2000

Software piracy: Attitudes & opinions of computer users and implications for software manufacturers & consumers

Bharath Pola

University of Northern Iowa

Follow this and additional works at: https://scholarworks.uni.edu/pst

Let us know how access to this document benefits you

Recommended Citation

https://scholarworks.uni.edu/pst/126

This Open Access Presidential Scholars Thesis is brought to you for free and open access by the University Honors Program at UNI ScholarWorks. It has been accepted for inclusion in Presidential Scholars Theses (1990 – 2006) by an authorized administrator of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.
Software Piracy: Attitudes & Opinions of Computer Users and Implications for Software Manufacturers & Consumers

Bharath Pola
Computer Science
Presidential Scholars Program
University of Northern Iowa
Software Piracy
Attitudes & Opinions of Computer Users and Implications for Software Manufacturers & Consumers

Introduction

Computer software became registered as a form of literary expression by the United States Copyright Office in 1964. By 1980, the Copyright Act was amended to explicitly include software applications. Today, it is illegal to create copies of original program disks without express permission from the manufacturer (Microsoft 1994). The Software and Information Industry Association (SIIA) states that $2.4 billion worth of copyrighted software was pirated in 1990. This figure represents almost one-half of the total revenue of the software industry for that year. An additional $10 to $12 billion was lost to pirates overseas. However, such statistics maintained by the SPA and other anti-piracy organizations, including the Business Software Alliance (BSA), have long been disputed by opponents as unwarranted exaggerations.

Product pirating is a major issue in terms of loss of sales across many industries, including computer software, pharmaceuticals, movies, audio, and books (Givon, Mahajan, and Muller 1995). However, the problem has been said to be most sensitive for the software industry (Givon, et al. 1995; Sims, Cheng, and Teegen 1996). Software piracy is extremely widespread and is global in nature (Barton and Malhotra 1993). Recent estimates of lost sales have exceeded $11 billion in 1996 (www.spa.org/piracy/releases/96pir.htm 1997). Yet for all this loss of sales through piracy, some researchers insist that the market
for software is expanded by software piracy (Givon et al. 1995). Consequently, piracy may serve as an instrument of diffusion by creating interest in the product and a demand for it. Software piracy, therefore, is a complex issue that may be looked upon from a number of perspectives. This study examines some of these perspectives using first-hand data collected from over 1,000 Internet users around the world.

**The Legal Perspective**

Unauthorized duplication of software is a Federal offense. While software is a new form of intellectual media, it is protected from the same laws that protect other forms of intellectual property, such as records, books, and films. Software is automatically protected by the Federal Copyright Act, Title 17, of the U.S. Code, the moment it is created. Software creates unique problems for the software industry because software is so easy to duplicate and copies are usually as good as the original. Unauthorized duplication or copyright infringement of software is punishable whether it is done willfully or accidentally. (SPA-2 1997)

Penalties for software piracy can be as great as $100,000 for each copyrighted item and can jump to $250,000 and up to five years if done “willfully and for the purposes of commercial advantage or private financial gain” (SPA-1 1997). There are three sections of the United States Code, that are of greatest important for this topic:

Title 17 U.S.C., Section 117 gives the owner of a copy of a computer program limited rights. First, the owner is allowed to make one copy of the original if required for the utilization of the computer program. This is the case for most modern software. Most software is purchased in a CD-ROM format and must be installed to the hard drive on the
computer it is to be used on. This copy is authorized according to U.S.C. A second copy is also permitted for the purposes of archival or backup. Archival copies must be destroyed when the owner is no longer has ownership of the computer program. Archival copies may be transferred to others only with the original copy and only as part of the lease, sale, or transfer of all rights in the program. Modifications or adaptations to the computer program may be prepared only with the express authorization of the copyright owner.

Title 17 U.S.C., Section 506, states that any person who willfully infringes on a copyright either for commercial purposes/financial gain or distributes one or more copies of copyrighted works over any 180-day period with a total combined value of more than $1,000, shall be punished as stated in Title 17, U.S.C., Section 2319.

Title 17 U.S.C., Section 2319 states that violations of Section 506 of Title 17 may be punished by, imprisonment of up to five years and fined if the person has distributed at least ten or more copyrighted works over the period of any 180-day period. Second offenders receive twice the sentence, up to ten years.

**The Economic Perspective**

An economic perspective of software piracy must consider the amount of gain and loss created through software piracy. On the one hand, software manufacturers lose revenue when potential consumers choose to pirate their product rather than legally purchasing it. A recent estimate of lost sales due to software piracy was $11.2 billion in 1996, according to a study conducted by the BSA and SIIA (...96pir.htm 1997). However, some counterintuitive thinking leads one to conclude that pirates also play a positive role in the software industry. Previous researchers have found that software pirates provide word-
of-mouth advertising, which helps increase the legal market diffusion of the product and the overall customer base (Conner and Rumelt 1991; Givon et al. 1995). Software manufacturers' costs are also reduced as many pirates provide free technical support to legitimate users through direct contact, e-mail, or USENET newsgroups. Increased sources of free technical support also improves the product image and leads to greater customer satisfaction. Moreover, overly protecting software from piracy may in fact reduce the software manufacturer's customer base and the value of the product.

The Moral Perspective

Aside from the legal and economic perspectives, it is also important to recognize the moral issues involved with software piracy. Piracy, after all, is another form of stealing, as is copyright violation of any other intellectual property. Most cultures and societies around the world consider stealing to be unethical, yet piracy still exists as a worldwide phenomenon (Barton and Malhotra 1993). Studies have shown that the unethical nature of software piracy is not a significant limiting factor (Simpson, Banerjee, and Simpson 1994). Piracy lacks the same level of ethical seriousness as do other forms of stealing (Logsdon, Thompson, and Reid 1994). Because of the intangible nature of software, the theft of a car, for example, is considered is looked upon less favorably then the theft of software (piracy). Another factor reducing the ethical intensity of software piracy is that it is seen as a collective activity (Summers and Markusen 1992). Software pirates do not see piracy as an individual activity, but rather as an activity done by organized groups.
According to a study conducted by the BSA and the SIIA in 1998, 38% of the business software applications loaded onto PC's worldwide were pirated. This is the first time that the annual piracy rate has dropped below 40%, and represents a continuous, but gradual, decrease in worldwide piracy rates since the 1994 rate of 49%. Although annual piracy rates have fallen modestly each year since 1994, the decline in 1998 was less than that in previous years of this study.

SIIA cites several reasons for this. First, software companies have worked to maintain a legal sales presence in all areas of the world. As they have done this, it became possible to purchase software in countries where it was not previously available legally. Second, software companies have expanded support for countries around the world. Technical support from the manufacturer provides a compelling reason to purchase a legal copy of the software. Third, the software industry has promoted the development of consumer education regarding the importance of intellectual property rights and have
included high-profile legal proceedings against businesses using illegal software. Fourth, governments around the world are more supportive of protecting and enforcing intellectual property rights. Fifth, a strengthening of the world economy and a decline in average software prices has made legal purchase of software more affordable.

The 38% piracy rate still translates into more than one of every three software applications installed is pirated. The study cites an industry loss of $11 billion from software piracy in 1998, which is an improvement from the 1997 figure of $11.4 billion.

1998 was an economically difficult year for many countries, particularly in Asia. PC and software sales, though strong in the U.S. and Western Europe (where the piracy rate is relatively low), were weaker in Asia, Eastern Europe, and the Middle East (where the piracy rate is the highest). As a result, economic recession brought with it lower 1998 dollar losses in Asia, Eastern Europe, and the Middle East than would have been expected without the
recession. Importantly, this suggests that the decline in piracy rates and dollar losses experienced in 1998 may not continue into the future.

Eastern Europe has the highest piracy rate, compared to any other region in the world. Russia tops this list with a piracy rate of 92%, which is up from the 89% figure in 1997. This region's average piracy rate declined one percentage point from 1997 to 1998.

Software piracy in the Middle East is high, but has declined by three percentage points since 1998, from 72% in 1997 to 69% in 1998. Lebanon, Oman, Bahrain, Qatar, and Pakistan have the highest piracy rates in this region, although all countries in the region are also well above the world average.

