SHAREWARE MARKET ANALYSIS

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ABSTRACT

Shareware programming is a wide open market for software sales. The use of different limitations, registration fees and payment methods are used throughout the shareware market. The goal of the project was to examine the methods of publishing shareware products as well as to inspect the shareware users' tendencies. Our data collecting techniques include surveys and interviews as well as an investigation of a popular shareware distribution website. The specific objectives of this project were to investigate shareware programmers' strategies of production, shareware users' likes and dislikes and to make recommendations to shareware companies as to how to publish a successful shareware program using the characteristics of shareware marketing that we have discovered through our research and analysis.

AUTHORSHIP

The following individuals have equally contributed to the work presented in the following report: Kenneth Belliveau, Peter Golaszewski, and Sebastian Jastrzebski.

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1 INTRODUCTION

Over the past two decades the software market has been enriched by the existence of shareware products. Shareware is defined as a promotional tool and is used to advertise fully featured software products. Individual programmers can start a business by creating a software product and distributing it under the shareware distribution method. Users can choose the product and evaluate it as necessary, and then send the programmer the registration fee to unlock the program's full capabilities. As a marketing method shareware can significantly benefit a company by increasing sales and providing publicity. Since this is a relatively new topic, there has not been much scientific research conducted on this subject. We are not aware of any statistical analysis being published on the use or development of shareware products.

The project's focus is an analysis of the shareware market from both developers' and users' points of view. The main goal of the project is to find out what parameters of shareware make it successful. Success in shareware production means short-term and long-term financial benefits to the developer. Through the means of surveys and interviews we found out what limitations and restricted evaluation periods the majority of shareware developers utilize when making their products. Through statistical analysis we developed results to show what limitations the developers feel are the foremost in making their product successful. We also used a survey to see what characteristics the students at Worcester Polytechnic Institute think should be included in a shareware product. Using a statistical analysis approach we developed results to characterize what the Worcester Polytechnic Institute student body feels makes a good shareware product.

Our sub-goals are to answer the following questions: How does the WPI student body use shareware? What do users like and dislike about shareware? What convinces users to pay the registration fees? What restrictions and limitations should developers put in their shareware? This information gave us results, which allowed us to make conclusions and recommendations to shareware developers, to make their businesses more productive in the long run, meaning acquiring more registered users. To conduct our research we used various means of data collection and statistical analysis. We used descriptive and inferential statistical methods to analyze responses from both the Developers' and the Users' Surveys as well as the secondary data acquired from WinFiles.com. As a part of our research we also carried out one-on-one interviews with successful shareware developers.

The audience targeted by this project consisted of individual computer programmers and software companies that are looking for an effective way to increase the sales of their software. The results and conclusions obtained from this project could be used to influence decisions that a software company follows during the process of software development and the subsequent publishing effort. The recommendations were based on what the people of the WPI student body had to say about registering shareware. The original user selection was based on a more general user population, due to lack of responses this was reduced to the undergraduate students at Worcester Polytechnic Institute.

Worcester Polytechnic Institute's Interactive Qualifying Project concentrates on the interaction of society and technology. This project motivated us to explore the social implications that technology had on the environment and people. Specifically, this

project was a case study of the shareware market. We analyzed both how shareware affects software companies and how shareware affects users. This is a direct relation between technology and the society. This project satisfies the Interactive Qualifying Project requirements by relating shareware and its distribution to the marketing model of software companies, and to society's (computer users) satisfaction.

2 LITERATURE REVIEW

This project, which is being advised in the WPI Computer Science Department, consists of a detailed study of the marketing structure behind shareware production. The contents of this literature review are designed to give the reader background information on terms and techniques that will be used throughout this project. The topics in this literature review are shareware, open source, freeware, public domain, data collection techniques and analysis.

2.1 THE STATE OF THE ART TODAY

2.1.1 Definition of Shareware

A common misconception within computer users is that shareware is just another type of software. This is incorrect. Shareware refers to a marketing method or to be more precise to a distribution method [2]. It is conceptually different from the retail channels because it allows a user to evaluate the product before paying for it. Users have an opportunity to try out the product and decide whether or not it will meet their expectations and needs. This is an entirely different approach than the one adapted by the retail channel.

Retail software found on the shelves of stores is offered in wrapped boxes, giving users little chance to see how it performs. To make things even worse, most stores do not allow returning unwrapped software products because of the piracy issue. This problem has been a primary issue in the software industry because of the ease with which one may duplicate a software product. Many users are often forced to rely on magazine reviews or recommendations from other people to decide what software to purchase.

Shareware distribution offers users hands-on experience on the product. If the product does not meet the user's expectations, he or she does not have to worry about getting his or her money back because the evaluation of a shareware program is completely free. "The shareware marketing method lets you try a program before you buy it" [2]. This is the major advantage over buying a program directly from a store.

Shareware titles are "just like programs you find in major stores, catalogs, and other places where people purchase software -- except you get to use them, on your own computer, before paying for them" [3]. The only difference between a retail program and a shareware product may be manifested by the presence of some form of restrictions that usually limits what a user can do with the program. A version of the shareware program featuring some type of restriction is often referred to as an evaluation version.

Authors of shareware programs often include some type of limitation to encourage users to register their software. Common types of limitations employed by shareware developers include: nag screens that pop up every time an evaluation version of a program is started, program counters that limit usage of an evaluation version to a certain number of times or a certain number of days, or features that have been disabled in an evaluation version. Shareware authors may also choose not to include any of these forms of restrictions. A look at history shows that every program that became a 'standard of the industry' used no registration incentives designed to annoy the user [2].

Copyright laws apply to both shareware and retail software. The author of a shareware title retains all rights to his or her copyrighted software. The difference lies in the distribution method. "The author specifically grants the right to copy and distribute the software, either to all and sundry or to a specific group. For example, some authors

require written permission before a commercial disk vendor may copy their shareware" [1].

2.1.2 History of Shareware

The concept of shareware originated in 1982 from two programmers, Andrew Fluegleman and Jim Knopf. They had written two major programs, a communication program and a database program, and wanted to publish them. Not having the time or money to invest in getting their programs into stores, these two entrepreneurs took advantage of pirate distribution networks, allowing their programs to be copied. Pirate distribution networks were largely popular in the 80's in a form of user groups and private or public bulletin board systems. They put a request for money to be sent to them in the documentation. Fluegleman called this method of distribution "Freeware and trademarked that name, meaning that nobody else could market their software as Freeware without his permission" [6].

The name Freeware presented however a few conceptual problems. First and foremost, this name was not very appropriate because "the software wasn't really intended to be free" [6]. Another problem with that name had to do with the fact that it has been trademarked and therefore was not appropriate as a general name for this distribution method that could be uniformly and legally used by the software industry.

In 1984, a computer journalist Nelson Ford held a contest in a popular computer magazine to come up with a new name for Freeware. Shareware, suggested by Bob Wallace, was the most popular choice. Wallace was an author of a popular word processing program, PC-Write, and he applied that term while distributing his application. However, unlike Fluegleman, he did not claim any exclusive rights to this

term. As a result, "the announcement was made that shareware was the winner" [6] and the successor to the term Freeware.

After a while, the program that Fluegleman distributed under the term Freeware was discontinued. The definition of the term freeware has evolved from its original meaning to the one that refers to software for which no fee was requested. This term currently refers to software "which can be 'freely' used without payment to the author, but for which the author retains the copyright to the software" [6].

The next major step in the evolution of shareware occurred in early 1987, when the Association of Shareware Professionals, a trade organization of shareware programmers was formed. Originally this group was only for programmers, but shortly after it was expanded to include vendors and software distributors [6].

The ASP plays a prominent role in the shareware industry. It functions as a protective and regulatory body for both customers and shareware vendors. With over 1500 shareware authors, vendors and online providers, the ASP's "members agree to uphold high standards of professionalism and to always deal fairly and courteously with their customers" [3].

The ASP logo program, or plan, sponsored by the organization, guarantees users who decide to purchase a shareware program featuring the ASP logo that the product will meet high quality standards expected from a commercial production. Additionally, "the ASP maintains an Ombudsman service, which can help customers resolve any problems with ASP members" [3] in case the need arises.

2.1.3 The Open Source Definition

Open source is defined by opensource.org as a program, which follows the following guidelines. The program must have an agreement for free distribution. This means that the license cannot restrict any party from selling or giving the software away as part of a distribution consisting of programs from different sources. Also, the license cannot require a fee for such a sale [13].

The program must include the source code and must allow the distribution of both the compiled version and the source code. The source code must be well publicized and easily accessible if the code is not supplied with the program [13].

The license must contain terms for derived works, meaning anything that is made as a spin-off of the original program. The license must allow modifications and distributions under the same terms as the license of the original software [13].

Integrity of the author's source code must also be protected. The license must permit distribution of software built from modified source code [13].

There must be no discrimination against persons or groups; any group that would like to use the software has every right to do so. No one can be denied usage of the open source software [13].

There can be no discrimination against fields of endeavor, meaning the code can be used for any purpose that the user would like. For example, the license must not restrict the program from being used in a business or from being used for genetic research, or any other specified field of endeavor [13].

The license must have a section devoted to the distribution of license. The rights attached to the program must apply to all whom the program is redistributed [13].

The license must not be specific to a product. The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution [13].

The license must not put any restrictions on other software that is distributed along with the licensed software [13].

Open Source definition - lay terms

Open source software is the term used to describe any freely distributed software that is distributed with the source code so that the user may alter it. It is a common misconception that free software is the same as "freeware." This is not the case. Free software is the same as open source software, which means that you are free to do what you want with the code and the program. Free software does not refer to the price. Freeware is a copyrighted program, which does not contain source code. It cannot be altered and has protections for the author.

2.1.4 History of the Open Source Effort

At a strategic session held on February 3, 1998, in Palo Alto, California the "Open Source" label was first introduced. The open source definition is derived from the Debian Free Software Guidelines. Bruce Perens wrote the original draft. It was later changed and revised using suggestions from the Debian GNU Linux distribution developers [8].

2.1.5 Other Non-Retail Software

Freeware is the term used to define software that is offered to a user for no cost [21]. This definition does not mean that a user is free to do whatever he or she pleases with the program. Freeware is used to describe a software product that is not paid for but still has laws to protect the author's work. Freeware does not mean that you can use the programming of the software to make something new. This is a misconception among many users. Copyrighted Freeware cannot be used by people to incorporate into their own developments; the program's source code is protected by law [21]. Freeware is usually distributed by user groups, and through e-mail, bulletin boards, and other electronic media [14].

FRS is a term used to define "Freely Redistributable Software." This terminology first entered the general Internet in 1995. The first formal conference on freely redistributable software was held in Cambridge, MA in February 1996. This conference was sponsored by the Free Software Foundation [14].

Software that is not copyrighted and "no-cost" is called Public Domain Software. Public Domain Software is composed of programs that the authors wanted to release to the public users at no charge so that the software can be shared with everyone. There is a big difference between freeware and public domain software; public domain software can be used without restriction as components of other programs [23].

Liteware is another name for shareware, which can be distributed freely but does not contain all the features of a company's full commercial software. The Liteware version can be distributed freely because it is used by the company as a tool to let the user get a feel for what the program offers. Letting a user get a hands-on feel for the program

before they have to buy it is a great way to show how good your product is, and whether or not the user needs the features of the particular software [22].

2.2 PREVIOUS RESEARCH

The shareware market is extremely large. The number of programs distributed as shareware is constantly increasing. The growth of the Internet is one of the primary key factors for the success of shareware distribution. There are a number of online virtual shareware collection sites that provide links to countless numbers of shareware titles. However, even in the presence of this large number of shareware products, there has been very little actual research done on how to publish a successful shareware.

2.2.1 Relevant Interactive Qualifying Projects

Students at WPI have previously done an Interactive Qualifying Project on the subject of software piracy and bulletin board systems. This project "examines the current state of the law concerning computer crime, specifically the topic of software piracy through the use of pirate bulletin board systems (BBS)" [24]. While BBS's are certainly one of the media used by the shareware distribution method, the main concentration of that Interactive Qualifying Project is on the piracy issue, which has little relevance to our topic. However, it serves as source of good background information as software piracy is one of the issues that shareware distribution indirectly tries to address.

2.2.2 Online Software Libraries

Another source of information about shareware comes from various statistics published by different Internet software libraries. These Internet sites, along with the links to downloadable programs, often publish on a regular basis a list of most popular

downloads from that site. These charts provide a good informational tool as to which programs enjoy the most popularity. Although these sites do not offer any substantial insight or analysis of their statistics, the information provided by those sites combined with other research is helpful in forming conclusive results. "Monthly Top 25" featured on the Stroud's CWSApp List [11] features top downloads from that site along with their rankings and number of months on the chart. The ZDNet software library [25] features "Weekly Top Ten", most popular files for each week. Along with ratings, this site also lists the number of downloads for each title listed in the top ten. These statistics lack any insight or analysis.

2.2.3 Surveys

The shareware distribution method has attracted the attention of many software companies. However, only a few attempts have been made to collect information about shareware users and authors on the World Wide Web using surveys as the means of data gathering. We have found four websites that publish results on the shareware usage by visitors who have participated and filled out the surveys:

- http://www.bsoftware.com/sur.htm [19]
- http://mirror.apple.com/mirrors/info-mac/info/sft/shareware-case-study.txt [4]
- http://www.aivosto.com/vbq8/vbq8.html [20]
- http://www.ganggang.com.au/journal/ggstats.htm [17]

Although every one of these surveys lacks professional statistical analysis, these sites provided us with interesting statistics.

2.2.4 Software Marketing Consulting Businesses

Since shareware is a part of software marketing, it can be taken into consideration and planning. Many parameters such as size and type of the software, potential markets and their behavior need to be taken into consideration when promoting commercial software. Shareware is considered one of the most powerful promotion tools. If one is looking for answers to questions regarding possible marketing implications of shareware, there is a variety of software marketing consulting businesses. They can be found at: http://dir.yahoo.com/Business_and_Economy/Companies/Marketing/Software/

2.2.5 Books

The shareware market is occupied in large portion by individual developers. It is common for a successful entrepreneur to gather his or her life experiences, and then publish a book on how to start a successful business in his or her domain. This is also true for the shareware development domain. There are several such books available on the market. Although most of these resources lack statistical data and mathematical analysis, they provide a large amount of guidelines and useful tips on how the shareware market works. Some books on shareware are listed in the Bibliography of this document.

2.3 RELEVANT STUDIES

2.3.1 Marketing

The Institute of Marketing defines marketing as "the management process responsible for identifying, anticipating and satisfying customer requirements profitably" [18]. This is obviously not always the case. Professional marketing associates know that

it is their job to sell a product. The consumer may not need this product or it may be exactly what he or she is looking for [18].

Marketing is a tool for a company to increase sales. Marketing therefore is a very valuable asset to a sales firm. In our case study, programmers use shareware distribution as a basis for their company's marketing. Products marketed under the shareware distribution method provide an efficient way of delivering a product to large audiences that may be spread over geographically diverse locations.

Shareware distribution, besides increasing exposure to the product, has another important aspect that gives it a marketing advantage. The overhead involved in producing and distributing a finished product is much lower than the overhead for any retail software, resulting in lower prices. Lower prices provide a competitive advantage in a consumer market.

2.3.2 Microeconomics

The term "microeconomics" refers to the study of small economic units, such as that of individual consumer or household, or a company or business. Microeconomics is one of the fundamental components of our project. Our research includes how companies that publish shareware improve profits and registered user numbers. The software market as a whole moves with trends in the software that is produced and that which is being most used.

