been conducted in South Africa to investigate the reasons why students pirate software. This paper reports on a study on the demographic factors affecting students' intention to pirate software. The study was carried out on students at the University of the Witwatersrand using questionnaires. It was found that gender and an individual's level of study had the most significant effect on intention to pirate, with academic discipline and level of household income having the least significant effect. Educational campaigns on the ethics and consequences of piracy are recommended.

Keywords: Software Piracy, Demographics, Students, Ethics, South Africa.

1 Introduction and Background

The use of technology has become necessary for our everyday lives [1], resulting in an increasing demand to use software. As the technology needed to pirate software has become cheaper and more efficient, piracy is increasing [2]. Worldwide, the piracy rate has increased from 38% in 2007 to 41% in 2009 (South Africa's piracy rate is 35%) and losses for the software industry grew by 5% (US$ 50.2 billion) [3].

Although some research has indicated that piracy assists diffusion of software and therefore "levels the playing field" for developing countries [4], other research has shown that piracy inhibits diffusion and so obstructs emerging countries [5], cited by [6] and [7]. Gopal and Sanders [8] suggested that developing countries may encourage or ignore piracy to allow cheaper access to technology.

Piracy can be defined as the "unauthorized use of computer software or the unauthorized distribution of copies of software without permission given by the owner" [9, p. 34]. It is regarded as both an illegal activity [1, 10] – taking an individual's property without consent or compensation is stealing – and an ethical issue [11, 12] – piracy may be regarded as a victimless and/or harmless act, seen as less ethically serious than the theft of physical property. This view may result in the erosion of ethics and individuals may resort to other such victimless or harmless practices [13].

Governance of Information Technology (IT) requires that assets and resources are managed to ensure that business goals are met, yet the escalating dependence on IT can result in increased risks for business [14]. Unethical behaviour by employees can

have serious outcomes for businesses – a critical issue for managers who are responsible for their employees' workplace behaviour [15].

Schilhavy and King [15] suggest that professional behaviour starts developing already in the educational system. As little piracy research has been done on students in South Africa, there is a need to investigate the factors that affect the intention to pirate software and whether the factors found overseas apply to South African students. In addition, as technology diffusion increases around the world, intellectual property rights for software are of increasing concern for both researchers and businesses [7].

As many courses require students to use computers, students' demand for software increases. However, students typically do not have much disposable income to acquire the software that they require; they may therefore resort to piracy as they often have the tools and know-how to do so [2]. Gan and Koh [16] and Van Belle, Macdonald and Wilson [17] suggested that piracy is highest among young people, with much of it happening at universities. In addition, Christensen and Eining [18] and Gattiker and Kelley [19] found that students pirate software because they believe it is reasonable or acceptable to pirate. Recent research has started to show that there are students who believe it is not illegal to make copies of software [6, 20], while there are others who believe it is acceptable to use "free" trial software versions for indefinite periods [16].

So, what are the factors behind this reasoning on the part of students? This paper reports on a study that explored the demographic factors that affect students' intention to pirate software.

1.1 Intention and Demographic Variables

Higgins [21] stated that intentions are an indication of how ready a person is to perform a specific behaviour. Ajzen [22] found that the greater the intention to perform an act, the greater was the probability of the behaviour actually taking place. Here, we examine six different variables and how they are treated in the literature in relation to software piracy.

Age. A large amount of research has looked at age and the effect it has on a person's acts of piracy. While Cronan, Leonard and Kreie [23] found that age was not a significant factor, Gopal and Sanders [24], Mishra, Akman and Yazici [25], Bhattacharjee, Gopal and Sanders [26] and Cronan, Foltz and Jones [27] found that younger students were more likely to pirate software than older students. In addition, Gan and Koh [16], Bachman [28], Seale, Polakowski and Schneider [29] and Kwong, Yau, Lee, Sin and Tse [30] found that age is inversely related to the amount an individual pirates software while Masrom, Ismail and Hussein [31] and Cronan and Al-Rafee [32] found a direct relationship between the age of a person and the extent to which that person may pirate.