Latin America has also seen a small improvement of piracy rates: its rate dropped two percentage points, from 64% in 1997 to 62% in 1998. The countries in this region with the highest piracy rates are El Salvador, Guatemala, and Paraguay, but the problem is
systemic. Brazil, the largest market for software in the region, has a piracy rate of 61%, just 1 percentage point below 1997 figure of 62%.

Eastern Europe, the Middle East, and Latin America all experienced economic recession in 1998. Until these regional economies recover, software piracy rates are expected to increase.

Although the regions with the highest dollar losses in 1998 were North America, the Asia/Pacific Region, and Western Europe, these regions also have the largest economies and accordingly, the largest PC and software markets. Therefore, even a low piracy rate still translates to a large dollar loss in such larger economies. Dollar losses grew in North America in 1998 by $100 million, and in Western Europe by $250 million over 1997’s figures. The only region to experience a decline in dollar losses is Asia. In 1998, Asia’s dollar losses were $3 billion, down $900 million from 1997. However, this decline appears to be almost entirely due to the economic problems experienced last year in the region, which indicates that the trend may reverse as the regional economy recovers.

<table>
<thead>
<tr>
<th>Country</th>
<th>Piracy Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>97%</td>
</tr>
<tr>
<td>China</td>
<td>95%</td>
</tr>
<tr>
<td>Oman</td>
<td>93%</td>
</tr>
<tr>
<td>Lebanon</td>
<td>93%</td>
</tr>
<tr>
<td>CIS - less Russia</td>
<td>93%</td>
</tr>
<tr>
<td>Russia</td>
<td>92%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>92%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>90%</td>
</tr>
<tr>
<td>Bahrain</td>
<td>89%</td>
</tr>
<tr>
<td>Kuwait</td>
<td>88%</td>
</tr>
<tr>
<td>Turkey</td>
<td>87%</td>
</tr>
<tr>
<td>Qatar</td>
<td>87%</td>
</tr>
<tr>
<td>Bolivia</td>
<td>87%</td>
</tr>
<tr>
<td>El Salvador</td>
<td>87%</td>
</tr>
<tr>
<td>Romania</td>
<td>86%</td>
</tr>
<tr>
<td>Pakistan</td>
<td>86%</td>
</tr>
<tr>
<td>Guatemala</td>
<td>85%</td>
</tr>
<tr>
<td>Egypt</td>
<td>85%</td>
</tr>
<tr>
<td>Paraguay</td>
<td>85%</td>
</tr>
<tr>
<td>Thailand</td>
<td>82%</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>81%</td>
</tr>
<tr>
<td>Jordan</td>
<td>80%</td>
</tr>
<tr>
<td>Mauritius</td>
<td>78%</td>
</tr>
<tr>
<td>Philippines</td>
<td>77%</td>
</tr>
<tr>
<td>Honduras</td>
<td>77%</td>
</tr>
<tr>
<td>Greece</td>
<td>74%</td>
</tr>
</tbody>
</table>
Although the U.S. has one of the largest dollar losses, $2.9 billion, it has the world's lowest piracy rate. The piracy rate in the U.S. had declined to 25% in 1998. In Western Europe, Germany and the United Kingdom had the highest dollar losses with $479 million and $465 million, respectively, despite piracy rates of 28% in Germany and 29% in the UK. France had the third highest loss in revenue for Western Europe with $425 million in losses, due in part by France's 43% piracy rate.

**Methodology**

Data for this study was collected by posting the survey on the Internet, accessible by any standard web browser (e.g., Netscape Navigator, Microsoft Internet Explorer, Lynx, etc.). The survey was written in the PERL computer language across the Common Gateway Interface for World Wide Web (WWW) accessibility. The program was designed to automatically receive and store survey responses in a format readable by any standard statistical software package, such as SPSS or SAS. The program also facilitated security measures to dissuade accidental or willful duplication of survey responses by the user submitting the same survey more than once. A second PERL program scanned through the data once more before the statistical analysis to identify and flag for removal any duplicate survey entries.
Requests were made on USENET newsgroups to complete the survey. Targeted newsgroups included those that serve both computer professionals (programmers, software engineers, computer analysts, etc.) found in the ALT.COMP and COMP areas, as well as a more general audience (students, educators, engineers, etc.) found in the REC and SOC areas. While an Internet based study does exclude a small category of the population that do pirate software but do not use the Internet, the consumers surveyed likely still form a representative sample of the large number of software pirates. The following message was posted to obtain responses from USENET:

To all computer users:

We are conducting a study to investigate people's attitudes towards software piracy. In order to accomplish this research project, we have designed a web-based survey. We would appreciate your assistance and cooperation in completing this survey. It should not take more than ten minutes to complete this survey. The survey can be accessed by any web browser at the following location:

http://www.cns.uni.edu/~pola/survey/survey.cgi

The survey itself consisted of four main sections. The first section included an introduction to the survey, and included a standard definition of software piracy. This definition allows all respondents to have the same basic understanding of what the term implies. The definition was given as follows:

**Software piracy** is defined as the act of making or distributing copies of copyrighted software without authorization from the software manufacturer. The only exception is the user's right to make a single backup copy for archival purposes.

The second section contained items pertaining to attitudes regarding software piracy. These items consist of a series of statements followed by an area where the respondent
may select his/her level of agreement or disagreement with the statement. The items are based on the five-point Likert scale, as follows: 1 signifies “Strongly Disagree,” 2 signifies “Somewhat Disagree,” 3 signifies “Indifferent,” 4 signifies “Somewhat Agree,” and 5 signifies “Strongly Agree.”

The third section contained questions dealing with piracy behavior and software use. Most of these questions were designed to gather self-reported software and piracy statistics. Statements included in this section included questions to gather the number of software packages the respondent pirates and purchases, as well as the type of software product.

The survey concluded with a final section containing classification/demographic related questions. This section collected general demographic information such as gender, age, occupation, education status, country/state, and income.

At the conclusion of the submission period, a total of 1092 survey responses were recorded. Of these responses, 14 were flagged by the PERL program as duplicate entries and were thus discarded. An additional 57 entries were found to be too incomplete for use and were also removed. A final tally indicated a total of 1021 valid responses suitable for a data analysis.

The SPSS software package was used to perform a statistical analysis of the above-mentioned data. The data analysis consisted of a preliminary data analysis of the demographics/classification, cross-tabulations, a factor analysis, and a regression analysis.
Results

Demographics

The vast majority of the individuals surveyed were male, 91.8%. The average age of the respondents was 32, with over 75% of them under the age of 35. In terms of employment, 40.7% of the individuals were employed in the computer sector, while 59.3% were employed in a non-computer position. The respondents had a mean of 15.3 years of education, with 12 years signifying completion of high school. About 21% were high school graduates, 47.3% were college graduates, and 22.6% had completed their masters. The remaining 9.2% completed post-graduate work (Ph.D., M.D., D.D.S., etc.). With respect to country of origin, 69.6% were from the U.S., while the remaining 30.4% of the respondents were scattered across 36 countries around the world. Within the U.S., 47 of the 50 states were represented, with California having the largest U.S. state sample, making up 14.2% of the total survey responses alone. Average combined household incomes of the respondents was $65,608.11 with nearly 15% of the respondents claiming over $85,000.

Preliminary Data Analysis

Of the respondents, 45.9% admitted to pirating at least one software package over the past year. We classified this segment of the respondents as software pirates. The vast majority, 95.7%, considered themselves experienced computer users. The mean number of purchases of software packages over the past year was 5.9. The average software pirate (based on the above definition), pirated 6.8 software packages over the past year. Based on the data, software pirates are polarized: while 42.4% pirate 2 or fewer software packages, 27.7% pirate over 13. The percentage of people who pirate at "moderate" levels
is relatively small. Games and Utilities were the software packages most susceptible to piracy, with piracy rates of 38.4% for each. Games and Utilities, are followed by Graphic Manipulation Applications at 29.7%, Operating Systems at 22.8%, Word Processors at 22.4%, Programming Languages at 20.2%, and Spreadsheets at 11.1%. Businesses rarely create illegitimate copies of software because the penalties for being caught do not make it cost efficient (Reid & Hume 1992). Therefore, software piracy is generally performed by individuals pirating for personal use. Results of this data analysis confirmed this, with piracy rates for personal use only at 86.3%, business use only at 2.3%, and both at 11.4%.