2.4 RELEVANT TECHNIQUES TO BE MASTERED TO DO THE PROJECT

2.4.1 Data Collection

Data collection is a large part of the beginning stages of this project. To gain an understanding of what is happening in the software market we collected data from shareware programmers and users. These users can be business, educational, or home users. For users, WPI undergraduate students made up the sample set for the data collected. After collection of the data, a detailed analysis was accomplished.

2.4.1.1 Statistical Data

Gaining useful statistical data from websites is a technique that was used throughout the course of this project. From shareware distribution sites, we researched the types of shareware, registration methods and fee, as well as the evaluation period. Conclusions were drawn from this data to see what evaluation limitations and fees are being used on the software in the general market.

2.4.1.2 Surveys

A skill that was needed for this project was survey design. This means both making it easy to understand and creating it to give us the required information needed to acquire the goals of this project. One of the main points about making a quality survey is to assure the reader that the survey is totally anonymous and that in no way can the information gained be traced back or used against the person taking the survey. We have given the survey takers a written agreement that we will strip all email addresses and IP addresses off the results.

A database was be set up to collect all the survey responses. This made the survey a quick and easy way to gather data. We then, as a group, analyzed the data to make a study of how shareware helps software manufacturers' sales and how consumers use and evaluate shareware.

2.4.1.3 Programmer Interviews

For the interviews, we made a script that had all the questions so we knew exactly what we were going to say and exactly how the interview should go. It is very important to look and sound as professional as you can, so you can get quality answers and gain other useful information that the programmer can offer. Questions aimed at one-on-one interviews are different than in the survey. These questions were open-ended and gave us a good overview of the information being collected.

2.4.2 Data Analysis and Interpretation

Most of the data collected from surveys, experiments and observations is raw. It is simply a collection of unrelated records. Collected data was collated, organized, summarized and described [5, p. 20]. Through application of content analysis and interpretation of the data collections it was possible to draw conclusions. Although directions of causalities cannot be simply concluded from the data, it may be possible to find relations between two or more variables [5, p. 3]. Tools such as graphs, tables and plots were very helpful in the process of data visualization. Statistical analysis is the most important aspect of any research based on data collections.

2.4.2.1 Statistical Analysis

Statistical skills and knowledge are the core requirements for successful and reliable results of this project. We gained strong foundations of both descriptive and the inferential statistics. In order to interpret the collected materials, we had to become familiar with various statistical methods.

2.4.2.1.1 Degree of Confidence

Results provided by analysis of data collections are in practice only estimates of the real world. The research data in this project was collected from limited sample space, which introduced uncertainty of the final results. One of our goals was to determine the uncertainty factor in the inferential analysis and to include it as a part of our research conclusions. Achieving a confidence interval of 95 percent can be considered satisfactory [5, p. 21].

2.4.3 Applying Results to the Problem

Once the collected data was summarized and described, conclusions were drawn about the relation between the research results and the real world problem or question. In the case of this research for example, conclusions drawn from the data allowed us to create recommendations of what a successful shareware product should incorporate based on user tendencies, and developer strategies. We were also able to compare our results to the current state of the shareware market.

2.5 HOW OTHERS HAVE GONE ABOUT TRYING TO SOLVE THE PROBLEMS

Most of the materials related to shareware development and usage can be categorized into three groups. The first group includes a family of shareware resource

directories. Such materials help users and developers find available shareware products. Often such directories contain shareware news, recommendations, distributor lists, reviews, etc. These resources provide little direct statistical data on the shareware market.

The second group of materials encapsulates books and articles written for shareware developers and distributors, where helpful tips and recommendations can be found. Experienced software developers who spent significant amount of time in the shareware industry usually write such materials. They usually contain all the information an amateur software programmer needs to get started in the shareware business, including legal and financial advice. Although such materials can serve as useful guidelines in creating successful shareware development, they also lack reliable statistical data.

Surveys and case studies are the third group of materials available. There were very few shareware surveys conducted:

· http://www.bsoftware.com/sur.htm [19]

· http://mirror.apple.com/mirrors/info-mac/info/sft/shareware-case-study.txt [4]

· http://www.aivosto.com/vbq8/vbq8.html [20]

· http://www.ganggang.com.au/journal/ggstats.htm [17]

Some of the available works on shareware and related topics can be found by searching http://www.amazon.com (keyword "shareware").

2.5.1 How our Approach is Different

The main difference between the approach of this project and other work that has been done in the domain of the shareware market is the application of statistical analysis. Our research involved a detailed analysis of acquired data and interpretation of the

results. Our results are based on both programmers' and users' survey data. As one of our goals, conclusions were drawn based on the results. Another difference is the fact that the team members did not have significant experience with shareware development. As a result of that, we are not biased toward any development techniques or beliefs.

3 PROCEDURE

3.1 PROJECT TARGET

In the preliminary portion of this project, we were still trying to focus on a strong research topic. The topic of Open Source Software and how it affects the software market, as a whole, was a subject that we started doing research on. This topic seemed like a very interesting topic, but it was a very new topic. All of the websites that we examined had the definition of Open Source dated in 1998. This did not give us much background information. Therefore, this topic and how Open Source Software affects the software market would be difficult to research. We initially planned on doing a case study of Windows NT versus Linux as the two most popular network server operating systems. We concluded that this would be one of the only ways to use Open Source as a topic, being that Linux is an Open Source product. This also proved to be a difficult topic to research.

How shareware affects companies' sales and marketing, and how people use and evaluate shareware is the topic of this Interactive Qualifying Project. Shareware is a well-known marketing tool. Software companies produce shareware to let users evaluate programs before they actually purchase it. This gave us two different views and ways of collecting data. There are many resources on shareware, such as the Association of Shareware Professionals. For our data collection we have both the shareware developer results and the shareware user results. From this we planned to make recommendations as to what characteristics a successful shareware product should have. We also evaluated shareware distribution websites to see what limitations, registration fees and other attributes, programmers most commonly use.

For the literature review section of this document, we have done extensive background research on shareware and other types of software. We obtained information on shareware such as definition, history, and even current information on the subject. The data collection means were very quick and easy, using an online survey and interviews.

We are focusing on the marketing aspect of shareware for the developer information. We sought to find out how shareware helps the company in their sales. We needed to know what are the limitations that make shareware successful as well as what are the registration fees required. This information helped us come up with guidelines on how to make a successful shareware product.

For the user, we focused on how the individual uses and evaluates shareware. We needed to find out what are the users' likes and dislikes of shareware products. Also, we wanted feedback from users such as how long they think a general evaluation period should last, and what a reasonable registration fee should be.

3.2 RELATION OF THE PROJECT TO THE TECHNOLOGY AND THE SOCIETY

Shareware is a marketing tool for software companies. It is a tool that lets developers get their programs out onto the Internet and other distribution media and allows people to use them. After evaluating a shareware product, the user has the choice to either purchase the software for a nominal fee or delete the program.

The social science of microeconomics goes into vast detail on sales and profits. Software engineering is a vastly growing technology that is expanding and reaching new levels all the time, and there are new companies being made based on only one product. One can see that a study of how a consumer uses and evaluates a shareware version of a

company's software is valuable information. How shareware is used as marketing tool for increasing a company's sales is also extremely important information. Such information is both valuable to the companies that produce shareware and to the companies that are upcoming and need a marketing tool to sell their product. Consumers could also use this information to their advantage as well, by recognizing which companies produce shareware so they can evaluate that software before purchasing it. A case study of how shareware, being a technology, affects software companies and users (society) shows that our topic fits into the criteria placed for the Interactive Qualifying Project of Worcester Polytechnic Institute.

3.3 PROCEDURE OBJECTIVES

The objective of our procedure, consisting of interviews and surveys, was to find out what shareware developers and users have to say about shareware products. All the likes and dislikes needed to be investigated to find out how to make a product that will both get the developer the registration money and make the user want to pay for the product. We needed to examine what limitations make a user upset enough to delete the program, and what limitations the user can tolerate enough to keep the product installed on his/her computer. This is the general objective to this project.

By analyzing WinFiles.com we found the average registration fees for certain shareware, and the limitations that the programmer used. In essence we will have information from the developers that shows what they feel is the best characteristics of shareware and we will also have information coming from users and what they feel a quality shareware product should possess.

3.4 DATA NEEDED TO CONDUCT THE PROJECT

To meet the project objectives, we needed to acquire an extensive amount of statistical data. This information consists of data gathered from the users and includes their likes and dislikes of the products. This information from the developers' viewpoint consisted of what they feel are the most effective characteristics to sell their products.

The surveys that we have made are used to acquire general information about shareware developers and users. To gain information on the shareware market as a whole we used statistical data that we gained from doing an analysis of WinFiles.com. By taking the shareware product, description, registration fee, time period, and limitations, we grasped a view of how the majority of shareware products are set up.

For the shareware developers we needed to find out more information on how their business is set up, how each product is developed, and how they choose which limitations to put on specific products. We would like to know how using shareware helped their sales and expansion within the company. We would like to know what types of distribution media are used and why these would be the best means to get the product out to users. For the registered users, we would like to know what special features are often received and do the programmers get feedback on this. A big question that would be left to open-ended interviews would be how do you decide on the registration fee? What are all the factors used to come up with a reasonable fee that will make the user happy and make the company profit. We would like to know what their best estimate on the percentage of users that register their software or how many registered users their product has. We left the interviews open to the programmer to give us any information that they think is worthy of this project.

We chose online surveys as the best way to reach a large number of both users and developers. This was the prime way to gather a large target audience and to get our questions out faster. We made a mailing list and sent the URL of the online survey to the recipients twice and got a large number of responses. For the developers' mailing list we took product developers email addresses from WinFiles.com, which contained their product. This was a fast way to get quality responses from successful shareware developers. The one-on-one interviews were the best way to get open-ended answers where we could let the programmer elaborate on certain issues. This was the best way to get the answers to specific questions. One-on-one interviews, surveys, and general market research are all extremely good ways of gaining useful information on the shareware market.

3.5 MATERIALS AND TOOLS USED IN THE PROJECT

The project procedure often dealt with automated data extracting, formatting and processing. The following tools were used to help us with the automation:

3.5.1 C Programs

C was the language used to write a Unix-based NNTP (Network News Transport Protocol) client tool. The program was used to communicate with a NNTP server, to download a list of email addresses from various newsgroups. The program was controlled by a shell script, and had the ability to create a results report. For more specific information on how the program was used, please read section 3.6.1. The source code for the program can be found in Appendix M.

3.5.2 CGI Database

All our surveys were Web-based. All the responses were stored in our on-line CGI database. One CGI script was used for each survey. Each script simply appended responses to an appropriate data file in a raw CGI query format. We have also created a simple script that reported to us the number of responses for each survey. The source code for each script can be found in Appendix O.

3.5.3 Perl Scripts

Perl scripts were used in our project for a few purposes. One of the scripts was used as a mass-mailing tool. It took an input list of email addresses, and sent our letters in sets of a certain size, each separated by 10-minute intervals. The source code for this script can be found in Appendix N. Another Perl script was used to pre-format our raw data from the survey responses. The pre-formatting needed to be done before the data was imported into an Excel worksheet. The source code for this script can be found in Appendix P.

3.5.4 Microsoft Excel Worksheets and Macros

Microsoft Excel worksheets and macros were mostly used as an intermediate step between raw data files and Microsoft Access databases. We found them particularly useful in parsing pages downloaded from WinFiles.com.

3.5.5 Microsoft Access Databases

Access tables were used to store most of our data such as email addresses, survey responses and WinFiles.Com statistics. We created various Standard Query Language queries and Visual Basic modules to maintain and format our data sets. For example, we

used a simple, non-relational table to track, which email addresses returned bounced (caused by an invalid email address) and who asked us to be removed from our mailing list. For the Developer's Survey there was an optional space for supplying us with an email address to provide the results to those who wanted them. The table also tracked those who already filled out our survey and gave us their email addresses.

3.5.6 Online Survey Database

Recently, the World Wide Web has become a largely spread and frequently used medium. In our research, we used a web-based database to host our survey manager. We gathered survey responses with the help of CGI Perl scripts. The surveys' database was located at:

http://www.wpi.edu/~peterg/IQP/

3.5.7 Statistical Analysis Tools

We used Microsoft Excel as our statistical analysis tool. Excel provides a large variety of statistical functions as well as extensive graphing capabilities. It made it easy for us to move our results into Microsoft Word, which was our word processor for this report.

3.5.8 Other Software

WebZip by Spidersoft (http://www.spidersoft.com) was used to download the entire WinFiles.Com site onto our computer. The pages were then imported into Microsoft Excel for parsing.

3.6 DATA GATHERING

The data gathering process is the most crucial part of this project. Data analysis, interpretation, and end results will largely depend on the amount of feedback and the quality of collected data. Therefore, a lot of effort was spent on carefully preparing and planning for this phase of the project.

The data gathering process consisted of several different steps. Considering the time constraints of this project, the data gathering process involved the collection of the data from several sources simultaneously. We approached this problem by preparing all the necessary materials such as surveys, the online database, and interview questions ahead of time. During these preparation efforts, a targeted audience for each of the methods of data collection was selected.

The next step of the data gathering process involved the deployment of data collection means. Surveys were sent to appropriate audiences. Interviews were scheduled and conducted with shareware software vendors.

These tasks were accompanied by simultaneous examination of the selected online shareware library resource, WinFiles.com. The examination process involved selecting and extracting information relating to different characteristics of shareware programs.

3.6.1 Surveys

The first and foremost thing to do when conducting a survey is to identify the information that is being sought. Then, by studying what you want to find, you must discover which type of survey is best suited for your needs. These include written surveys through the mail, electronic mail surveys, telephone questionnaires, and one-on-

one interviews [5, p. 1]. An online database was set up to collect the answers for an electronic Web-based survey. The database made the survey a quick and easy questionnaire, which we felt would increase the chances of getting a good response rate.

The next step for completing a working survey was to design the questions that are to be asked. The questions needed to be asked in a certain way, so as to gain the most useful information. This was accomplished by setting up the surveys, for both users and developers, with closed-ended questions. The questions were multiple-choice with certain questions allowing for short written answers [5, p. 2].

The questions needed to be asked, so that they do not include any biases, and are not emotionally worded [5, p. 2]. The questions must be easy to follow and to answer, otherwise the recipient will not take the little bit of time needed to finish the survey.

The construction of the questionnaire was the next step in the collection process. The first thing to do for a survey is to send a cover page, something that tells who you are, what the survey is about, why you are doing it, and the protection of the user's identity [5, p. 3]. Also on the survey, there should be some explanation of the questions and reasons for the survey [5, p. 3]. The first questions should be intriguing to the taker. We want them to be pulled into the survey.

The next thing that needs to be done before sending out the finished survey is to give it to a control group of a few people and pre-test the questionnaire. This is an important step because you need to see if the survey is going to be effective.

We sent the survey in two waves to the developers' mailing list and the users' mailing list. The second mailing approximately doubled the survey response rate. As stated earlier, both a user and a developer survey will be incorporated as data gathering

tools for this project. The surveys were sent to the WPI undergraduate student body and the shareware developers from WinFiles.com.

We have published three surveys: the Developers' Survey, the Users' Survey and the Students' Survey. The following are the detailed steps we have taken to gather data from each survey:

3.6.1.1 Developers' Survey:

1. Establishing the target audience: We decided to focus mostly on Microsoft Windows shareware programmers. Windows currently dominates the shareware market. We also decided to address a small part of the general software developers' audience, but request that only shareware developers respond to our survey.