Gender. Males are more likely to pirate software compared to females according to Chiang and Assane [2], Simpson, Banerjee and Simpson [10], Van Belle, Macdonald

and Wilson [17], Siponen and Vartiainen [20], Bhattacharjee, Gopal and Sanders [26], Cronan, Foltz and Jones [27], Bachmann [28] and Kwong et al. [30]. However, Gopal and Sanders [24], Mishra, Akman and Yazici [25] and Al-Rafee and Cronan [33] found no correlation between gender and the decision to pirate software.

Price. The price of software is seen to be a major factor in determining a person's intention to pirate software [34, 35]. The higher the price, particularly if the gap between the price of legal and illegal software is great, the more individuals are likely to pirate rather than purchase software [11, 34, 35, 36, 37] especially when income levels are low [8].

Level of Household Income. Research into this determinant of intention to pirate has had mixed results. It is generally thought that as the level of household income increases, the amount of software pirated would decrease. However, Cheng, Sims and Teegen [36] and Rahim, Seyal and Rahman [38], cited by Liang and Yan [39], found only a weak relationship between household income and an individual's intention to pirate software. Gan and Koh [16], Kwong et al. [30], and Rahim, Seyal and Rahman [40] found no correlation between these variables. On the other hand, Lau [9], Mishra, Akman and Yazici [25] and Coyle, Gould and Gupta [41] found a significant relationship between income and the reasons for using pirated software. When software has a high price relative to income, it makes economic sense to purchase hardware and rely on pirated software [8].

Academic Discipline. This factor looks at the major subject or discipline that a student is studying. Wong, Kong and Ngai [42], cited by Liang and Yan [39], determined that students with majors in Science and Computer Studies were more likely to pirate software than students with business majors. However, no relationship between the courses studied and intention to pirate was found by Simpson, Banerjee and Simpson [10] and Gan and Koh [16].

Computer Ownership. Individuals who have their own computer spend more time using computers than those who do not. This allows those owners to become more knowledgeable about computers, including how to pirate software. Seale, Polakowski and Schneider [29] and Rahim, Seyal and Rahman [40] found that individuals who own a computer are more likely to use pirated software, but Kini, Ramakrishna and Vijayaraman [43] found that an individual who owned a computer had a higher level of moral intensity.

Personal Computer Experience. This variable looks at a student's familiarity with a computer (measured in the number of years of use). Students who do not have much experience of computer use are more likely to use a computer only for what their tasks and assignments require [40]. Cronan, Foltz and Jones [27], Malin and Fowers [44], and Seyal and Rahman [45] found that the more familiar a student is with a computer, the more likely the student will be to pirate software. In contrast, Kini,

Ramakrishna and Vijayaraman [43] found that the relationship between experience and piracy was insignificant.

As a result of these conflicting findings about the impact of a variety of variables on a student's intention to pirate software, and the increasing software needs of "dishonest" students, it is deemed important to undertake research into the reasons why students pirate software. Little research has been done on the impact of ranges of variables on students' intention to pirate software in a South African context. Understanding the determinants of piracy may help to identify the target audience(s) for educational campaigns (which may assist in curbing software piracy) and assist employers in understanding the graduates that they employ.

2 Methodology

Approximately 400 questionnaires were distributed to university students at University of the Witwatersrand, via an online posting and handouts. Participation was voluntary and anonymous. The questionnaire targeted both undergraduate and postgraduate students, across the university's five faculties (Commerce, Law and Management, Humanities, Science, Engineering and the Built Environment and Health Sciences). Students were excluded if they were first-time computer users; the remaining respondents were students who may or may not have pirated software before. A total response rate of 62% was achieved, with the majority of respondents being undergraduate (90.7%) males (53.7%). The age of respondents varied from 18 to 25 for undergraduates (118 males and 104 females) and 21 to 31 for postgraduate students (13 males and 9 females). The majority of the respondents (88.2%) owned a computer or laptop and 51.4% had used a computer for 10 to 18 years. The majority of students (43.6%) responded that their total household income was R100 000 or more and 12.8% were in the range of less than R20 000, which showed a diversity of economic backgrounds (this represents monthly income)[1].