Motivations for software piracy varied widely among the respondents, but several of these are considered. The vast majority, 91.7% believe that it is easy to pirate software without getting caught and 69.7% believe that most computer users pirate software. This belief of the ease and frequency of software piracy is a contributing motivational factor for software pirates. Only 15.9% stated that if they pirated software, their peers (family, friends, etc.) would show concern, while 65.2% stated that their peers do not mind at all if they use pirated software. While many, 59.9%, consider piracy unethical, a significant portion of the respondents, 26.4%, did not consider software piracy unethical. These values were mirrored with the level of agreement from the respondents regarding the belief that software piracy is the same as stealing. Many, 58.2%, considered it the same as stealing, while 33.8% do not. 23.4% of the respondents believe that piracy is an acceptable behavior. Another motivation for software piracy is the need to share or use files with others using software that the respondent does not own. For example, if a student is working on a research paper in a group, and does not own Microsoft Word, s/he may pirate the application for the purpose of also contributing to the group project. Since many software
packages are expensive (many in the range of several hundred dollars) and there is often no way to evaluate the software, many respondents, 44.4%, pirate software for the purposes of evaluation. If after the evaluation, they feel that the product would be useful, they purchase it; otherwise, they discontinue use. Pirating software for the purposes of selling it to others (bootlegging) does not seem to be a significant motivational factor. Less than one percent (0.8%) stated that they pirate software to sell to others. In addition, 94.8% believe that it is unethical to sell pirated software.

While 86.7% stated that they were aware of the criminal and legal consequences of software piracy, very few of the respondents were able to correctly identify the correct maximum fine and penalties for software piracy. Many of the respondents, stated that they did not know what the maximum fine and penalties are for software piracy, 43.8% and 42.5% respectively. Of the remaining individuals who believed they knew the correct answer, only 11.2% knew the correct maximum fine and only 14.3% knew the correct maximum jail sentence. Interestingly, had the respondents guessed randomly, a larger proportion of the respondents would have correctly answered the maximum fine and jail sentence questions, 14.3% and 16.7%. Even though many, (81.7% and 77.3% for fine and jail penalties respectively), underestimated the true legal penalties for piracy, 33.8% stated that it is not worth the risk of getting caught to pirate software. Perhaps due to this underestimation, 38.5% believe that the software penalties are currently not strict enough.

While many, 55.9%, believe that piracy contributes to an increase in software prices and 79.1% believe that software manufacturers incur a loss from software piracy, 72.9% believe that software manufacturers could charge lower prices and still be profitable. A large portion, 65.6%, believe that software is too expensive to purchase.
Considering the level of piracy among some of the respondents, it is difficult to believe that these computer users are actually pirating software they actually need or would ever purchase. A study conducted by Jim Thomas and Gordon Meyer, both respected members within the computer community, found that many pirates pirate software even when they don't intend to use it (Thomas and Meyer 1990). As a result, these computer programs are stored on the computer, used a few times until the novelty of the new program has worn off, and then left in the computer never to be touched again. In our research study, 17.8% state that they pirate software whenever they have the opportunity, whether or not they intend to use the product. 23.4% stated that they frequently pirate software. The belief that pirates illegally copy software that they would never have purchased anyhow, is confirmed by the statistic that 72.5% of the respondents would purchase less than 10% of their pirated software if it were no longer possible to pirate software. The vast majority of the respondents, 93.6%, stated that they were able to provide tech support for the software applications they use, through direct help, e-mail, or USENET newsgroups. Pirates perform the service of word-of-mouth advertising it, with 80.1% of the respondents stating that they recommend good software to others (businesses, family, friends, etc.) for purchase.

Cross-Tabulations

The above is a cross-tabulation analysis with “Have you pirated software over the past year?” versus “What is your gender?”. The purpose of this analysis was to determine if there are any significant differences in software piracy tendencies between males and females. The Pearson Chi-Square value was 2.86 and the
p-value was 0.09084. At $\alpha=0.05$, the results were not seen as significant. Therefore, there does not seem to be any significant differences in software piracy tendencies between males and females.

<table>
<thead>
<tr>
<th>Know penalties</th>
<th>Don't know penalties</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pirate</td>
<td>50.8%</td>
<td>45.7%</td>
</tr>
<tr>
<td>Don't pirate</td>
<td>49.2%</td>
<td>54.3%</td>
</tr>
<tr>
<td>Total</td>
<td>6.5%</td>
<td>93.5%</td>
</tr>
</tbody>
</table>

The above is a cross-tabulation analysis with “Have you pirated a software package over the past year?” with “Do you know the penalties for being caught?”. The purpose of this analysis was to test whether correct knowledge regarding the penalties for software piracy have any correlation with the tendency of the respondent to piracy. The Pearson Chi-Square value was 0.62 and the p-value was 0.43108. At $\alpha=0.05$, the results were not seen as significant. Therefore, there does not seem to be any correlation on knowledge of penalties with tendency to pirate software.

**Factor Analysis**

A factor analysis was done, and factors with a reliability of less than 0.5 and those with an Eigen value less than 1 were discarded. This left a total of six factors:

- **FACTOR 1**: Attitudes toward Software Piracy (reliability = 0.958)
- **FACTOR 2**: Tendency to Pirate (reliability = 0.906)
- **FACTOR 3**: Ease and Widespread Nature of Software Piracy (reliability = 0.636)
- FACTOR 4: Manufacturers and Consumers Incur a Loss (reliability = 0.711)
- FACTOR 5: Manufacturers Overcharge Consumers (reliability = 0.517)
- FACTOR 6: Unethical to Bootleg Pirated Software (reliability = 0.587)
- FACTOR 7: Pirate Software for Evaluation (reliability = N/A)

The remaining factors did not meet the necessary criteria for inclusion for further analysis, and were thus removed. These factors include:

  - FACTOR 8: Consider Penalties to be Minor (reliability = 0.472)
  - FACTOR 9: Aware of the Penalties for Piracy (reliability = 0.346)

**Regression Analysis**

A multiple regression analysis was done with the dependent variable as the number of software packages pirated, using the above-mentioned factors as well as three classification variables—age, income, and education. The analysis found four items of significance ($\alpha = 0.05$): FACTOR 2, FACTOR 6, FACTOR 7, and the classification variable age. FACTOR 2, which described the tendency to pirate software, had a p-value of 0.0000 and positive correlation, that is, people with positive attitudes toward piracy are likely to pirate more software. FACTOR 6, regarding the ethics of bootlegging, had a p-value of 0.0133 and a negative correlation, that is, those who consider bootlegging is illegal pirate less. FACTOR 7, pirating software for the purposes of evaluation, had a p-value of 0.0010 and a positive correlation, that is, people who want to evaluate software before purchase, pirate software more. Finally, the demographic age had a p-value of 0.0048 and negative
correlation, that is, younger people are more likely to pirate software than compared to older people. All other factors and classification variables were not significant.

**Discussion**

While over 90% of computer users agree that it is easy to pirate software without getting caught, software manufacturers may wish to choose an alternative to increased criminalization. While software manufacturers may lose some potential revenue from pirated software, these same individuals are providing services to the software industry. Over 80% of the respondents stated that they provide word-of-mouth advertising and over 90% provide free technical support to others using the same product. This advertising increases the customer base and revenue for the software company. Technical assistance increases user satisfaction, leading to future purchases and upgrades, as well as reducing costs of technical service representatives. Previous researchers have found that pirates generally purchase more software—sometimes by as much as a factor of three—than non-pirates (Thomas & Meyer 1990). Thus, it would seem as though the software industry would be best benefited by a certain level of software piracy.

However, if software manufacturers believe that they are losing too much money from piracy, they must take action. Ethical appeals may not be a good course of action. A large percentage of the respondents from this study did not see any ethical problems with software piracy. In addition, few of the respondents had peers that would show concern of their pirating. An ad campaign to significantly change these notions may not be enough to change the behaviors of pirates.
One of the central causes for software piracy is a lack of an evaluation process. The amount of money required to purchase a particular software package may become quite an investment. Many common office suites (e.g., Microsoft Office 2000) and graphics tools (e.g., Adobe Photoshop 5.5) cost consumers hundreds of dollars. Without a means to evaluate the package before purchase, making a decision as to which product would best meet the consumer's needs becomes difficult. Product reviews from magazines and advice from computer professionals are of limited use, as only direct trial can assure one's purchase. Similarly, most consumers test drive a car before making the purchase, as reading magazine reviews does not give all the information required to make an informed decision; surely, there must be some means to evaluate software before purchase. Most software retailers have a "no return" policy which prevents potential users from returning a product that does not meet their needs. Thus, piracy for the purposes of evaluation becomes a defensive consumer strategy. Software manufacturers can aid the consumer's decision, without forcing the potential consumer into piracy, by providing evaluation copies of their product. Evaluation copies may be a full-featured product that expires after a set period (usually 30 to 90 days) or it may be a product with missing features, without a timeout period. Since most people can't afford to risk purchasing software that could run hundreds of dollars, many programs remain unpurchased (Thomas & Meyer 1990). Consequently, evaluation product versions benefit both the software industry and consumers.