2. Developing the survey structure and writing the questions: We based this part of the procedure on our project objectives, which can be found in section 3.3. The "Introduction to Survey Design and Methodology" [5] was very useful in writing the survey. You can find the Students' Survey in Appendix B of this report.

3. Creating a CGI database to store the survey responses: A CGI Perl script was used to store the responses (see section 3.5.2 for more information).

4. Pre-testing: We asked a small set of people, to take the survey, and provide us with feedback, specifically if any of the questions were clear, how long it took to fill out the survey, as well as if there were any additional questions that they felt should be asked. The gathered feedback helped us to improve the clarity of the survey.

5. Gathering email addresses: We decided to contact our audience using email as a communication medium. To gather the developers' email addresses we have taken two approaches.

a) The majority of the email addresses we acquired from advertisements on WinFiles.com. We used the WebZip shareware by Spidersoft to download all of the WinFiles.com pages. Downloaded pages were then imported into Microsoft Excel. Using Excel macros, we extracted email addresses of all the shareware developers that advertised their software on the site. The list was then exported into Microsoft Access, where we were able to maintain it more easily. We gathered a total of 4201 email addresses from WinFiles.com.

b) The smaller portion of the developer email addresses came from parsing messages posted to newsgroups. We selected the following newsgroups for this purpose:

- comp.org.acm
- comp.client-server
- comp.databases
- comp.lang.c++
- comp.os.ms-windows.programmer.win32
- comp.os.ms-windows.programmer.misc

A public NNTP server (newsfeed.ksu.edu) was accessed using our "NNTP Fetcher" program (see section 3.5.1 for more information on the program).

A total of 4184 email addresses was acquired from the newsgroups above. This brought the total number of acquired developer emails to 8385.

6. Writing the cover letters and sending out emails: Our cover letters introduced the purpose of the project, and provided the URL to the survey database. We asked that only shareware developers respond to the survey. The letters sent to the developers can

be found in Appendix E of this report. We wrote a Perl script called "Emailer" to send out the emails (see section 3.5.3 for more information on the program).

3.6.1.2 Users' Survey:

1. Establishing the target audience: We decided to focus mostly on Microsoft Windows shareware users. Windows currently dominates the shareware market.

2. Developing the survey structure and writing the questions: We based this part of the procedure on our project objectives, which can be found in section 3.3. The "Introduction to Survey Design and Methodology" [5] was very useful in writing the survey. You can find the Users' Survey in Appendix C of this report.

3. Creating a CGI database to store the survey responses: A CGI Perl script was used to store the responses (see section 3.5.2 for more information).

4. Pre-testing: We asked a small set of people to take the survey, and to provide us with feedback, specifically if all questions were clear, how long it took to fill out the survey, as well as if there were any additional questions that they feel should be asked. The gathered feedback helped us to improve the clarity of the survey.

5. Gathering email addresses: Originally we wanted to contact our audience using email as a communication medium. To gather shareware users' email addresses we parsed messages posted to newsgroups. We selected the following newsgroups for this purpose:

- comp.os.ms-windows.win95.misc
- comp.misc
- comp.fontscomp.os.ms-windows.misc
- comp.graphics.misc

- comp.multimedia
- comp.answers
- comp.os.ms-windows.apps.misc
- comp.infosystems.www.misc
- alt.comp.shareware
- comp.edu
- comp.sys.intel
- comp.windows.misc

A public NNTP server (newsfeed.ksu.edu) was accessed using our "NNTP Fetcher" program (see section 3.5.1 for more information on the program).
A total of 8463 email addresses were acquired from the newsgroups above.

6. Writing the cover letters and sending out emails: Our original intent was to send out two or three waves of emails. The purpose of the first wave was to introduce the purpose of the project. The letter sent to the users can be found in Appendix G of this report. We wrote a Perl script called "Emailer" to send out the emails (see section 3.5.3 for more information on the program). Around 1 percent of our audience complained about the "unsolicited" email. Some of the complaints were also addressed to the WPI network administrators. At that point we were prohibited from emailing any more messages to our users list. Taking into consideration the fact that around 12 percent people from the users list asked to be removed from our mailing list, we decided to take on a different strategy for approaching shareware users.

7. Taking on a different approach for reaching shareware users: Instead of sending emails to a known set of people, we decided to make the URL to the Users'

Survey publicly accessible from Internet. We registered the link with most of the major search engines such as Yahoo.com, AltaVista.com, Lycos.com, Excite.com, HotBot.com. We also asked all major shareware distribution websites to put a link to the survey on their web pages. The list of sites that we asked to participate in this project can be found in Appendix L. The letter sent to the site administrators can be found in Appendix J. Finally, we published the URL to the Users' Survey on the following newsgroups:

- alt.comp.shareware
- comp.answers
- comp.edu
- comp.fonts
- comp.graphics.misc
- comp.infosystems.www.misc
- comp.lang.java.programmer
- comp.multimedia
- comp.os.ms-windows.apps.misc
- comp.os.ms-windows.misc
- comp.os.ms-windows.win95.misc
- comp.software.shareware.announce
- comp.software.shareware.authors
- comp.software.shareware.users
- comp.sys.intel
- comp.windows.misc

3.6.1.3 Students' Survey:

As a contingency plan, we decided to use college students as the secondary target audience for the shareware users. The following steps were taken to prepare the Student's Survey:

1. Establishing the target audience: We decided to address college students in the Colleges of the Worcester Consortium. The following schools are members of the Colleges of the Worcester Consortium:

- Anna Maria College (http://www.anna-maria.edu/)
- Assumption College (http://www.assumption.edu/)
- Becker College (http://www.becker.edu/)
- Clark University (http://www.clarku.edu/)
- College of the Holy Cross (http://www.holycross.edu/)
- Quinsigamond Community College (http://www.qcc.mass.edu/)
- University of Mass. Worcester (http://www.ummed.edu/)
- Tufts University, School of Veterinary Medicine (http://www.vec.tufts.edu/)
- Worcester Polytechnic Institute (http://www.wpi.edu/)
- Worcester State College (http://www.worc.mass.edu/)

2. Developing the survey structure and writing the questions: We based the Student's Survey questions on the questions asked in the original Users' Survey. We had to adjust some of the questions to fit this new audience. You can find the Students' Survey in Appendix B of this report.

3. Creating a CGI database to store the survey responses: A CGI Perl script was used to store the responses (see section 3.5.3 for more information).

Gathering email addresses: We decided to acquire a general student body email alias from the network administrators of each college and mail our cover letters manually.

4. Writing the cover letters and sending out emails: The format and content of the email messages sent to the college students were very similar to the messages sent for the Users' Survey. The majority of the network administrators and research authorities from the Colleges of the Worcester Consortium were not willing to participate in our project. Some did not respond to our request at all. Due to lack of time, we decided to change the target audience of our Student's Survey to just the undergraduate students at WPI. A total of 2480 WPI students received an invitation to participate in our survey. The letter sent to the WPI students can be found in Appendix F of this report.

3.6.2 Interviews

The information needed to make conclusions on this project cannot all be gained through simple, multiple-choice surveys. For the more open-ended information we need, one-on-one interviews with shareware developers are the only viable sources. We will incorporate these interviews into our data collection, and use the information as a supplement to the survey material.

The questions were left open-ended to give the programmers as much space as they need to give us the information that we seek. In return for an interview, the individual and his or her company were added to our acknowledgements section, unless anonymity was requested.

The types of questions that we asked were on the lines of: Does all the work and money put into developing a shareware copy of your software help increase your sales? We were looking for more technical information as well, such as which limitations are

used, and why? Which limitations get the best responses on registering the product? While interviewing the developers we found out what forms of distribution media they used. This information helped us to formulate recommendations and conclusions for using shareware as a successful marketing tool.

3.6.2.1 Interview Procedure

The first thing that we did to start the interview procedure was to send a letter inviting the programmer to participate in a telephone interview. The letter can be found in Appendix K. When a list of companies that agreed to be interviewed was established we made up a list of questions that were to be asked on the telephone interview. The list of questions can be found in Appendix D.

The next step was to call the individual programmers and set up a time when we could carry out a telephone interview. The procedure for the telephone interview was very simple. We first asked if we could tape-record the conversation and directly quote the participants. The next step was to carry out the interview on a speakerphone and record the conversation with a microphone and tape recorder.

The information gathered from the interviews will be used to support the conclusions that we have drawn from the survey data and Winfiles.Com breakdown.

3.6.3 Statistical Data from Websites

WinFiles.com presents a valuable source of information about particular methods used to produce shareware titles. Information such as registration fees, restriction methods, and evaluation periods were extracted from the content of this site. The gathered data was used in the creation of a database. The database was utilized to obtain statistical information about methods used to produce shareware titles.

3.6.3.1 WinFiles.com Data Gathering

WinFiles.com, one of the largest virtual shareware libraries on the Internet, is an excellent source of information about shareware products. The site provides an enormous inventory of shareware programs, listing many different characteristics for each program. Therefore, the site presents an attractive source of information, which was utilized to extract useful data about different attributes of shareware programs.

WinFiles.com site is composed of a large number of sections containing different categories of shareware programs. Each one of these sections contains a loosely formatted list of program entries. The format of each section consists of an HTML table with each row holding a listing for a single program.

The site does not impose a strict layout for each row containing an entry for a program. Therefore, the format for a row may slightly differ from one entry to another. The difference is clearly visible for entries containing programs that are not shareware, and therefore might not have attributes that are common among shareware programs, such as the price or the expiration date.

Since WinFiles.com does not limit its content just to shareware programs, but the site also lists public domain, freeware, giftware, and commercial demos, the task of data gathering is additionally complicated by the presence of these heterogeneous types of software. The heterogeneous software types complicate the data gathering process because they introduce variations in the attribute set for each program. In addition, certain attributes, such as program's description, vary greatly in length from one or two lines to one spanning over more than ten lines.

The WinFiles.com data gathering concentrated on techniques used to extract information about shareware programs from the site's pages and then importing them into

a database, which was used in the data analysis part of this project. The procedure for obtaining data from Winfiles.com consisted of ten distinct steps described below.

STEP 1

The WinFiles.com data gathering process started with downloading the content of the WinFiles.com site onto a local hard drive. Among the many offline browser tools, we selected WebZip as the program of choice. WebZip saves files in their native format, maintaining the original file names and directory structure. A snapshot of the content of the site has been then taken.

Once the content of the site has been downloaded onto a local hard drive, the first step in the importing process was to merge all the sections of the site into a single file for easier processing. The WinFiles.com site is composed of more than 270 separate sections, each with a corresponding HTML file. Therefore, by merging them into a single entity, further processing will only have to work with a single file. The DOS "copy" command was used to merge all the files together into a single file. The following command was entered into a DOS prompt and then executed:

```
copy d:\WinFiles\*.html d:\WinFiles.html
```

To append files, the "copy" command takes a single file for destination, which in this case is "d:\WinFiles.html", and multiple files for source, which are specified using wildcards as "d:\WinFiles*.html". The copy operation resulted in a 37.4MB file containing all the sections of WinFiles.com merged into a single file called "WinFiles.html".

STEP 2

The WinFiles.com site was also used as the source of email addresses of the developers chosen for the developer shareware survey. Because of a certain problem that we encountered while importing the data into Microsoft Excel, the email addresses of developers needed to be specially pre-processed before the data could be loaded into Excel.

The problem that we encountered dealt with the way in which Microsoft Excel treats and exports hyperlinks. During the importing process, Excel maintains hyperlink addresses in its internal file format. The export file format that we used did not preserve hyperlink addresses, but rather outputted just hyperlink names.

During this step, we used tagged regular expressions, a feature of TextPad text editor and other Unix tools, to filter out the hyperlink tags from email addresses of developers. The following expressions were entered into the Find dialog of TextPad:

Published by <B><A HREF="mailto:\(.*\)">.*</A></B>

\1

The first expression identifies the string to locate in the text file, while the second expression tells the program what to replace the located text with.

STEP 3

The next three steps of the WinFiles.com data gathering procedure concentrate on eliminating the unnecessary information from the source file. We primarily used Microsoft Excel for this purpose.

Microsoft Excel has excellent HTML importing capabilities. Since we needed to filter out the HTML formatting tags, while preserving the structure of the tables, we utilized Excel import functions to remove the irrelevant tags.

Considering our limited computing resources, the filtering process was divided into several distinct stages. During each stage, a section of the source file was loaded into the spreadsheet and converted to the Excel file format and then saved.

The Open command from the File menu allows us to change the 'Files of Type' field to "*.htm, *.html" for importing HTML documents. The importing process preserves the structure of the table in the HTML documents by putting rows and columns into corresponding Excel cells, which is very important because the layout of the columns and rows is used to distinguished between separate program entries.

STEP 4

During this step, each of the spreadsheet files in the Excel file format was converted to a Tab Delimited text format for further processing. Excel's file export capabilities were utilized for this purpose. The "Save as Type" field in the File Save As dialog allows for the selection of the tab delimited file format, which uses tabs to separate spreadsheet's columns, and new line characters to separate spreadsheet's rows.

STEP 5

The text files from the previous step were merged into a single text file again using the DOS copy command as described in "Step 1" of this section.

```
copy "WinFiles Step 4-*.txt" "WinFiles Step 5.txt"
```

STEP 6

The data exported by Microsoft Excel lacked the HTML tags while preserving the table structure of the original document. The next step used in extracting information about shareware programs from WinFiles.com involved merging multiple lines in the tab delimited text file that belonged to a single program entry into a single line. This operation results in each entry that spans over multiple lines to be combined into a single line and marked by special tags to distinguish them from lines that were not merged. The special tags used for this purpose are <ENTRY> and </ENTRY>.

Merging multiple lines into a single line was accomplished by the following tagged regular expressions:

\(Click Here for FREE.*\)\n\(\t.*\)\n\(\t.*\)\n\(\t.*\)\n\(\t.*\)\n\(\t.*\)\n

<ENTRY>\1\2\3\4\5\6</ENTRY>\n

The first expression selects several lines that match the specified pattern, while the second expression takes specific fragments of the first expression, and uses them as a replacement expression in place of the found text.

STEP 7

The next step in the process of collecting data from WinFiles.com involved removing lines that have not been tagged in the previous step. The regular expression shown below selects any lines that do not start with "<" and replace them with an empty line. The following expressions were used for this purpose:

^[^<].*

\n

After this step, only the tagged entries were present in the file with all other information eliminated from the file.

STEP 8

The final step before importing the data into the database involved removing the tags used to identify the marked entries. A tagged regular expression was used again for this purpose. The first expression below identifies the string to find, while the second expression specifies the replacement string.

<ENTRY>\(.*\)</ENTRY>\n

\1\n

The data was then sorted alphabetically in the text editor with the "Delete Duplicate Option" selected to remove duplicate entries or lines.

STEP 9

Finally, the processed data file was imported back into Microsoft Excel, which handles the tab delimited file format better than Microsoft Access does. The data was selected, copied into the Windows clipboard, and pasted into the Access database. To make sure that the database contained homogenous information about shareware programs, the following query was run once the data has been copied into the database:

DELETE * FROM WinFiles WHERE Type <> "Shareware";

The query deleted any record in the database, which had a "Type" field set to something other than "Shareware". As a result, the remaining records in the database contained programs of the type "Shareware".

3.7 ANALYSIS AND INTERPRETATION

Our research was based on two families of statistical methods: descriptive statistical analysis and inferential statistical analysis. Statistical techniques were used to inspect the data gathered through surveys and the WinFiles.com site. We also used

intuitive interpretation of the information acquired through interviews, to support our research.