Besides the demographic questions, the questionnaire contained five questions which tested the respondent's intention to pirate software, namely: I intend to copy software in the near future; I will try to copy software in the near future; I will not make an effort to copy software in the near future; If I had the opportunity, I would commit software piracy; I would never commit software piracy. The questions were adapted from Goles et al. [13], Cronan and Al-Rafee [32], Peace, Gallette and Thong [46], and Limayem, Khalifa and Chin [47]. These were measured using a 7 point Likert scale from Strongly Disagree to Strongly Agree. Pearson's correlation coefficient analysis, an independent samples t-test and a one-way ANOVA were used to explore the relationships between the demographic factors and the intention to pirate.

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[1] At the time of writing there are around eight South African rand to the American dollar, nine to the euro, and seven to the Australian dollar.

3 Findings and Discussion

Here we explore the questionnaire findings in relation to the appropriate variables indicated in the literature.

Age. Pearson's correlation coefficient analysis was used to look at the relationship between age (M=20.24, SD=1.945) and the intention to pirate (M=4.2057, SD=1.51321). The correlation was statistically significant (r=0.356, p<0.01), showing a strong positive relationship between age and intention to pirate. A scatter plot is shown in Figure 1.
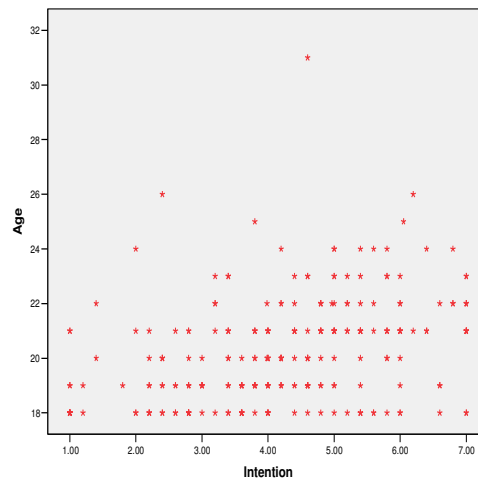

Fig. 1. Relationship between Age and Intention to Pirate.

Past research has yielded contradictory findings on the effect that age has on a student's intention to pirate software. The findings of this study are consistent with the results of Gan and Koh [16], Bachman [28], Cronan, Foltz and Jones [27], and Kwong et al. [30], which suggested that age has a significant impact on an individual's intention to behave ethically or unethically. Specifically, the findings suggest that age has an inverse direct effect on a student's intention to pirate software. The results were confirmed by an independent samples t-test that was carried out to compare the effect of level of study (undergraduate vs postgraduate) on intention to pirate. It was found that there was a significant difference in the scores for undergraduate students (M=4.1187, SD=1.49772) and postgraduate students (M=5.2091, SD=1.39588); t=3.277, p<0.05. These findings suggest that as students mature, their level of moral intensity increases and perhaps they are more aware of the effects and consequences of pirating software. It would also suggest that younger students should be the target of educational campaigns.

Gender. An independent samples t-test was carried out to compare the effect of gender on intention to pirate. There was a significant difference in the scores on intention to pirate for males (M=4.9001, SD=1.36831) and females (M=3.4243, SD=1.28455); t=8.678, p<0.05.), suggesting that gender does have a significant effect on intention to pirate. The relationship is shown in Figure 2.
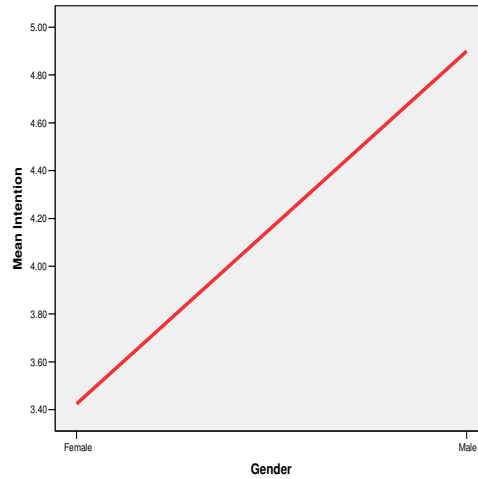

Fig. 2. Relationship between Gender and Intention to Pirate.

The findings of this study which show a significant relationship between gender and intention to pirate software are consistent with prior research by Chiang and Assane [2], Simpson, Banerjee and Simpson [10], Siponen and Vartiainen [20], Bhattacharjee, Gopal and Sanders [26], Cronan, Foltz and Jones [27], Bachmann [28], and Kwong et al. [30]. Specifically, the results reveal that males are more likely to pirate than females, which would suggest that males should be targeted in any anti-piracy education campaign.