Alternative marketing schemes are another work-around for software piracy. Sun Microsystems provides an excellent case study on one such scheme. Sun Microsystems provides commercial software, such as their operating system Solaris and their office suite
StarOffice, free of cost for educational and non-commercial use. However, commercial users are charged for these products. As reported earlier, software piracy is generally only a concern for individual users; business users do not generally pirate software due to possible consequences for doing so. Sun Microsystems expands their customer base by providing their software for free for educational use. When these students graduate from school and move to a corporate or commercial setting, they purchase Sun Microsystems products because they have been using it throughout their educational years.

Another alternative marketing scheme is employed by Red Hat. Like Sun Microsystems, they too release their product for free. However, Red Hat releases their product for free to everyone—commercial and non-commercial. However, their free, though usable, version of their software provides only basic services. Additional services are provided at an added cost in so-called "Deluxe" or "Professional" versions. Consumers are encouraged to try out free versions of their software and are then persuaded to purchase the more advanced versions that provide added features. Red Hat also generates revenue from their free products by charging fees for technical support.

Conclusions

The issue of software piracy is a complex one. Software manufacturers must be able to balance their software piracy tactics. Insufficient involvement in preventing piracy of their products may lead to uncontrolled piracy as in some foreign countries where piracy rates have risen to 97%. On the other hand, excess expenditure of time and resources on software piracy may also have negative consequences, as described by Conner and Rumelt (1991). For example, strict piracy protection policies reduces the total number of users of
the software package. Also, the increased cost of protection and enforcement leads to higher software costs, leading consumers to purchase competing, less expensive, software packages.

## Limitations

A limitation of this study is the use of a non-random sample. The sample of respondents is composed of people in known groups—judgment samples. As stated earlier, we attempted to keep the sample broad by including USENET newsgroups that cater to both computer professionals and the general public. Also, an Internet-based survey eliminates the possibility for responses from computer users who do not use the Internet, or USENET newsgroups. This sample of computer users may differ from those sampled.

Another possible limitation is that there may be some social desirability in the responses. We tried to minimize this possibility by making sure the respondents knew their survey responses would be anonymous. While there may be still be some under-reporting, the fact that nearly half of all respondents reported pirating software, it is likely minimal. This limitation, however, is a characteristic of all surveys done on controversial topics.


Reid, T.R. and Brit Hume. “Yes, Piracy’s Illegal, But not the Scourge it’s Cracked up to be” *Chicago Tribune* 9 August 1992: Sec. 7, Pg. 7.


Appendix A

Survey: Opinions about Software Piracy
University of Northern Iowa

We are conducting a study to investigate people's attitudes towards software piracy. Please answer the following questions to the best of your knowledge. Do not include your name anywhere in this survey. Since your name will not appear on this survey, you will remain anonymous and NO ONE will know who you are. It will take about ten minutes to complete this survey.

Software piracy is defined as the act of making or distributing copies of copyrighted software without authorization from the software manufacturer. The only exception is the user's right to make a single backup copy for archival purposes. For the purposes of this survey, please do not consider unregistered shareware as pirated software. This survey only concerns commercial software.

Section A

Please indicate your level of agreement or disagreement with the following questions. Mark your response by choosing the appropriate selection in the popup menu under each question.

1. I share my software with others.

   **SELECT ONE**

2. I consider myself to be an experienced computer user.

   **SELECT ONE**

3. Pirating just a small software package is not so bad.

   **SELECT ONE**

4. My friends do not mind if I use pirated software.

   **SELECT ONE**

5. Software manufacturers are benefited by piracy.

   **SELECT ONE**

6. I am aware of the criminal and other legal penalties for software piracy.

   **SELECT ONE**
7. After I become experienced with a software package, I am able to provide some technical support for others who use this package.

**SELECT ONE**

8. My religious beliefs are strong.

**SELECT ONE**

9. Many software companies rip me off, so it is all right for me to pirate their software.

**SELECT ONE**

10. Software piracy contributes to an increase in prices of software products.

**SELECT ONE**

11. Software companies could charge lower prices and still be profitable.

**SELECT ONE**

12. My supervisor doesn't mind if I use pirated software.

**SELECT ONE**

13. If you don't have enough money for software you really need, it is okay to pirate it.

**SELECT ONE**

14. It is easy to pirate software without getting caught.

**SELECT ONE**

15. It is fair to prosecute software pirates.

**SELECT ONE**

16. If people get caught pirating, it will not affect their future very much.

**SELECT ONE**

17. Software manufacturers incur a loss due to piracy.

**SELECT ONE**

18. I pirate software whenever I have the opportunity to do so.

**SELECT ONE**
19. It is not worth the risk of getting caught to pirate.

**SELECT ONE**

20. I consider piracy of computer software as unethical.

**SELECT ONE**

21. I consider software piracy to be the same as stealing.

**SELECT ONE**

22. I consider software piracy to be acceptable behavior.

**SELECT ONE**

23. People who pirate software should feel guilty.

**SELECT ONE**

24. People who pirate software should be punished.

**SELECT ONE**

25. I frequently pirate software.

**SELECT ONE**

26. I pirate software because I need to share files with others using specific software.

**SELECT ONE**

27. I consider software piracy to be a crime.

**SELECT ONE**

28. I pirate software so I can evaluate it and decide if I want to purchase it.

**SELECT ONE**

29. I pirate software to sell to others.

**SELECT ONE**

30. Software manufacturers incur a loss due to individuals selling pirated software.

**SELECT ONE**

31. If I like a certain software package that I have pirated, I recommend it to my friends.
32. I think the criminal and other legal penalties for piracy are minor.

33. I like the idea of having a large software collection.

34. Software is too expensive to purchase.

35. It is unethical to share software with others.

36. It is unethical to sell pirated software.

37. Most computer users pirate software.

---

**Section B**

Please answer the following questions.

1. Please indicate the number of software packages you purchased during the last one year period.

2. Have you pirated a software package over the last one year period?

3. Please indicate the number of software packages you pirated during the last one year period.

4. What percentage of your pirated software do you use frequently?

5. If it were impossible to pirate software, approximately what percentage of your pirated software would you have purchased?
6. Please specify the amount of money you spent in purchasing software during the last one year period.

7. Please specify the value of the pirated software you have acquired during the last one year period.

8. Suppose that someone is caught pirating 10 copies of software with an estimated value of $2,500, what do you think is the penalty for this act under current U.S. law (in terms of a fine and/or jail term)?

Enter the fine:

Enter the jail term:

9. How many years of experience do you have with computers?

10. Which of the following software types do you usually pirate? (Please check all the boxes that apply)

   - Word Processing
   - Operating Systems
   - Games
   - Spreadsheets
   - Programming Languages
   - Other
   - Graphics
   - Utilities
   - I do not Pirate

11. I generally pirate software for...

Section C

The information being collected in this last section is used for classification purposes only. This information will remain confidential and will not identify you in any way.

1. What is your gender?

2. What is your age?
3. What is your occupation? (Please type in)

4. What is your education status?

5. Please enter the name of the country in which you reside. (Please type in)

6. Please indicate your ethnic origin. (examples: African-American, Italian, Indian, etc.)

6. If you are from the U.S., please enter the two-letter postal abbreviation of your state. (e.g. New York would be NY) If you are not from the U.S., please enter XX. (please type in)

7. What was the total combined annual income of your household, before taxes, in 1996? (Please include the income of all the members of your household.)

Thank you for completing this survey!

Please submit your survey by clicking on the 'Submit Survey' button below.