3.7.1 Descriptive Statistical Analysis

Descriptive analysis helped us understand and interpret our data sets. Most of our data was composed of various types of scores. A score in the case of a survey for example, would be a numerical response to a particular question (e.g. "What do you think is a reasonable shareware evaluation period?"). However, scores can belong to different scale types such as a nominal scale, an ordinal scale or a ratio scale [7, p. 37]. Through application of various techniques and methods, we were able to answer the following questions about our data sets: What results did we acquire? Are the particular scores generally high or low? How close are the scores to each other? What are the natures of relationships between our scores? [7, p. 29].

3.7.2 Inferential Statistical Analysis

Inferential analysis let us relate the results acquired from the descriptive analysis of gathered data to the general population. The essence of inferential statistics is to figure out to what degree the results obtained by the descriptive analysis represent the population, from which the samples were drawn [7, p. 257]. In this project we applied inferential statistics to our Developers' Survey results and related that to our WinFiles.com review.

There are two types of inferential statistics: parametric statistics and non-parametric statistics. Parametric statistical methods require making certain assumptions about the general population of scores, such as the presence of the normal distribution

curve, and interval or ratio score scales [7, p. 273]. Non-parametric methods do not require such assumptions, so they were the bases for our inferential analysis.

3.7.3 Developers' Survey

3.7.3.1 Descriptive Analysis

The Descriptive Analysis of the Developers' Survey was composed of the following two parts:

Questions Summary:

In this part of the analysis each of the questions was summarized by appropriate statistical functions and methods. Depending on the type of scale represented by each question, the following techniques were used:

- creating frequency and relative frequency distribution tables
- creating distribution bar graphs and histograms
- recognizing the distribution type
- recognizing the central tendency
- calculating the score mean
- calculating the score median
- calculating the score mode
- finding the score range and semi-interquartile range
- calculating the score variance
- calculating the standard deviation

The definition of the some of the above terms can be found in the GLOSSARY section of this report.

Relational Summary:

The main goal of conducting the relational summary is to bring up relations between two sets of scores. It is also possible to analyze multiple relations by finding dependencies between multiple questions. The following is a simplified list of questions on the Developers' Survey:

1. What limitations do you usually include in your shareware?
2. What usage limitations do you put on your shareware?
3. What do you offer with the shareware version of your software?
4. What do you offer with your registered version of the software?
5. What type of media do you use to distribute your shareware?
6. What do you find are the benefits of producing the shareware version of your software?
7. Did distribution of the shareware meet your expectations?
8. How many programmers were involved in the production of the shareware?
9. Which of the methods do you provide to pay the registration fee?
10. Approximately, what is your shareware registration fee?
11. Give us your best estimate on the number of users of the full version of your software?
12. Using your own data, is the cost of putting out the shareware worth the results?

We decided to analyze possible relations between the answers to the following questions:

- Question 1 Vs Question 7
- Question 2 Vs Question 7

- Question 5 Vs Question 7
- Question 1 Vs Question 11
- Question 2 Vs Question 11
- Question 4 Vs Question 11
- Question 10 Vs Question 11
- Question 12 Vs (Question 11 * Question 10)
- Question 6 Vs Question 12
- Question 8 Vs Question 12
- Question 9 Vs Question 12

In cases where the relation between two contiguous scores was analyzed, a score plot was created to observe possible regression type.

3.7.3.2 Inferential Analysis

In this part of the project we tried to find out how well our sample set for the Developers' Survey represents the general shareware developers population. We based this part of the analysis on the data gathered from WinFiles.com (see section 3.6.3). Our assumption was that the shareware programs found on WinFiles.com represent the general population of shareware products. Based on our observations in the descriptive analysis of WinFiles.com, we concluded that these two scores: the shareware registration fee and the evaluation period in weeks, do not create normal distribution curves, which does not qualify these two scores for parametric methods of inferential analysis.

3.7.4 Students' Survey

3.7.4.1 Descriptive Analysis

The descriptive analysis of the Students' Survey used the same procedure as above for the Developers' survey. The descriptive analysis was broken down into the same two categories:

Questions Summary:

The question summary consists of all the statistical functions performed on the response data set for each question in the survey. The Students' Survey was sent to 2480 undergraduate students. We received 425 responses from the WPI survey. This equates to a 17 percent response rate.

The analysis of the survey responses started off by taking the questions that had multiple choice answers and calculating relative frequencies. The relative frequency was calculated by taking the number of responses to each of the multiple-choice answers and dividing that number by the number of survey responses. This gave the percentage of answers to each of the multiple-choice questions. This was then used to make a relative frequency distribution graph. The graph shows the percentage of people that responded to each choice for every question. Frequency distributions are a great way to graphically view the data collected.

For the questions that had written-in answers, such as how many registered Shareware products do you use, the analysis was a different approach. For the analysis of this type of question we had to make a frequency histogram. This takes the total number of responses to a question and plots it against the answer. So if you have 13 people say they have 5 products, you would graph the frequency Vs the number of products, or 13

Vs 5. This visually shows a bar graph that tells what number of products got the most number of write-ins.

These write-in questions also had to be statistically analyzed to see where the responses stand in accordance with each other. To do this we studied different statistical functions over the response set. These would include the range of answers, mean, mode, median, standard deviation, and variance. These functions are to determine the averages of the responses, central tendencies, and how the distribution varies from the average.

Relational Summary:

The relational summary was used to gain information through correlating questions to see if their responses have any relationships or tendencies. After completion of the question summary we took all the results that were gathered and used that information in the relational summary.

We related the following questions to one another:

a) 2. Where do you get most of your shareware from? Vs 13. Which methods do you feel most comfortable paying the registration fees?

6,7,8 How many Unregistered Shareware Programs, Registered Shareware Programs, and Other Retail Programs do you use?

9. Why do you register Shareware Vs What do you do most of the time when your Shareware runs out? (stop using it, buy full version)

10. On Average does the full version meet your expectations (yes, no) Vs 14. On Average how would you describe the quality of Shareware?

1. On average, when looking for software with certain features, what type of software do you investigate first? Vs 14. On average, how would you describe the quality of shareware products?
3. When using shareware, what limitation do you dislike? Vs 6. How many unregistered shareware programs do you use?
3. When using shareware, what limitation do you dislike? Vs 7. How many registered shareware programs do you use?
5. What problems do you experience with shareware most often? Vs 6. How many unregistered shareware programs do you use?
5. What problems do you experience with shareware most often? Vs 7. How many registered shareware programs do you use?

3.7.4.2 Inferential Analysis

The inferential analysis consisted of taking the information gathered and using it to describe a larger group than the original sample set. For the WPI Students' Survey we have three demographic questions attached to the end of the survey: Age, Gender, and Major. Two of these will be the means for doing the inferential analysis, Gender and Major. We obtained the same information from the WPI registrar's office, for all the undergraduates at WPI, and used it to see if our data can generalize the WPI undergraduate student body. Our survey responses were not a good measure used to generalize the WPI undergraduate student body.

4 RESULTS

4.1 DEVELOPERS' SURVEY

4.1.1 Survey Summary

Sample set size: 8385

Total responses: 1602

Survey response rate: 19.11%

Number of questions: 12

4.1.2 Questions Summary

Notes:

13. For definition and explanation of some of the statistical functions below, please read the Glossary section of this report.
14. All relative response frequencies (marked as 'REL. FREQ.') were computed against the total number of survey responses, equal to 1602.
15. All real numbers were rounded to two decimal places
16. In some cases we have limited the X-axis range to improve visualization.

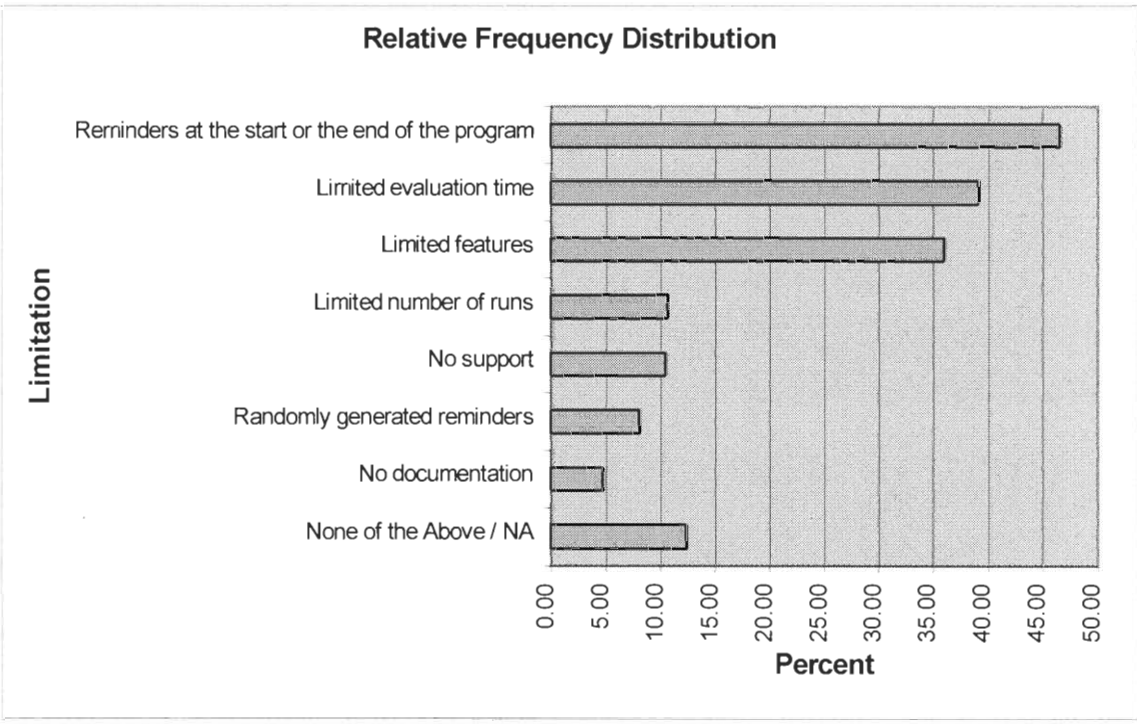
QUESTION 1: What limitations do you usually include in your shareware?

Table 1: Shareware Limitations

Scale: Nominal multiple choice

ANSWER	FREQ.	REL. FREQ. [%]:
None of the Above / NA	198	12.36
No documentation	76	4.74
Randomly generated reminders	129	8.05
No support	168	10.49
Limited number of runs	171	10.67
Limited features	578	36.08
Limited evaluation time	628	39.20
Reminders at the start or the end of the program	746	46.57
QUESTION RESPONSES:	1404	
TOTAL RESPONSES:	1602	
QUESTION RESPONSE RATE [%]:	87.64	

Figure 1: Shareware Limitations



QUESTION 2: What usage limitations do you put on your shareware?

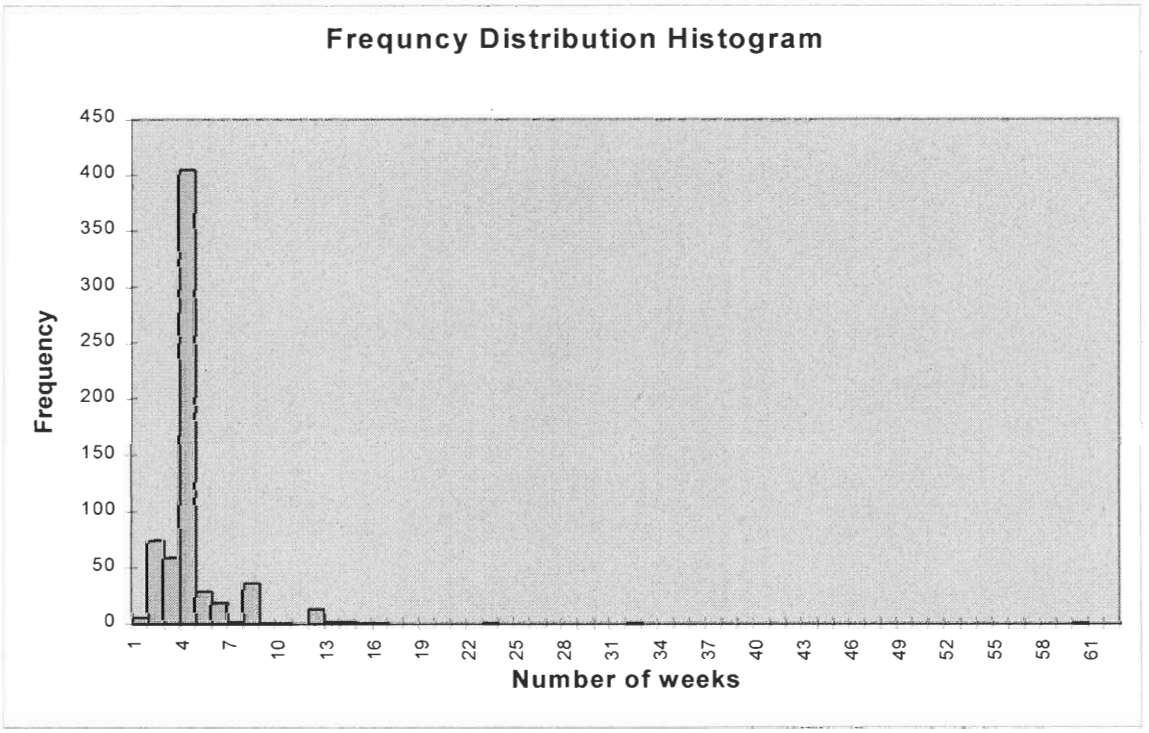
Evaluation time in weeks:

Table 2: Evaluation Period in Weeks

Scale: Continuous

MEAN:	4.39
MODE:	4.00
MEDIAN:	4.00
RANGE:	1.00 – 60.00
VARIANCE:	10.40
STANDARD DEVIATION:	3.23
CENTRAL TENDENCY:	4.39
SCORE AT 25%:	4.00
SCORE AT 75%:	4.00
SEMI INTERQUARTILE RANGE:	0.00
DISTRIBUTION TYPE:	NA
QUESTION RESPONSES:	655
TOTAL RESPONSES:	1602
QUESTION RESPONSE RATE [%]:	40.89 [%]