Price of Software. An independent samples t-test was carried out to compare the effect of price of software on intention to pirate. There was a significant difference in the scores for respondents who believe that the price of software affects their decision about original software (M=4.4507, SD=1.44571) and those who do not (M=3.3623, SD=1.4827); t=4.828, p<0.05, which suggests that price does have a significant effect on intention to pirate. The relationship is shown in Figure 3.

The results of this study are consistent with the findings of Hsu and Shiue [34], Moores and Dhaliwal [35], Tan [11], Cheng, Sims and Teegen [36], and Miyazaki, Rodriguez and Langenderfer [37], which suggest that the price of software is a determinant in an individual's decision whether or not to pirate software. In order to succeed educationally, a student may need to work with various software packages. On a limited income, he or she may turn to piracy as a way of obtaining the software

required. To curb software piracy which takes place for this reason, software development companies should consider lowering the price of software, and/or increasing the software's perceived value by marketing the product better, and/or insuring a better product so the student perceives value for money. Alternatively, cheaper student versions of software could be made available, while retaining the various capabilities that students require. This would be particularly important in developing economies where cheaper access to technology is needed.
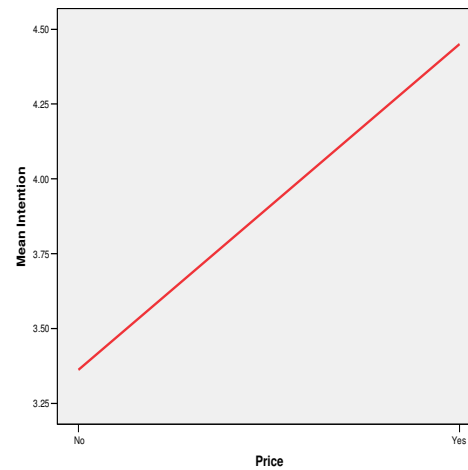

Fig. 3. Relationship between Price of Software and Intention to Pirate.

Level of Household Income. A one-way ANOVA between subjects was explored to compare the effect of income on intention to pirate at different income levels. There was no significant effect of income on intention to pirate at the $p>0.05$ level for the different levels of income. The findings were consistent with those of Gan and Koh [16], Kwong et al. [30], and Rahim, Seyal and Rahman [40] who found no correlation between income and pirating of software, yet they were expected to be similar to the findings of Lau [9], Mishra, Akman and Yazici [25], and Coyle, Gould and Gupta [41] who did find a significant relationship. It is important to note that students may not have known the answer to this particular question; as they were not given the opportunity to ask their parents for financial information, some students may have guessed or estimated the answer about the level of their household income.

Academic Discipline. A one-way ANOVA between subjects was explored to compare the effect of academic discipline on intention to pirate in Commerce, Engineering and the Built Environment, Health Sciences, Humanities and Science which represent the different faculties at the University of the Witwatersrand. There was no significant effect at the $p>0.05$ level for the different faculties. The study expected to find results consistent with those of Wong, Kong and Ngai [42], cited by

Liang and Yan [39], who found a relationship between the major discipline of study and intention to pirate, but instead the findings were consistent with Simpson, Banerjee and Simpson [10] and Gan and Koh [16]. Irrespective of their choice of faculty, students are required to be familiar with computers and are required to use software. Although it might be believed that students in Engineering, Science and perhaps Commerce (doing courses that require software for systems design or programming, for example) may be more likely to pirate (since their courses demand more software to be used), an interesting finding of this study was that the Humanities faculty respondents had the greatest intention to pirate software. (The results, however, could be skewed due to the smaller number of student respondents from the university's Humanities faculty.)