If you have any questions, comments, or any kind of feedback, you can mail them to us (anonymously, if you wish) by going to the feedback page.
Appendix B

Survey.cgi

#!/opt/bin/perl
#
# Displays software piracy survey and formats query results into SPSS format
#
BEGIN {
    unshift@INC, '/user/pola/web/cgi-bin';
}
use CGI;
$query = new CGI;
print $query->header;
print $query->start_html(-title=>'Survey: Opinions about Software Piracy',
    -author=>'Bart Pola',
    -TEXT=>'#O00000',
    -BGCOLOR=>'#FFFFFF');
if(!$query->param)
{
    print "<center><hl>Survey: Opinions about Software Piracy</hl><br><h2>University of Northern Iowa</h2><hr>
We are conducting a study to investigate people's attitudes towards software piracy. Please answer the following questions to the best of your knowledge. Do not include your name anywhere in this survey. Since your name will not appear on this survey, you will remain anonymous and NO ONE will know who you are. It will take about ten minutes to complete this survey.<p>
Software piracy is defined as the act of making or distributing copies of copyrighted software without authorization from the software manufacturer. The only exception is the user's right to make a single backup copy for archival purposes. For the purposes of this survey, please do not consider unregistered shareware as pirated software. This survey only concerns commercial software.</p>

<h3><center>Section A</center></h3>Please indicate your level of agreement or disagreement with the following questions. Mark your response by choosing the appropriate selection in the popup menu under each question.

print $query->startform;
print "<dl><dt>1. I share my software with others.<br><dd>
print $query->popup_menu(-name=>'v01',
    -values=>['5','4','3','2','1',' '],
    -default=>',
    -labels=>{'5'=>'Strongly agree',
        '4'=>'Somewhat agree',
        '3'=>'Indifferent',
        '2'=>'Somewhat disagree',
        '1'=>'Strongly disagree',
    ' '=>'**SELECT ONE**');

print "<br><dt>2. I consider myself to be an experienced computer user.<br><dd>
print $query->popup_menu(-name=>'v02',
    -values=>['5','4','3','2','1',' '],
    -default=>',

29
print "<dt>3. Pirating just a small software package is not so bad.<br><dd>
print $query->popup_menu(-name=>'v03',
-values=>['5','4','3','2','1'],'
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','others'=>['**SELECT ONE**']});

print "<dt>4. My friends do not mind if I use pirated software.<br><dd>
print $query->popup_menu(-name=>'v04',
-values=>['5','4','3','2','1'],'
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','others'=>['**SELECT ONE**']});

print "<dt>5. Software manufacturers are benefited by piracy.<br><dd>
print $query->popup_menu(-name=>'v05',
-values=>['5','4','3','2','1'],'
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','others'=>['**SELECT ONE**']});

print "<dt>6. I am aware of the criminal and other legal penalties for software piracy.<br><dd>
print $query->popup_menu(-name=>'v06',
-values=>['5','4','3','2','1'],'
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','others'=>['**SELECT ONE**']});

print "<dt>7. After I become experienced with a software package, I am able to provide some technical support for others who use this package.<br><dd>
print $query->popup_menu(-name=>'v07',
-values=>['5','4','3','2','1'],'
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','others'=>['**SELECT ONE**']});
8. My religious beliefs are strong.

9. Many software companies rip me off, so it is all right for me to pirate their software.

10. Software piracy contributes to an increase in prices of software products.

11. Software companies could charge lower prices and still be profitable.

12. My supervisor doesn’t mind if I use pirated software.
13. If you don’t have enough money for software you really need, it is okay to pirate it.

14. It is easy to pirate software without getting caught.

15. It is fair to prosecute software pirates.

16. If people get caught pirating, it will not affect their future very much.

17. Software manufacturers incur a loss due to piracy.

18. I pirate software whenever I have the opportunity to do so.
print $query->popup_menu(-name=>'v18',
-values=>['5','4','3','2','1',''],
-default=>'',
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','**SELECT ONE**'});

print "<br><dt>19. It is not worth the risk of getting caught to pirate.<br><dd>";
print $query->popup_menu(-name=>'v19',
-values=>['5','4','3','2','1',''],
-default=>'',
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','**SELECT ONE**'});

print "<br><dt>20. I consider piracy of computer software as unethical.<br><dd>";
print $query->popup_menu(-name=>'v20',
-values=>['5','4','3','2','1',''],
-default=>'',
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','**SELECT ONE**'});

print "<br><dt>21. I consider software piracy to be the same as stealing.<br><dd>";
print $query->popup_menu(-name=>'v21',
-values=>['5','4','3','2','1',''],
-default=>'',
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','**SELECT ONE**'});

print "<br><dt>22. I consider software piracy to be acceptable behavior.<br><dd>";
print $query->popup_menu(-name=>'v22',
-values=>['5','4','3','2','1',''],
-default=>'',
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','**SELECT ONE**'});

print "<br><dt>23. People who pirate software should feel guilty.<br><dd>";
print $query->popup_menu(-name=>'v23',
-values=>['5','4','3','2','1',''],
-default=>'',
-labels=>{'5'=>'Strongly agree','4'=>'Somewhat agree','3'=>'Indifferent','2'=>'Somewhat disagree','1'=>'Strongly disagree','**SELECT ONE**'})
24. People who pirate software should be punished.

25. I frequently pirate software.

26. I pirate software because I need to share files with others using specific software.

27. I consider software piracy to be a crime.

28. I pirate software so I can evaluate it and decide if I want to purchase it.
29. I pirate software to sell to others.

29. I do not pirate.

SELECT ONE

30. Software manufacturers incur a loss due to individuals selling pirated software.

30. I do not pirate.

SELECT ONE

31. If I like a certain software package that I have pirated, I recommend it to my friends.

31. I do not pirate.

SELECT ONE

32. I think the criminal and other legal penalties for piracy are minor.

32. I do not pirate.

SELECT ONE

33. I like the idea of having a large software collection.

33. I do not pirate.

SELECT ONE
34. Software is too expensive to purchase.

35. It is unethical to share software with others.

36. It is unethical to sell pirated software.

37. Most computer users pirate software.

Please answer the following questions:

1. Please indicate the number of software packages you purchased during the last one year period.
2. Have you pirated a software package over the last one year period?

3. Please indicate the number of software packages you pirated during the last one year period.

4. What percentage of your pirated software do you use frequently?

5. If it were impossible to pirate software, approximately what percentage of your pirated software would you have purchased?

6. Please specify the amount of money you spent in purchasing software during the last one year period.
7. Please specify the value of the pirated software you have acquired during the last one year period.

8. Suppose that someone is caught pirating 10 copies of software with an estimated value of $2,500, what do you think is the penalty for this act under current U.S. law (in terms of a fine and/or jail term)?

9. How many years of experience do you have with computers?

10. Which of the following software types do you usually pirate? (Please check all the boxes that apply)
1. I generally pirate software for...