Figure 2: Evaluation Period in Weeks



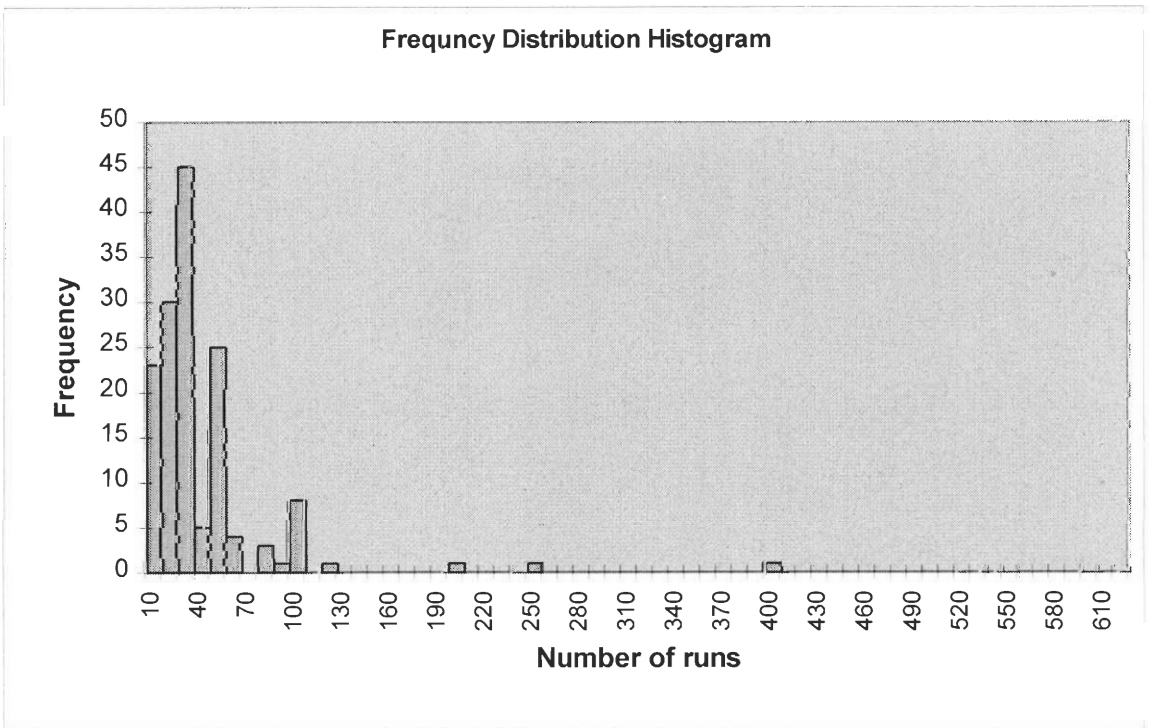
Limit to number of runs:

Table 3: Number of Runs

Scale: Continuous

MEAN:	42.57
MODE:	30.00
MEDIAN:	30.00
RANGE:	3.00 – 600.00
VARIANCE:	4068.69
STANDARD DEVIATION:	63.79
CENTRAL TENDENCY:	42.57
SCORE AT 25%:	20.00
SCORE AT 75%:	50.00
SEMI INTERQUARTILE RANGE:	15.00
DISTRIBUTION TYPE:	NA
QUESTION RESPONSES:	149
TOTAL RESPONSES:	1602
QUESTION RESPONSE RATE [%]:	9.30 [%]

Figure 3: Number of Runs



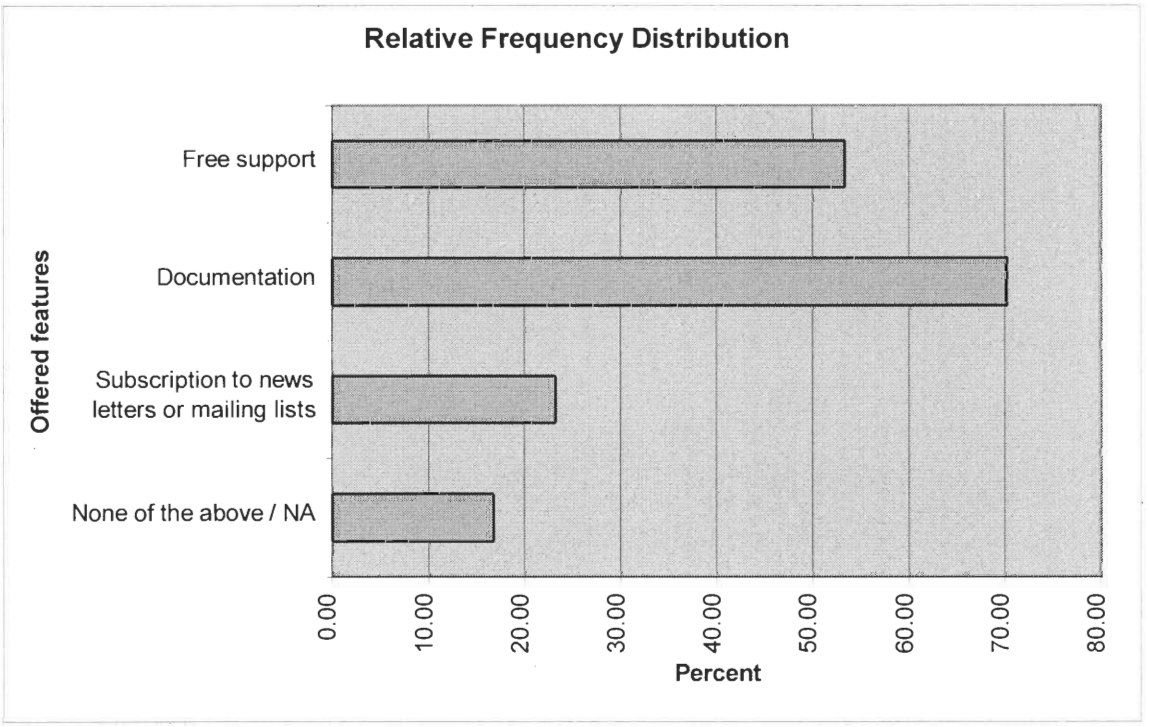
QUESTION 3: What do you offer with the shareware version of your software?

Table 4: Features That Come With Shareware

Scale: Nominal multiple choice

ANSWER	FREQ.	REL. FREQ. [%]:
None of the above / NA	267	16.67
Subscription to news letters or mailing lists	371	23.16
Documentation	1124	70.16
Free support	854	53.31
QUESTION RESPONSES:	1335	
TOTAL RESPONSES:	1602	
QUESTION RESPONSE RATE [%]:	83.33	

Figure 4: Features That Come With Shareware



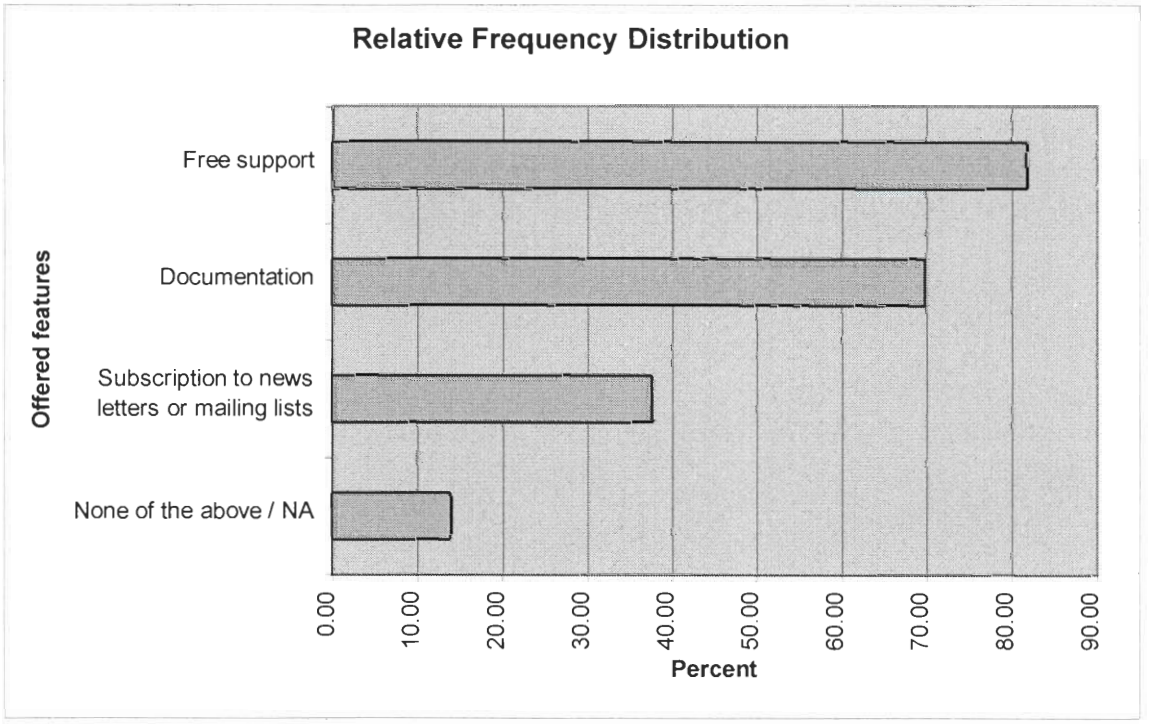
QUESTION 4: What do you offer with your registered version of the software?

Table 5: Features That Come With Registered Shareware

Scale: Nominal multiple choice

ANSWER	FREQ.	REL. FREQ. [%]:
None of the above / NA	223	13.92
Subscription to news letters or mailing lists	604	37.70
Documentation	1119	69.85
Free support	1309	81.71
QUESTION RESPONSES:	1379	
TOTAL RESPONSES:	1602	
QUESTION RESPONSE RATE [%]:	86.08	

Figure 5: Features That Come With Registered Shareware



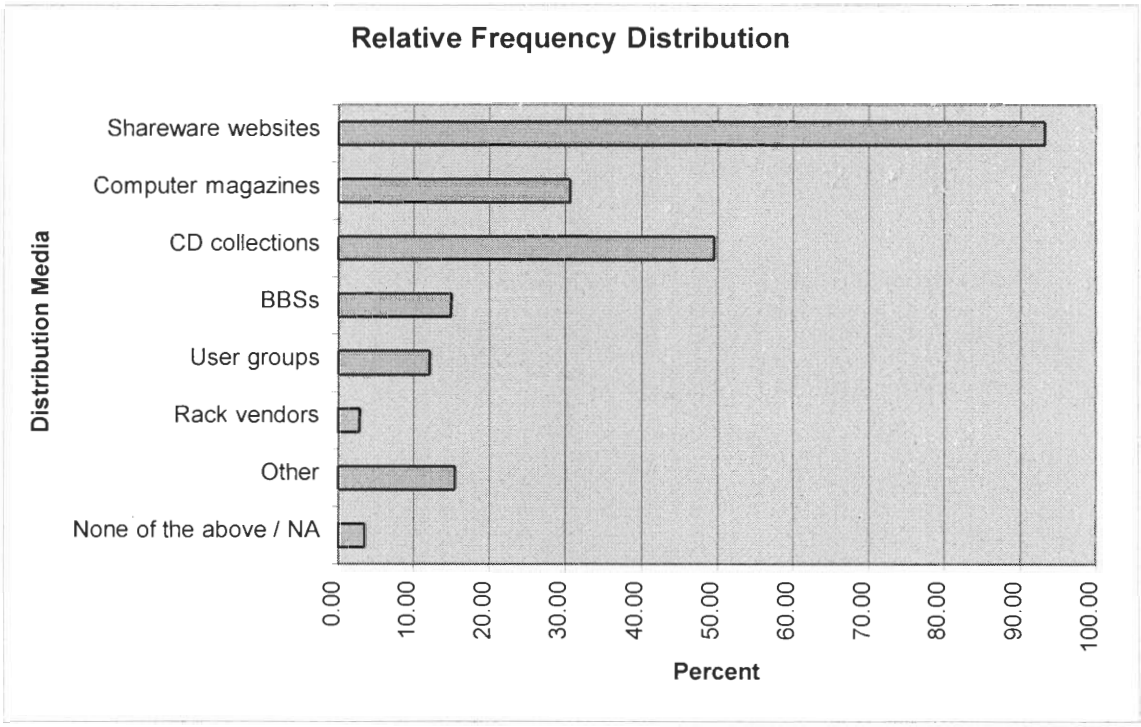
QUESTION 5: What type of media do you use to distribute your shareware?

Table 6: Distribution Media Used

Scale: Nominal multiple choice

ANSWER	FREQ.	REL. FREQ. [%]:
None of the above / NA	57	3.56
Other	248	15.48
Rack vendors	45	2.81
User groups	195	12.17
BBSs	240	14.98
CD collections	795	49.63
Computer magazines	491	30.65
Shareware websites	1494	93.26
QUESTION RESPONSES:	1545	
TOTAL RESPONSES:	1602	
QUESTION RESPONSE RATE [%]:	96.44	

Figure 6: Distribution Media Used



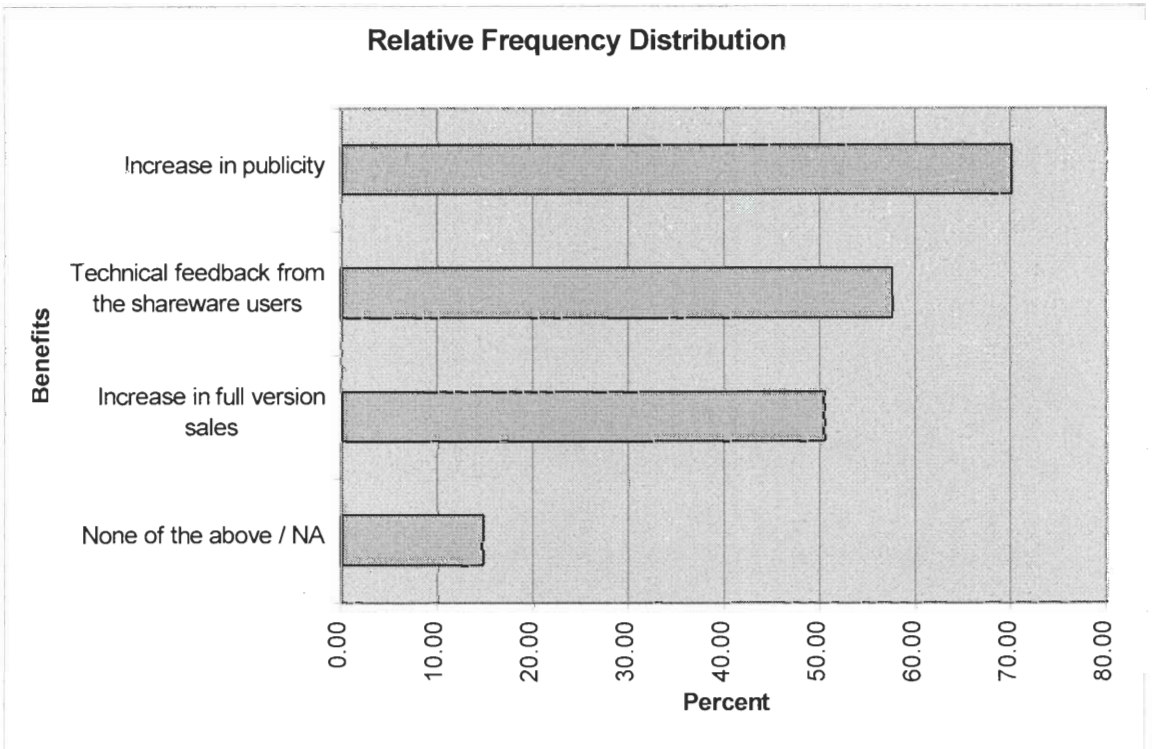
QUESTION 6: What do you find are the benefits of producing the shareware version of your software?