Computer Ownership. An independent samples t-test was carried out to determine the effect of computer ownership on intention to pirate. There was a significant difference in the scores on intention to pirate for students who own a computer ((M=4.2939, SD=1.49392) and students who do not own a computer (M=3.6345, SD=1.60095); t=2.214, p<0.05. This suggests that ownership of a computer has a greater influence on students to pirate software. The relationship is shown in Figure 4.
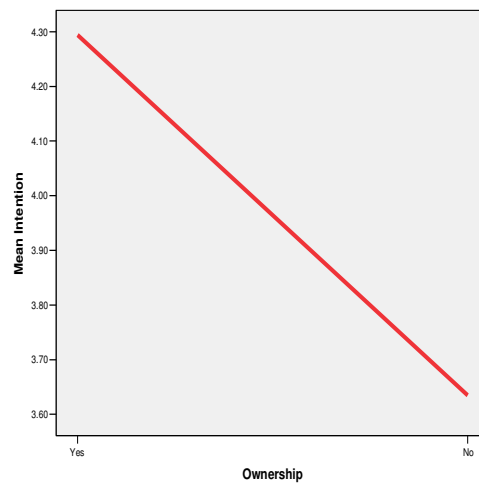

Fig. 4. Relationship between Computer Ownership and Intention to Pirate.

The findings of this study are consistent with the results of studies done by Seale, Polakowski and Schneider [29] and Rahim, Seyal and Rahman [40]. They indicate that individuals who have their own computers are more likely to pirate software. Students would want their own copies of software and the mechanisms to monitor the actions of individuals on their own computers are inadequate. As the price of computers decreases, more people will purchase their own computers which may result in a need to educate computer owners about the effects and consequences of

piracy. Once again, this would suggest that education about software piracy should start earlier as individuals would start using home computers at an earlier age.

Personal Computer Experience. Pearson's correlation coefficient analysis was used to look at the relationship between the number of years a student has used a computer (M=9.07, SD=4.815) and intention to pirate (M=4.2057, SD=1.51321). The correlation was found to be statistically significant (r=0.232, p<0.01), which suggests a strong positive relationship between personal computer experience and intention to pirate. A scatter plot is shown in Figure 5.
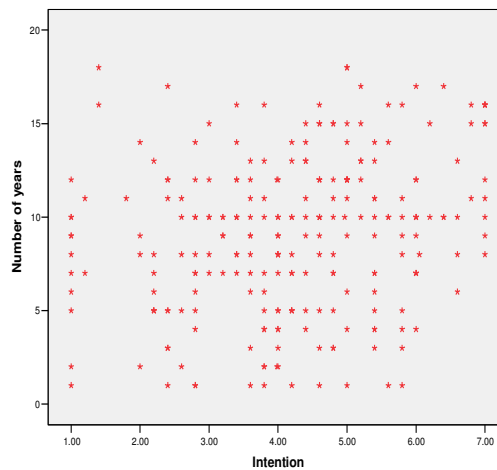

Fig. 5. Relationship between PC Experience and Intention to Pirate.

The results are consistent with the findings of Cronan, Foltz and Jones [27], Malin and Fowers [44], and Seyal and Rahman [45]. They reveal that the longer a student has used a computer, the greater his/her intention to pirate software. This could be a consequence of the student being more familiar with how to pirate and/or increasing needs for software. As young people will increasingly be using computers from a younger age, there will be an increase in piracy: this suggests that perhaps education on computer-related ethics and the effects and consequences of piracy should begin even earlier than at the tertiary level.

4   Conclusion

Software piracy is increasing and is of great concern. Students need more software at a life stage when they usually cannot afford it. This study has explored the demographic factors that affect University of the Witwatersrand's students' intention

to pirate software, with gender and level of study having the most significant effect and academic discipline and level of household income having the least significance.

This study measured intention to pirate as opposed to actual piracy behaviour, although intention is seen to be a good predictor of behaviour. Although measurement of piracy acts may be more accurate, it could raise the challenge of underreporting of piracy due to the illegal nature of that piracy. The accuracy of the variable relating to the level of household income, which some students may have guessed, is a further limitation of this study.

One of the strongest recommendations that can be taken from this study is the need for students in developing economies (including South Africa) to be educated in and become aware of the ethical norms expected of them, as they move from tertiary education into the business world that operates globally. This includes understanding and respecting intellectual property rights and the ethics of software piracy. Such an understanding would enable students to understand clearly the implications and consequences of pirating software and why piracy is regarded as unethical. Similarly, businesses need to know the standard of graduate who is entering the workplace, as part of the management of their IT assets and resources. This study would suggest that educational campaigns should target younger people who own computers, particularly males.

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