2. What is your gender?

3. What is your age?

4. What is your occupation? (Please type in)

5. Please enter the name of the country in which you reside. (Please type in)
<br><dt>6. Please indicate your ethnic origin. (examples: African-American, Italian, Indian, etc.)<br><dd><br><dt>6. If you are from the U.S., please enter the two-letter postal abbreviation of your state. (e.g. New York would be NY) If you are not from the U.S., please enter XX. (please type in)<br><dd><br><dt>7. What was the total combined annual income of your household, before taxes, in 1996? (Please include the income of all the members of your household.)<br><dd><br>Thank you for completing this survey! Please submit your survey by clicking on the 'Submit Survey' button below.<br>
$v08 = $query->param('v08');
$v09 = $query->param('v09');
$v10 = $query->param('v10');
$v11 = $query->param('v11');
$v12 = $query->param('v12');
$v13 = $query->param('v13');
$v14 = $query->param('v14');
$v15 = $query->param('v15');
$v16 = $query->param('v16');
$v17 = $query->param('v17');
$v18 = $query->param('v18');
$v19 = $query->param('v19');
$v20 = $query->param('v20');
$v21 = $query->param('v21');
$v22 = $query->param('v22');
$v23 = $query->param('v23');
$v24 = $query->param('v24');
$v25 = $query->param('v25');
$v26 = $query->param('v26');
$v27 = $query->param('v27');
$v28 = $query->param('v28');
$v29 = $query->param('v29');
$v30 = $query->param('v30');
$v31 = $query->param('v31');
$v32 = $query->param('v32');
$v33 = $query->param('v33');
$v34 = $query->param('v34');
$v35 = $query->param('v35');
$v36 = $query->param('v36');
$v36=$query->param('v36');
#
v37
$v37=$query->param('v37');
#
v38
$v38=$query->param('v38');
#
v39
$v39=$query->param('v39');
#
v40
$v40=$query->param('v40');
#
v41
$v41=$query->param('v41');
#
v42
$v42=$query->param('v42');
#
v43
$v43=$query->param('v43');
#
v44
$v44=$query->param('v44');
#
v45
$v45=$query->param('v45');
#
v46
$v46=$query->param('v46');
#
v47
$v47=$query->param('v47');
#
v48
@on=$query->param('v48m');
foreach $x (@on) { $v48 [$x] =1;}
for($x=l;$x<l0;$x++) {if($v48 [$x] != 1) {($v48 [$x] =0;}}
#
v49
$v49=$query->param('v49');
#
v50
$v50=$query->param('v50');
#
v51
$v51=$query->param('v51');
#
v52
$v52=$query->param('v52');
while(length($v52)<20) {$v52 .= " ";}
#
v53
$v53=$query->param('v53');
#
v54
$v54=$query->param('v54');
while(length($v54)<15) {$v54 .= " ";}
#
v55
$v55=$query->param('v55');
while(length($v55)<20) {$v55 .= " ";}
#
v56
$v56=$query->param('v56');
$v56=~ tr/[a-z]/[A-Z]/;
#
v57
$v57=$query->param('v57');
#
v58
$v58=$ENV{'REMOTE_HOST'};
while(length($v58)<25) {$v58 .= " ";}
#
v59
($sec,$min,$hour,$mday,$mon,$year,$wday,$yday,$isdst)=localtime(time);
$v59="$hour:$min .($mon+1)."/$mday/$year";
while(length($v59)<15) {($v59 .= " ");}
#Print survey data
$DataLine=undef;
$OpenLine=undef;
$DataLine.="$LocSurveyNum ";
$OpenLine.="$LocSurveyNum ";
$DataLine.="$v01$v02$v03$v04$v05";
(v01,v02,v03,v04,v05)
$DataLine.="$v06$v07$v08$v09$v10";
(v06,v07,v08,v09,v10)
$DataLine.="$v11$v12$v13$v14$v15";
(v11,v12,v13,v14,v15)
$DataLine.="$v16$v17$v18$v19$v20";
(v16,v17,v18,v19,v20)
$DataLine.="$v21$v22$v23$v24$v25";
(v21,v22,v23,v24,v25)
$DataLine.="$v26$v27$v28$v29$v30";
(v26,v27,v28,v29,v30)
$DataLine.="$v31$v32$v33$v34$v35";
(v31,v32,v33,v34,v35)
$DataLine.="$v36$v37 ";
(v36,v37)
$DataLine.="$v38$v39$v40$v41$v42";
(v38,v39,v40,v41,v42)
$DataLine.="$v43$v44$v45$v46$v47";
(v43,v44,v45,v46,v47)
for ($x=1;$x<10;$x++) { $DataLine.="$v48[$x] ";}
(v48[1-9])
$DataLine.="$v49";
$DataLine.="$v50$v51";
(space,v50,v51)
$OpenLine.="$v52";
$DataLine.="$v53";
$OpenLine.="$v54";
$DataLine.="$v55";
$OpenLine.="$v56$v57";
$DataLine.="$v58$v59";
(address,date)
$DataLine.="\n";
(data)
$OpenLine.="\n";
(openend)

&CheckLock;

open(DATA,">>/user/pola/web/survey/survey.dat"); #Open data file (append output)
print DATA $DataLine; #Write survey results to data file
close(DATA); #Close data file
open(OPEND, ">>/user/pola/web/survey/opend.dat");
print OPEND $OpenLine; #Close data file
unlink("/user/pola/web/survey/file.lock"); #Cleanup -- remove file.lock

#Print Thank You page
print "<center><h2>Thank You!</h2></center>";
if($waited ne 'F') {

print "Sorry for the long wait... I had to wait for permission to write your survey results into the data file. ";
}
print "Thanks for your time and patience for completing this survey. Your survey results have been recorded.";
)
print "</BODY></HTML>";

sub CheckLock {
    # Check time.lock -- is this survey being submitted (suspiciously) soon as the last?
    ($dev,$ino,$mode,$nlink,$uid,$gid,$rdev,$size,$mtime,$ctime,$blksize,$blocks)= stat("/user/pola/web/survey/time.lock");
    if(($mtime+60) < time)
        ($waited='F';)
    else
        ($waited='T';
        while(($mtime+60) > time)
            {sleep 1;}
    )
    utime time, time, "/user/pola/web/survey/time.lock";

    # Check file.lock -- is data file in use?
    for ($i = 1;$i <= 15; $i++)
    {
        if (-e "/user/pola/web/survey/file.lock")
            {sleep 1;}
        else
            {
                open(LOCK,">/user/pola/web/survey/file.lock");
                print LOCK "0*";
                close(LOCK);
                last;
            }
    }
}
)

---

Mailme.cgi

#!/opt/bin/perl
#
# Anonymously mail me and dad from survey
#
BEGIN {
    unshift@INC,’/user/pola/web/cgi-bin’;
}
use CGI;
$query= new CGI;
print $query->header;
print $query->start_html(-title=>'Feedback!',
    -TEXT=>"#000000",
    -BGCOLOR=>"#FFFFFF");
print "<h2><center>Feedback!</center></h2><hr>
if(!$query->param)
{
    print "If you have questions or comments about this survey, please feel free to mail us. Just enter your message here and click the send button when you are done. Note that this is will be sent to us anonymously, so if you want a reply, you must include your e-mail address. Thanks for your input!";
    print $query->startform;
    print "<center>
    print $query->textarea('message','',10,50);
    print "<br>";
    print $query->submit('Send Feedback');
    print "</center>
    print $query->endform;
}
else
{
    ($sec,$min,$hour,$mday,$mon,$year,$wday,$yday,$isdst)=localtime(time);
    $time="$hour:$min ($mon+1)/$mday/$year";
    $Message=$query->param('message');
    print "Thank you! Your feedback has been received. The following message, as is, has been sent to us:
    open(MAIL, ">/user/pola/web/survey/mail");
    print MAIL "From: $ENV{'REMOTE_HOST'}
    print MAIL "Recived: $time"
    print MAIL "Message:"
    print MAIL "$Message"
    close(MAIL);
}
print "</body></html>";
Piracy Rate for Various Types of Software Packages

- Games: 45.00%
- Utilities: 40.00%
- Graphics Applications: 35.00%
- Operating Systems: 30.00%
- Word Processors: 25.00%
- Programming Languages: 20.00%
- Spreadsheets: 15.00%
- Other: 10.00%
- Other: 5.00%
- Other: 0.00%
Location

Foreign 30%

U.S. 70%
Occupation

- Computer-Related: 40%
- Student: 23%
- Other: 37%
Claim to Know Consequences of Piracy

Don't Know
13%

Know
87%
Correctly Selected Fine

Correct
11%

Wrong
89%
Know Correct Jail Term

Correct
14%

Wrong
86%
Software Piracy

Attitudes & Opinions of Computer Users and Implications for Software Manufacturers & Consumers
Introduction

- Product Pirating
- 1996: More than $11 Billion lost due to Software Piracy
- An Expanded Market
- Purpose of Research

Product Pirating

Product pirating is a major issue in terms of loss of sales across many industries, including computer software, pharmaceuticals, movies, audio, and books. However, the problem has been said to be most sensitive for the software industry.

1996: More than $11 Billion Lost Due to Software Piracy

Software piracy is extremely widespread and is global in nature. Recent estimates of lost sales have exceeded $11 billion in 1996.

An Expanded Market

Yet for all this loss of sales through piracy, some researchers insist that the market for software is expanded by software piracy. Consequently, piracy may serve as an instrument of diffusion by creating interest in the product and a demand for it. Software piracy, therefore, is a complex issue that may be looked upon from a number of perspectives.

Purpose of Study

This study examines some of these perspectives using first-hand data collected from over 1,000 Internet users around the world. The purpose of the study is to understand the opinions of computer users on software piracy and consider the implications to the computer industry.
Software is protected under the same laws that protect other forms of intellectual property, such as records, books, and films. But software creates unique problems for the software industry because software is so easy to duplicate and copies are usually as good as the original.