Table 7: Benefits of Shareware Production

Scale: Nominal multiple choice

ANSWER	FREQ.	REL. FREQ. [%]:
None of the above / NA	236	14.73
Increase in full version sales	808	50.44
Technical feedback from the shareware users	920	57.43
Increase in publicity	1121	69.98
QUESTION RESPONSES:	1366	
TOTAL RESPONSES:	1602	
QUESTION RESPONSE RATE [%]:	85.27	

Figure 7: Benefits of Shareware Production



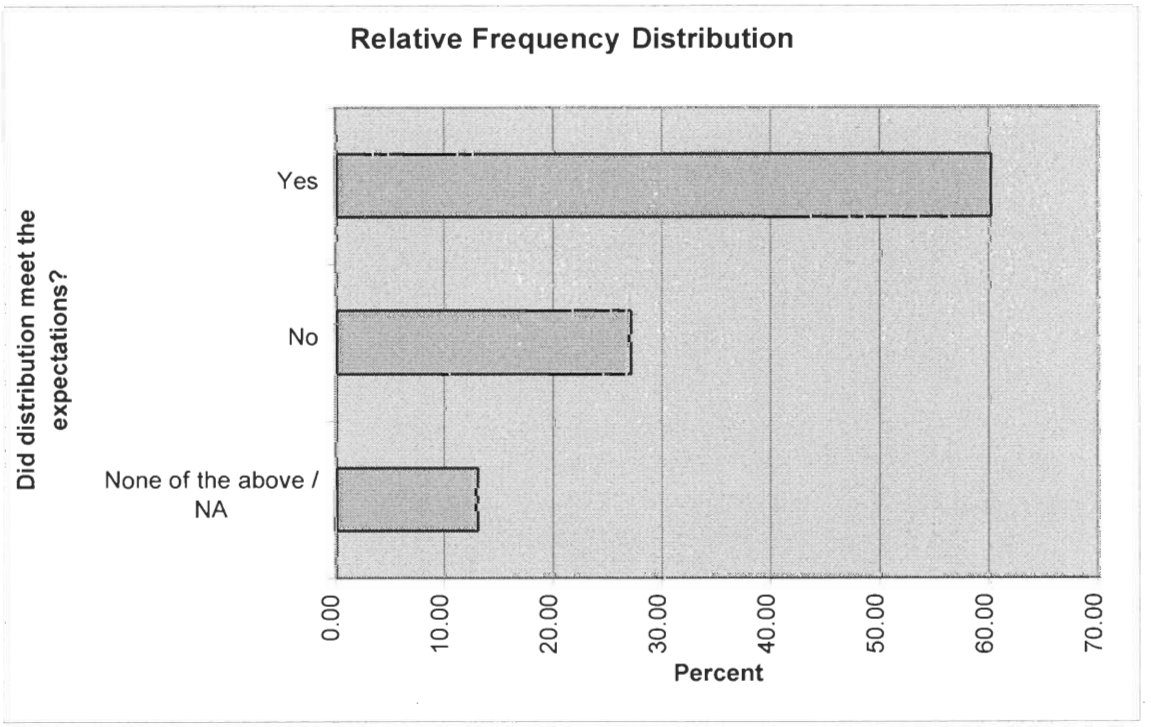
QUESTION 7: Did distribution of the shareware meet your expectations?

Table 8: Meeting Distribution Expectations

Scale: Nominal single choice

ANSWER	FREQ.	REL. FREQ. [%]:
None of the above / NA	207	12.92
No	433	27.03
Yes	962	60.05
QUESTION RESPONSES:	1395	
TOTAL RESPONSES:	1602	
QUESTION RESPONSE RATE [%]:	87.08	

Figure 8: Meeting Distribution Expectations



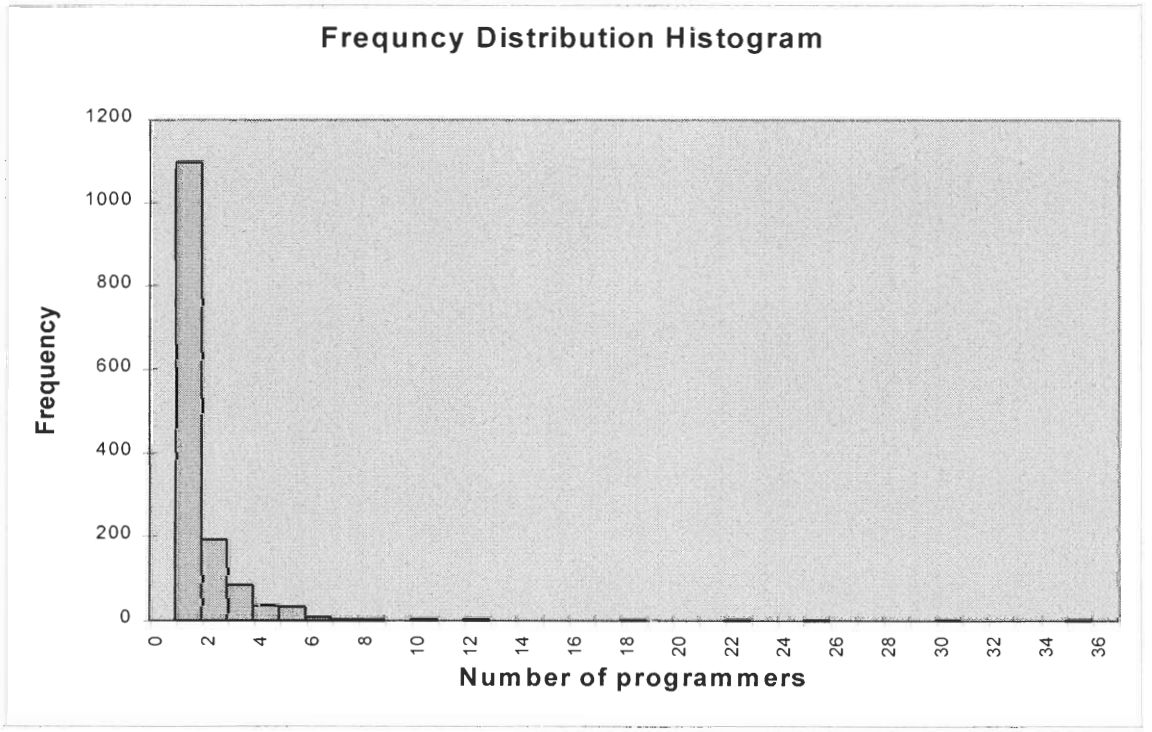
QUESTION 8: How many programmers were involved in the production of the shareware?

Table 9: Development Team Size

Scale: Continuous

MEAN:	1.68
MODE:	1.00
MEDIAN:	1.00
RANGE:	1.00 – 100.00
VARIANCE:	10.78
STANDARD DEVIATION:	3.28
CENTRAL TENDENCY:	1.68
SCORE AT 25%:	1.00
SCORE AT 75%:	1.50
SEMI INTERQUARTILE RANGE:	0.25
DISTRIBUTION TYPE:	Positively Skewed
QUESTION RESPONSES:	1472
TOTAL RESPONSES:	1602
QUESTION RESPONSE RATE [%]:	91.89 [%]

Figure 9: Development Team Size



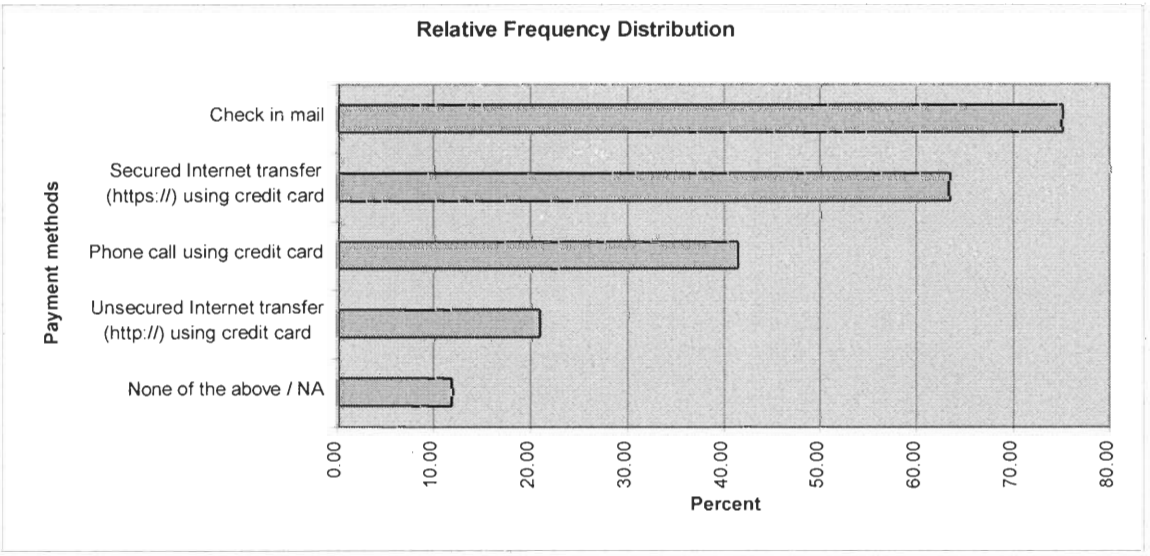
QUESTION 9: Which of the methods do you provide to pay the registration fee?

Table 10: Registration Fee Payments Methods

Scale: Nominal multiple choice

ANSWER	FREQ.	REL. FREQ. [%]:
None of the above / NA	190	11.86
Unsecured Internet transfer (http://) using credit card	333	20.79
Phone call using credit card	662	41.32
Secured Internet transfer (https://) using credit card	1015	63.36
Check in mail	1202	75.03
QUESTION RESPONSES:	1412	
TOTAL RESPONSES:	1602	
QUESTION RESPONSE RATE [%]:	88.14	

Figure 10: Registration Fee Payments Methods



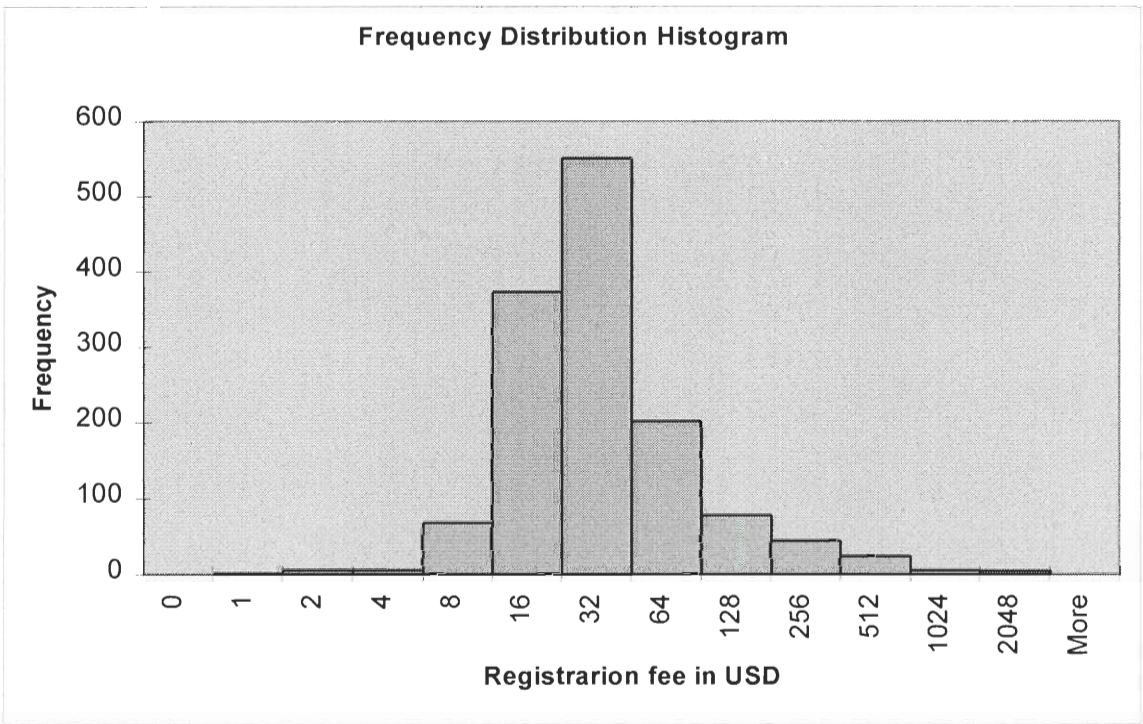
QUESTION 10: Approximately, what is your shareware registration fee?

Table 11: Registration Fee in USD

Scale: Continuous

MEAN:	44.61
MODE:	20.00
MEDIAN:	20.00
RANGE:	1.00 – 1595.00
VARIANCE:	11875.58
STANDARD DEVIATION:	108.98
CENTRAL TENDENCY:	44.61
SCORE AT 25%:	15.00
SCORE AT 75%:	35.00
SEMI INTERQUARTILE RANGE:	10.00
DISTRIBUTION TYPE:	Positively Skewed
QUESTION RESPONSES:	1360
TOTAL RESPONSES:	1602
QUESTION RESPONSE RATE [%]:	84.89 [%]

Figure 11: Registration Fees in USD



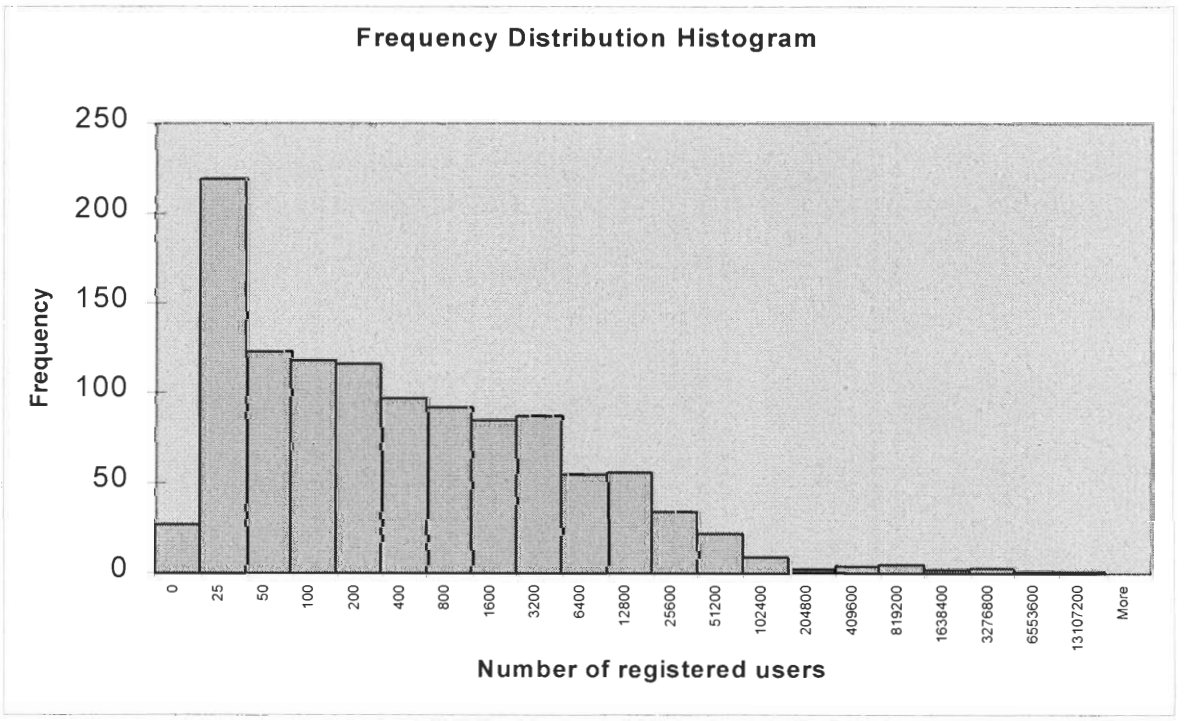
QUESTION 11: Give us your best estimate on the number of users of the full version of your software?

Table 12: Number of Registered Users

Scale: Continuous

MEAN:	25758.08
MODE:	100.00
MEDIAN:	200.00
RANGE:	1.00-10,000,000.00
VARIANCE:	113213763755.96
STANDARD DEVIATION:	336472.53
CENTRAL TENDENCY:	25758.08
SCORE AT 25%:	35.00
SCORE AT 75%:	1500.00
SEMI INTERQUARTILE RANGE:	732.50
DISTRIBUTION TYPE:	Positively Skewed
QUESTION RESPONSES:	1158
TOTAL RESPONSES:	1602
QUESTION RESPONSE RATE [%]:	72.28 [%]

Figure 12: Number of Registered Users



Note: The histogram above has X-axis in following scale: 0, 25, 50, 100, 200, 400, etc.