**Limited Rights**

First, the owner is allowed to make one copy of the original if required for the utilization of the computer program. A second copy is also permitted for the purposes of archival or backup. Archival copies must be destroyed when the owner is no longer has ownership of the computer program.

**Penalties**

Penalties for software piracy can be as great as $100,000 for each copyrighted item and can jump to $250,000 and up to five years if done “willfully and for the purposes of commercial advantage or private financial gain.” Imprisonment of up to five years and fined if the person has distributed at least ten or more copyrighted works over the period of any 180-day period. Second offenders receive twice the sentence, up to ten years.

**Criminal Offense**

Distributes one or more copies of copyrighted works over any 180-day period with a total combined value of more than $2,500, shall be punished.
There are two economic sides to software piracy that affect software manufacturers.

**Losses**

On the one hand, software manufacturers lose revenue when potential consumers choose to pirate their product rather than legally purchasing it. A recent estimate of lost sales due to software piracy was $11.2 billion in 1996, according to a study conducted by the BSA and SIIA.

**Gains**

However, some counterintuitive thinking leads one to conclude that pirates also play a positive role in the software industry. Previous researchers have found that software pirates provide word-of-mouth advertising, which helps increase the legal market diffusion of the product and the overall customer base. Software manufacturers' costs are also reduced as many pirates provide free technical support to legitimate users. Increased sources of free technical support also improves the product image and leads to greater customer satisfaction.
The last perspective to consider is the moral perspective.

**Stealing**

Piracy, after all, is another form of stealing, as is copyright violation of any other intellectual property. Most cultures and societies around the world consider stealing to be unethical, yet piracy still exists as a worldwide phenomenon. Studies have shown that the unethical nature of software piracy is not a significant limiting factor.

**Ethical Intensity**

Piracy lacks the same level of ethical seriousness as do other forms of stealing. Because of the intangible nature of software, the theft of a car, for example, is considered is looked upon less favorably then the theft of software (piracy).
According to a study conducted by the BSA and the SIIA in 1998, 38% of the business software applications loaded onto PC's worldwide were pirated. This is the first time that the annual piracy rate has dropped below 40%, and represents a continuous, but gradual, decrease in worldwide piracy rates since the 1994 rate of 49%. Although annual piracy rates have fallen modestly each year since 1994, the decline in 1998 was less than that in previous years of this study.

The 38% piracy rate still translates into more than one of every three software applications installed is pirated. The study cites an industry loss of $11 billion from software piracy in 1998, which is an improvement from the 1997 figure of $11.4 billion.

Although the U.S. has one of the largest dollar losses, $2.9 billion, it has the world's lowest piracy rate. The piracy rate in the U.S. had declined to 25% in 1998.
Methodology

- Web-based Survey
- PERL/CGI Script
- SPSS Data Analysis
- Survey Organization
  - Definition
  - Attitudes
  - Behavior
  - Demographics

Web-based Survey

Posted the survey on the Internet, accessible by any standard web browser.

PERL/CGI

The survey was written in the PERL computer language across the Common Gateway Interface for World Wide Web (WWW) accessibility. The program was designed to automatically receive and store survey responses in a format readable by any standard statistical software package, such as SPSS or SAS.

SPSS Data Analysis

The SPSS software package was used to perform a statistical analysis of the above-mentioned data. The data analysis consisted of a preliminary data analysis of the demographics/classification, cross-tabulations, a factor analysis, and a regression analysis.

Survey Organization

The survey itself consisted of four main sections. The first section included an introduction to the survey, and included a standard definition of software piracy. This definition allows all respondents to have the same basic understanding of what the term implies.

The second section contained items pertaining to attitudes regarding software piracy. These items consist of a series of statements followed by an area where the respondent may select his/her level of agreement or disagreement with the statement. The items are based on the five-point Likert scale.

The third section contained questions dealing with piracy behavior and software use. Most of these questions were designed to gather self-reported software and piracy statistics.

The survey concluded with a final section containing classification/demographic related questions.

At the conclusion of the submission period, a total of 1092 survey responses were recorded. Of these responses, 14 were flagged by the PERL program as duplicate entries and were thus discarded. An additional 57 entries were found to be too incomplete for use and were also removed. A final tally indicated a total of 1021 valid responses suitable for a data analysis.
Gender

The vast majority of the individuals surveyed were male, 91.8%.

Employment

In terms of employment, 40.7% of the individuals were employed in the computer sector, while 59.3% were employed in a non-computer position.

Location

With respect to country of origin, 69.6% were from the U.S., while the remaining 30.4% of the respondents were scattered across 36 countries around the world. Within the U.S., 47 of the 50 states were represented, with California having the largest U.S. state sample, making up 14.2% of the total survey responses alone.
Age

The average age of the respondents was 32, with over 75% of them under the age of 35.

Education

The respondents had a mean of 15.3 years of education, with 12 years signifying completion of high school. About 21% were high school graduates, 47.3% were college graduates, and 22.6% had completed their masters. The remaining 9.2% completed post-graduate work (Ph.D., M.D., D.D.S., etc.).

Household Income

Average combined household incomes of the respondents was $65,608.11 with nearly 15% of the respondents claiming over $85,000.
Of the respondents, 45.9% admitted to pirating at least one software package over the past year. We classified this segment of the respondents as software pirates. The mean number of purchases of software packages over the past year was 5.9. The average software pirate (based on the above definition), pirated 6.8 software packages over the past year.

Based on the data, software pirates are polarized: while 42.4% pirate 3 or fewer software packages, 27.7% pirate over 11. The percentage of people who pirate at "moderate" levels is relatively small.
Games and Utilities were the software packages most susceptible to piracy, with piracy rates of 38.4% for each. Games and Utilities, are followed by Graphic Manipulation Applications at 29.7%, Operating Systems at 22.8%, Word Processors at 22.4%, Programming Languages at 20.2%, and Spreadsheets at 11.1%.
Motivations for Piracy

- Ease
- Frequency
- No Peer Concerns
- Not Considered Unethical
- Evaluation Purposes

Ease/Frequency

Motivations for software piracy varied widely among the respondents, but several of these are considered. The vast majority, 91.7% believe that it is easy to pirate software without getting caught and 69.7% believe that most computer users pirate software. This belief of the ease and frequency of software piracy is a contributing motivational factor for software pirates.

No Peer Concerns

Only 15.9% stated that if they pirated software, their peers (family, friends, etc.) would show concern, while 65.2% stated that their peers do not mind at all if they use pirated software.

Not Considered Unethical

While many, 59.9%, consider piracy unethical, a significant portion of the respondents, 26.4%, did not consider software piracy unethical. These values were mirrored with the level of agreement from the respondents regarding the belief that software piracy is the same as stealing. Many, 58.2%, considered it the same as stealing, while 33.8% do not. 23.4% of the respondents believe that piracy is an acceptable behavior.

Evaluation Purposes

Since many software packages are expensive (many in the range of several hundred dollars) and there is often no way to evaluate the software, many respondents, 44.4%, pirate software for the purposes of evaluation. If after the evaluation, they feel that the product would be
While 86.7% stated that they were aware of the criminal and legal consequences of software piracy, very few of the respondents were able to correctly identify the correct maximum fine and penalties for software piracy.

Many of the respondents, stated that they did not know what the maximum fine and penalties are for software piracy, 43.8% and 42.5% respectively.

Of the remaining individuals who believed they knew the correct answer, only 11.2% knew the correct maximum fine and only 14.3% knew the correct maximum jail sentence. Interestingly, had the respondents guessed randomly, a larger proportion of the respondents would have correctly answered the maximum fine and jail sentence questions, 14.3% and 16.7%.

Even though many, (81.7% and 77.3% for fine and jail penalties respectively), underestimated the true legal penalties for piracy, 33.8% stated that it is not worth the risk of getting caught to pirate software. Perhaps due to this underestimation, 38.5% believe that the software penalties are currently not strict enough.
Piracy Behavior

- Thomas & Meyer Study
- Frequency of Pirating
  - Whenever Possible
  - Frequently
- Software Usage

- Tech Support
- Word-of-Mouth Advertising

Thomas & Meyer Study

Considering the level of piracy among some of the respondents, it is difficult to believe that these computer users are actually pirating software they actually need or would ever purchase. A study conducted by Thomas & Meyer found that many pirates pirate software even when they don't intend to use it. As a result, these computer programs are stored on the computer, used a few times until the novelty of the new program has worn off, and then left in the computer never to be touched again.