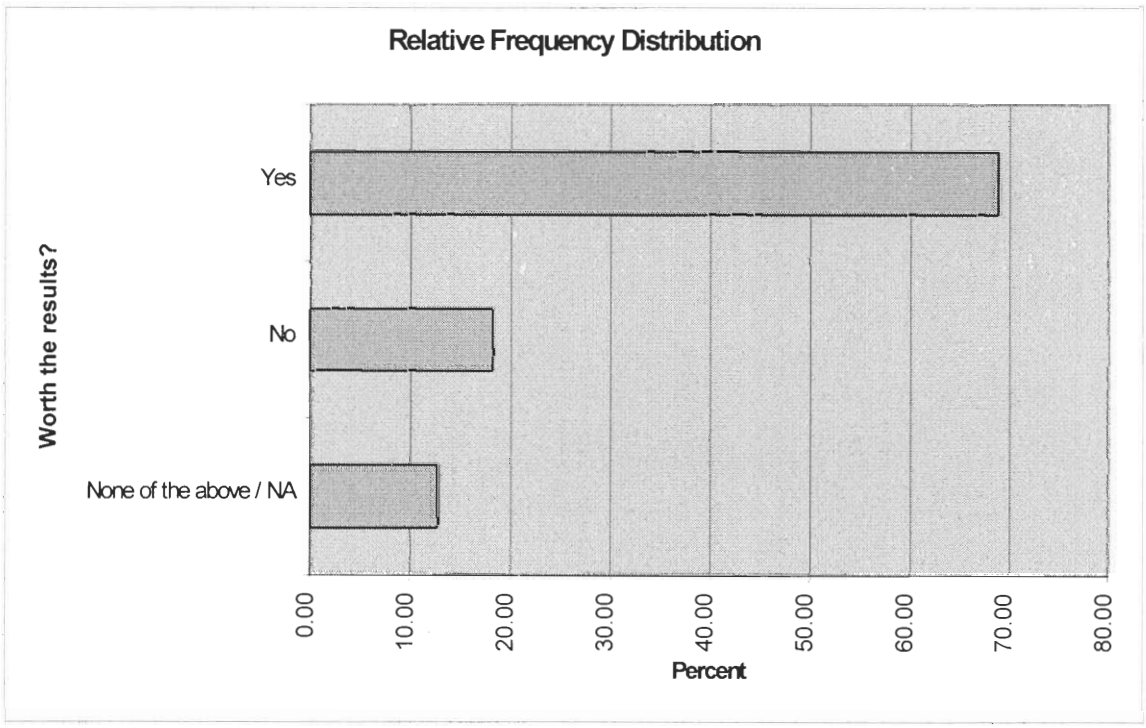
QUESTION 12: Using your own data, is the cost of putting out the shareware worth the results?

Table 13: Is it Worth the Results

Scale: Nominal single choice

ANSWERS	FREQ.	REL. FREQ. [%]:
None of the above / NA	204	12.73
No	293	18.29
Yes	1105	68.98
QUESTION RESPONSES:	1398	
TOTAL RESPONSES:	1602	
QUESTION RESPONSE RATE [%]:	87.27	

Figure 13: Is it Worth the Results



4.1.3 Relational Summary

In order for the following summary to make sense, the QUESTIONS SUMMARY should also be read. Following is simplified list of questions on the Developers' Survey:

1. What limitations do you usually include in your shareware?
2. What usage limitations do you put on your shareware?
3. What do you offer with the shareware version of your software?
4. What do you offer with your registered version of the software?
5. What type of media do you use to distribute your shareware?
6. What do you find are the benefits of producing the shareware version of your software?
7. Did distribution of the shareware meet your expectations?
8. How many programmers were involved in the production of the shareware?
9. Which of the methods do you provide to pay the registration fee?
10. Approximately, what is your shareware registration fee?
11. Give us your best estimate on the number of users of the full version of your software?
12. Using your own data, is the cost of putting out the shareware worth the results?

Other notes on the results of relational summary:

1. For definition and explanation of some of the statistical functions below, please read the Term Glossary section of this report.
2. All real numbers were rounded to two decimal places
3. In some cases we have limited the X-axis range to improve visualization.

QUESTION 1 VS. QUESTION 7:

QUESTION 1: What limitations do you usually include in your shareware?

QUESTION 7: Did distribution of the shareware meet your expectations?

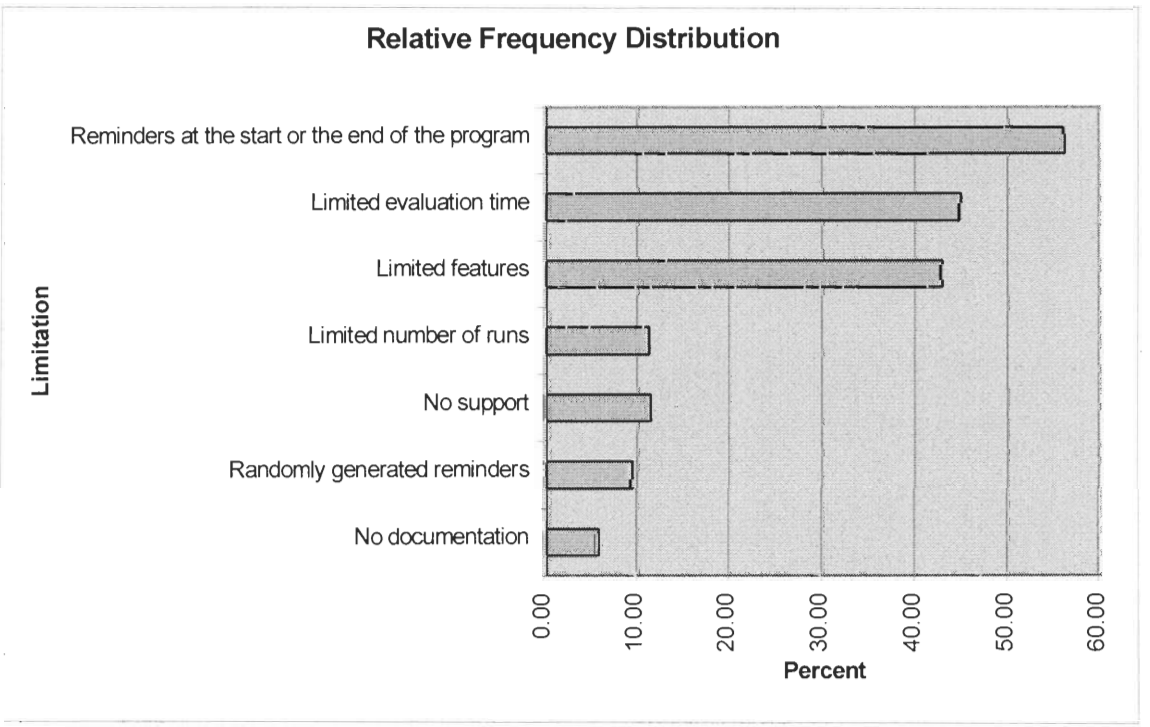
Following is question 1 summary in responses where question 7 was answered "Yes":

Table 14: Shareware Limitations Vs Satisfied with Distribution

ANSWER	FREQ.	REL. FREQ. [%]:
No documentation	49	5.65
Randomly generated reminders	81	9.33
No support	99	11.41
Limited number of runs	97	11.18
Limited features	372	42.86
Limited evaluation time	389	44.82
Reminders at the start or the end of the program	487	56.11
COUNTED RESPONSES:	**868**	

Note: The relative frequency above was computed with respect to the subset size of counted responses (see COUNTED RESPONSES above).

Figure 14: Shareware Limitations Vs Satisfied with Distribution



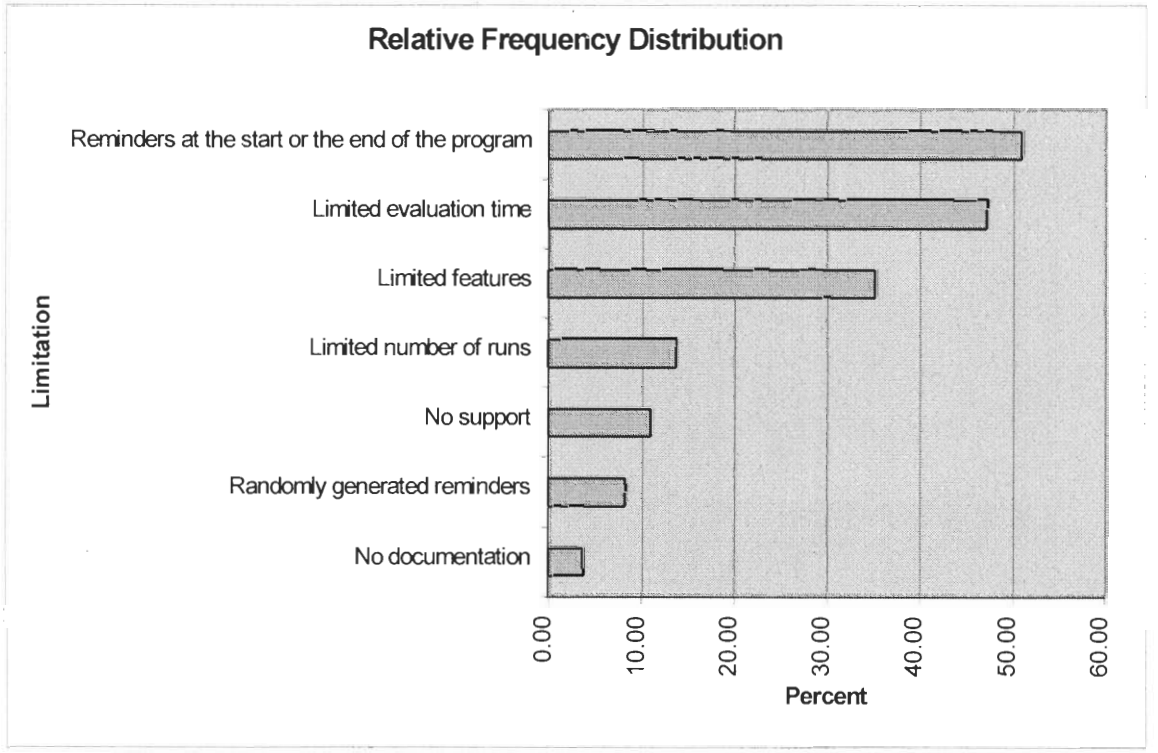
Following is question 1 summary in responses where question 7 was answered "No":

Table 15: Shareware Limitations Vs Not Satisfied with Distribution

ANSWER	FREQ.	REL. FREQ. [%]:
No documentation	15	3.75
Randomly generated reminders	33	8.25
No support	44	11.00
Limited number of runs	55	13.75
Limited features	141	35.25
Limited evaluation time	189	47.25
Reminders at the start or the end of the program	204	51.00
COUNTED RESPONSES:	**400**	

Note: The relative frequency above was computed with respect to the subset size of counted responses (see COUNTED RESPONSES above).

Figure 15: Shareware Limitations Vs Not Satisfied with Distribution



QUESTION 2 VS. QUESTION 7:

QUESTION 2: What usage limitations do you put on your shareware?

QUESTION 7: Did distribution of the shareware meet your expectations?

Following is question 2 summary in responses where question 7 was answered "Yes":

Evaluation period in weeks:

Table 16: Evaluation Period in Weeks Vs Satisfied with Distribution

MEAN:	4.25
MODE:	4.00
MEDIAN:	4.00
RANGE:	1.00 - 22.50
SCORE AT 25%:	4.00
SCORE AT 75%:	4.00
SEMI INTERQUARTILE RANGE:	0.00
COUNTED RESPONSES: [1]	412

Number of "Unlimited" responses: 417.00

Relative number of "Unlimited" responses: 50.30% [2]

Evaluation period in number of runs:

Table 17: Limited Number of Runs Vs Satisfied with Distribution

MEAN:	47.48
MODE:	30.00
MEDIAN:	30.00
RANGE:	3.00 – 600.00
SCORE AT 25%:	20.00
SCORE AT 75%:	50.00
SEMI INTERQUARTILE RANGE:	15.00
COUNTED RESPONSES: [3]	84

Number of "Unlimited" responses: 417.00

Relative number of "Unlimited" responses: 83.23% [4]

[1] Represents the number of responses that reported limitation by some positive value.

Following is question 2 summary in responses where question 7 was answered "No":

Evaluation period in weeks:

Table 18: Evaluation Period in Weeks Vs Not Satisfied with Distribution

MEAN:	4.61
MODE:	4.00
MEDIAN:	4.00
RANGE:	1.00 – 60.00
SCORE AT 25%:	3.38
SCORE AT 75%:	4.00
SEMI INTERQUARTILE RANGE:	0.31
COUNTED RESPONSES: [5]	192

Number of "Unlimited" responses: 177.00

Relative number of "Unlimited" responses: 47.97% [6]

Evaluation period in number of runs:

Table 19: Limited Number of Runs Vs Not Satisfied with Distribution

MEAN:	38.89
MODE:	20.00
MEDIAN:	20.00
RANGE:	5.00 – 400.00
SCORE AT 25%:	15.00
SCORE AT 75%:	45.00
SEMI INTERQUARTILE RANGE:	15.00
COUNTED RESPONSES: [7]	48

Number of "Unlimited" responses: 177.00

Relative number of "Unlimited" responses: 78.67% [8]

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[2] Computed against subset of responses, where number of weeks was reported to be limited or unlimited.
[3] Represents the number of responses that reported limitation by some positive value.
[4] Computed against subset of responses, where number of runs was reported to be limited or unlimited.
[5] Represents the number of responses that reported limitation by some positive value.
[6] Computed against subset of responses, where number of weeks was reported to be limited or unlimited.
[7] Represents the number of responses that reported limitation by some positive value.
[8] Computed against subset of responses, where number of runs was reported to be limited or unlimited.

QUESTION 5 VS. QUESTION 7:

QUESTION 5: What type of media do you use to distribute your shareware?

QUESTION 7: Did distribution of the shareware meet your expectations?