Frequency of Pirating

In our research study, 17.8% state that they pirate software whenever they have the opportunity, whether or not they intend to use the product. 23.4% stated that they frequently pirate software.

Software Usage

The belief that pirates illegally copy software that they would never have purchased anyhow, is confirmed by the statistic that 72.5% of the respondents would purchase less than 10% of their pirated software if it were no longer possible to pirate software.

We also confirmed some of the positive characteristics software pirates have on the software industry. The vast majority of the respondents, 93.6%, stated that they were able to provide tech support for the software applications they use, through direct help, e-mail, or USENET newsgroups. Pirates perform the service of word-of-mouth advertising it, with 80.1% of the respondents stating that they recommend good software to others (businesses, family, friends, etc.) for purchase.
We were curious to see if there was any differences in piracy behavior between genders. We performed a cross-tabulation analysis the question “Have you pirated a software package over the past year?” and “What is your gender?”. The results show that at the alpha equals 0.05 level, the results were not significant. This implies that there are no significant differences in piracy behavior between genders.
Knowledge of Legal Consequences

<table>
<thead>
<tr>
<th></th>
<th>Know Penalties</th>
<th>Do Not Know Penalties</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pirated</td>
<td>51%</td>
<td>46%</td>
<td>46%</td>
</tr>
<tr>
<td>Don’t Pirate</td>
<td>49%</td>
<td>54%</td>
<td>54%</td>
</tr>
<tr>
<td>Total</td>
<td>7%</td>
<td>94%</td>
<td></td>
</tr>
</tbody>
</table>

Pearson Chi-Square = 0.62
p-value = 0.43108
At α=0.05, results were not significant

We were also curious to see if knowing the consequences of software piracy had any correlation to their piracy habits. We performed a cross-tabulation analysis between the statement “Have you pirated any software over the past year?” and whether they were able to correctly answer the questions on penalties. At the alpha equals 0.05 level, the results were not significant. There does not appear to be any correlation with knowledge of the penalties for software piracy and the tendency to pirate software.
A factor analysis was done, and factors with a reliability of less than 0.5 and those with an Eigen value less than 1 were discarded. This left a total of six factors:

**FACTOR 1:** Attitudes toward Software Piracy (reliability = 0.958)

**FACTOR 2:** Tendency to Pirate (reliability = 0.906)

**FACTOR 3:** Ease and Widespread Nature of Software Piracy (reliability = 0.636)

**FACTOR 4:** Manufacturers and Consumers Incur a Loss (reliability = 0.711)

**FACTOR 5:** Manufacturers Overcharge Consumers (reliability = 0.517)

**FACTOR 6:** Unethical to Bootleg Pirated Software (reliability = 0.587)

**FACTOR 7:** Pirate Software for Evaluation (reliability = N/A)

The remaining factors did not meet the necessary criteria for inclusion for further analysis, and were thus removed. These factors include:

**FACTOR 8:** Consider Penalties to be Minor (reliability = 0.472)

**FACTOR 9:** Aware of the Penalties for Piracy (reliability = 0.346)
Regression Analysis

- Regression Analysis with FACTORs & demographic variables
- Four Items of Significance:
  - FACTOR2: p-val=0.0000; + correlation
  - FACTOR6: p-val=0.0133; - correlation
  - FACTOR7: p-val=0.0010; + correlation
  - Age: p-val=0.0048; - correlation

A multiple regression analysis was done with the dependent variable as the number of software packages pirated, using the above-mentioned factors as well as three classification variables—age, income, and education.

The analysis found four items of significance ($\alpha = 0.05$): FACTOR 2, FACTOR 6, FACTOR 7, and the classification variable age. FACTOR 2, which described the tendency to pirate software, had a p-value of 0.0000 and positive correlation, that is, people with positive attitudes toward piracy are likely to pirate more software. FACTOR 6, regarding the ethics of bootlegging, had a p-value of 0.0133 and a negative correlation, that is, those who consider bootlegging unethical pirate less. FACTOR 7, pirating software for the purposes of evaluation, had a p-value of 0.0010 and a positive correlation, that is, people who want to evaluate software before purchase, pirate software more. Finally, the demographic age had a p-value of 0.0048 and negative correlation, that is, younger people are more likely to pirate software than compared to older people. All other factors and classification variables were not significant.
Implications for the Industry

- First consider benefits
- Ethical appeals
  - Unlikely to succeed
  - Current campaigns
    - "Reboot Your Attitude"
    - Sponsored by BSA

While over 90% of computer users agree that it is easy to pirate software without getting caught, software manufacturers may wish to choose an alternative to increased criminalization. While software manufacturers may lose some potential revenue from pirated software, these same individuals are providing services to the software industry. Over 80% of the respondents stated that they provide word-of-mouth advertising and over 90% provide free technical support to others using the same product. This advertising increases the customer base and revenue for the software company. Technical assistance increases user satisfaction, leading to future purchases and upgrades, as well as reducing costs of technical service representatives. Previous researchers have found that pirates generally purchase more software—sometimes by as much as a factor of three—than non-pirates.

However, if software manufacturers believe that they are losing too much money from piracy, they must take action. Ethical appeals may not be a good course of action. A large percentage of the respondents from this study did not see any ethical problems with software piracy. In addition, few of the respondents had peers that would show concern of their pirating. An ad campaign to significantly change these notions may not be enough to change the behaviors of pirates.
One of the central causes for software piracy is a lack of an evaluation process. The amount of money required to purchase a particular software package may become quite an investment. Many common office suites (e.g., Microsoft Office 2000) and graphics tools (e.g., Adobe Photoshop 5.5) cost consumers hundreds of dollars. Without a means to evaluate the package before purchase, making a decision as to which product would best meet the consumer's needs becomes difficult. Product reviews from magazines and advice from computer professionals are of limited use, as only direct trial can assure one's purchase. Similarly, most consumers test drive a car before making the purchase, as reading magazine reviews does not give all the information required to make an informed decision; surely, there must be some means to evaluate software before purchase. Most software retailers have a “no return” policy which prevents potential users from returning a product that does not meet their needs. Thus, piracy for the purposes of evaluation becomes a defensive consumer strategy. Software manufacturers can aid the consumer’s decision, without forcing the potential consumer into piracy, by providing evaluation copies of their product. Evaluation copies may be a full-featured product that expires after a set period (usually 30 to 90 days) or it may be a product with missing features, without a timeout period. Since most people can't afford to risk purchasing software that could run hundreds of dollars, many programs remain unpurchased (Thomas & Meyer 1990). Consequently, evaluation product versions benefit both the software industry and consumers.
Alternative marketing schemes are another work-around for software piracy. Sun Microsystems provides an excellent case study on one such scheme. Sun Microsystems provides commercial software, such as their operating system Solaris and their office suite StarOffice, free of cost for educational and non-commercial use. However, commercial users are charged for these products. As reported earlier, software piracy is generally only a concern for individual users; business users do not generally pirate software due to possible consequences for doing so. Sun Microsystems expands their customer base by providing their software for free for educational use. When these students graduate from school and move to a corporate or commercial setting, they purchase Sun Microsystems products because they have been using it throughout their educational years.

Another alternative marketing scheme is employed by Red Hat. Like Sun Microsystems, they too release their product for free. However, Red Hat releases their product for free to everyone—commercial and non-commercial. However, their free, though usable, version of their software provides only basic services. Additional services are provided at an added cost in so-called “Deluxe” or “Professional” versions. Consumers are encouraged to try out free versions of their software and are then persuaded to purchase the more advanced versions that provide added features. Red Hat also generates revenue from their free products by charging fees for technical support.
The issue of software piracy is a complex one. Software manufacturers must be able to balance their software piracy tactics. Insufficient involvement in preventing piracy of their products may lead to uncontrolled piracy as in some foreign countries where piracy rates have risen to 97%. On the other hand, excess expenditure of time and resources on software piracy may also have negative consequences, as described by Conner and Rumelt (1991). For example, strict piracy protection policies reduces the total number of users of the software package. Also, the increased cost of protection and enforcement leads to higher software costs, leading consumers to purchase competing, less expensive, software packages.