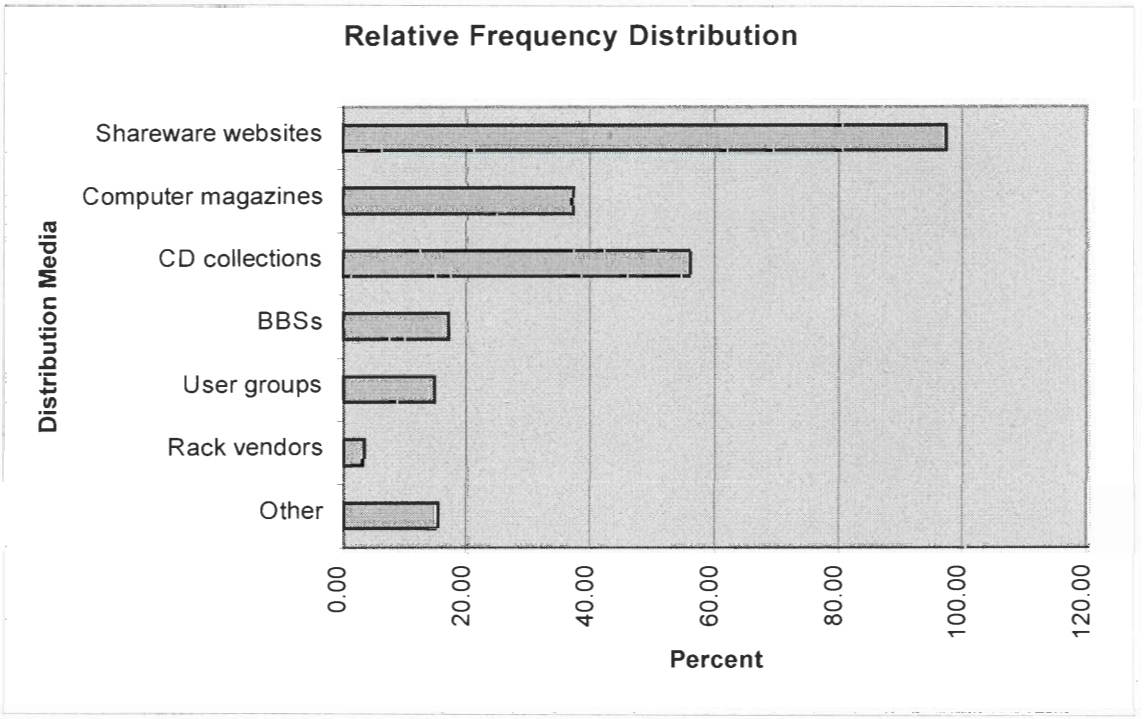
Following is question 5 summary in responses where question 7 was answered "Yes":

Table 20: Distribution Media Vs Satisfied with Distribution

ANSWER	FREQ.	REL. FREQ. [%]:
Other	145	15.14
Rack vendors	32	3.34
User groups	140	14.61
BBSs	162	16.91
CD collections	535	55.85
Computer magazines	356	37.16
Shareware websites	931	97.18
COUNTED RESPONSES:	**958**	

Note: The relative frequency above was computed with respect to the subset size of counted responses (see COUNTED RESPONSES above).

Figure 16: Distribution Media Vs Satisfied with Distribution



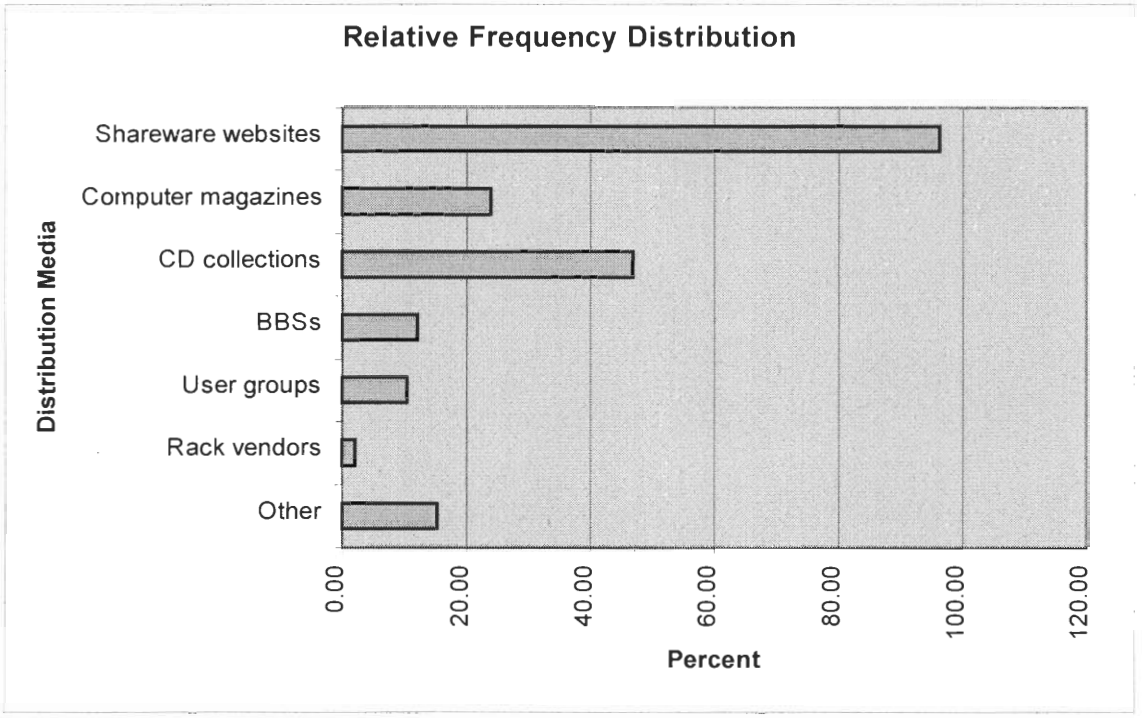
Following is question 5 summary in responses where question 7 was answered "No":

Table 21: Distribution Media Vs Not Satisfied with Distribution

ANSWER	FREQ.	REL. FREQ. [%]:
Other	66	15.24
Rack vendors	9	2.08
User groups	45	10.39
BBSs	52	12.01
CD collections	203	46.88
Computer magazines	103	23.79
Shareware websites	417	96.30
COUNTED RESPONSES:	**433**	

Note: The relative frequency above was computed with respect to the subset size of counted responses (see COUNTED RESPONSES above).

Figure 17: Distribution Media Vs Not Satisfied with Distribution



QUESTION 1 VS. QUESTION 11:

QUESTION 1: What limitations do you usually include in your shareware?

QUESTION 11: Give us your best estimate on the number of users of the full version of your software?

Table 22: Limitations Type Vs Number of Registered Users

	# OF USERS:				
ANSWER	**MEAN**	**MODE**	**MEDIAN**	**RANGE**	**OCCURRENCES**
No documentation	1308.60	100.00	115.00	1-10000	48.00
Randomly generated reminders	15486.65	200.00	200.00	2-800000	100.00
No support	23627.84	5.00	100.00	1-1836500	108.00
Limited number of runs	5347.98	100.00	300.00	1-120000	131.00
Limited features	12089.71	100.00	200.00	1-2000000	417.00
Limited evaluation time	37656.07	200.00	300.00	1-10000000	484.00
Reminders at the start or the end of the program	16463.94	500.00	300.00	1-4000000	566.00

Figure 18: Limitations Type Vs Number of Registered Users (Means)

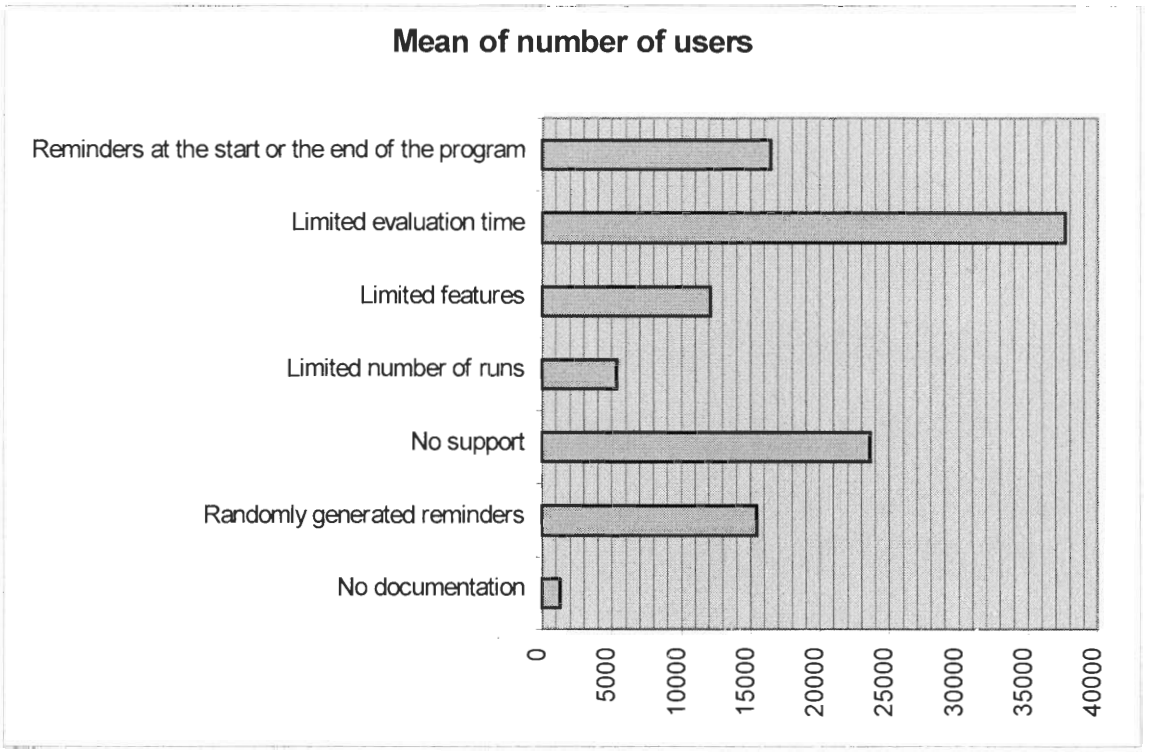
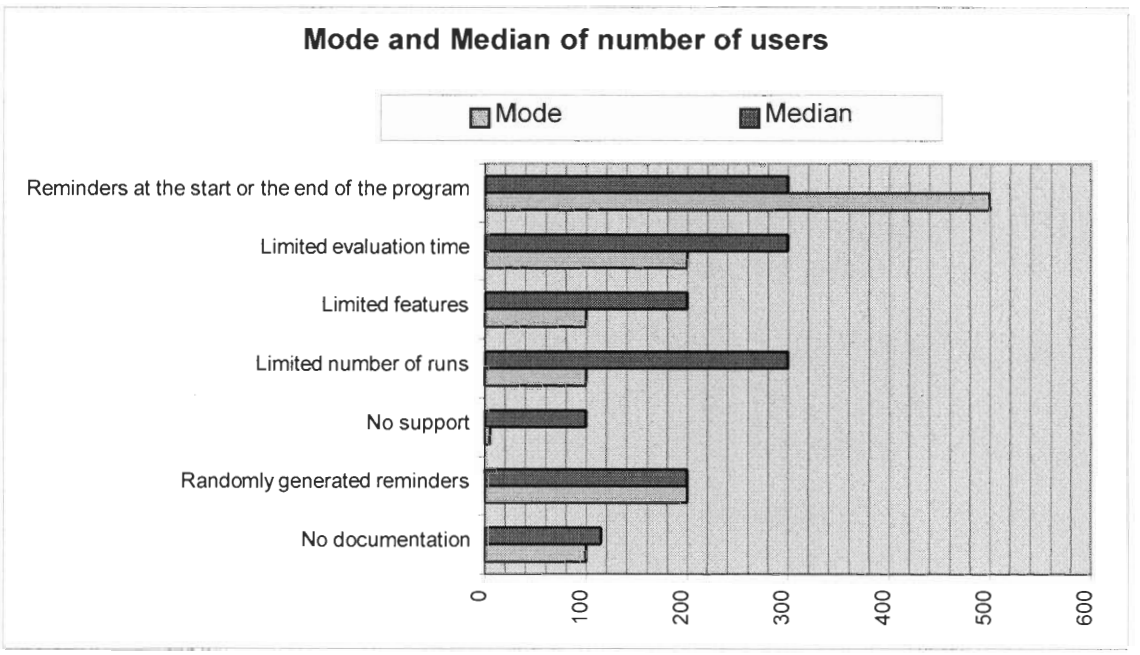


Figure 19: Limitations Type Vs Number of Registered Users (Modes, Medians)



QUESTION 2 VS. QUESTION 11:

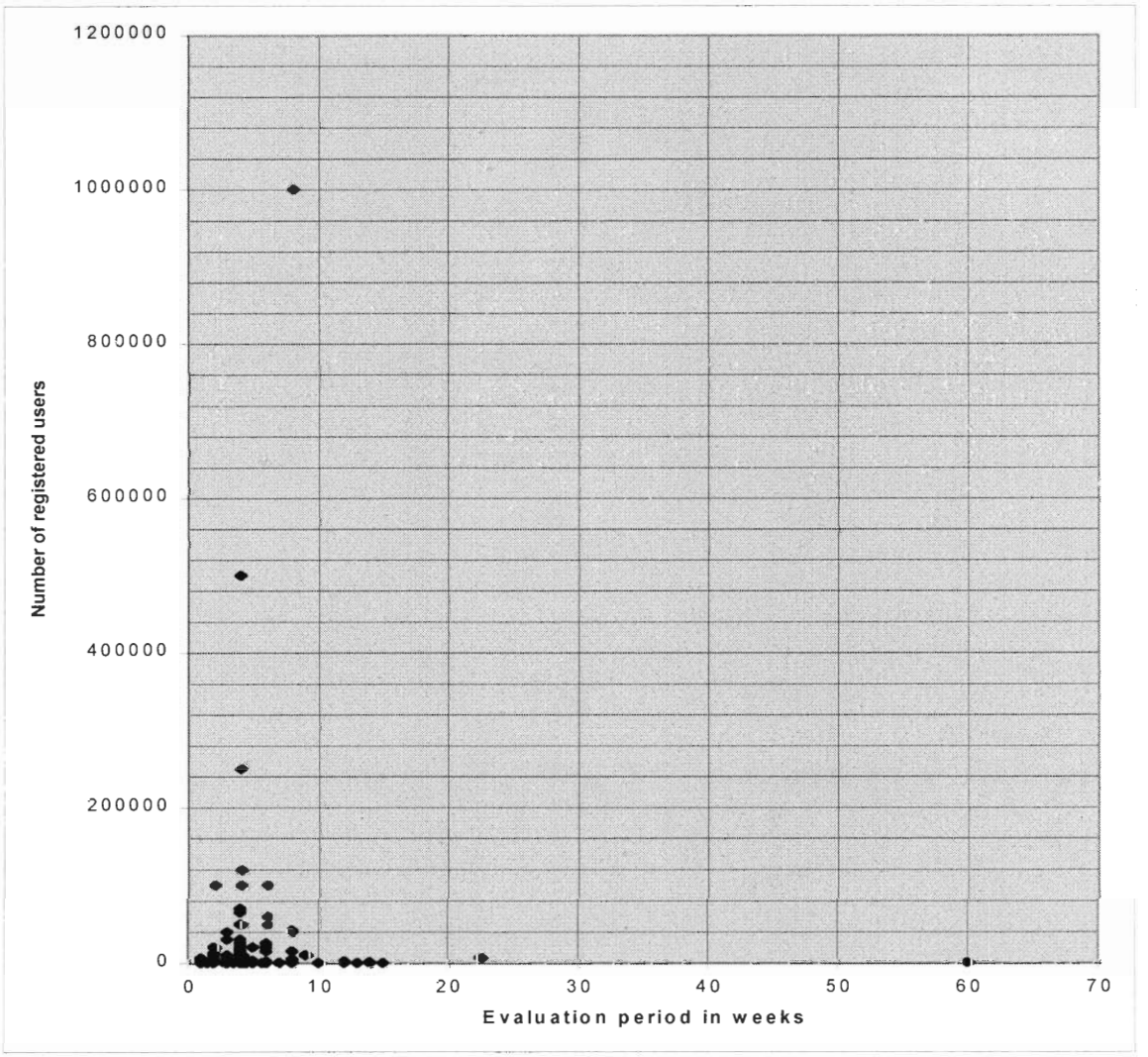
QUESTION 2: What usage limitations do you put on your shareware?

QUESTION 11: Give us your best estimate on the number of users of the full version of your software?

Evaluation period in weeks:

Number of responses examined: 503

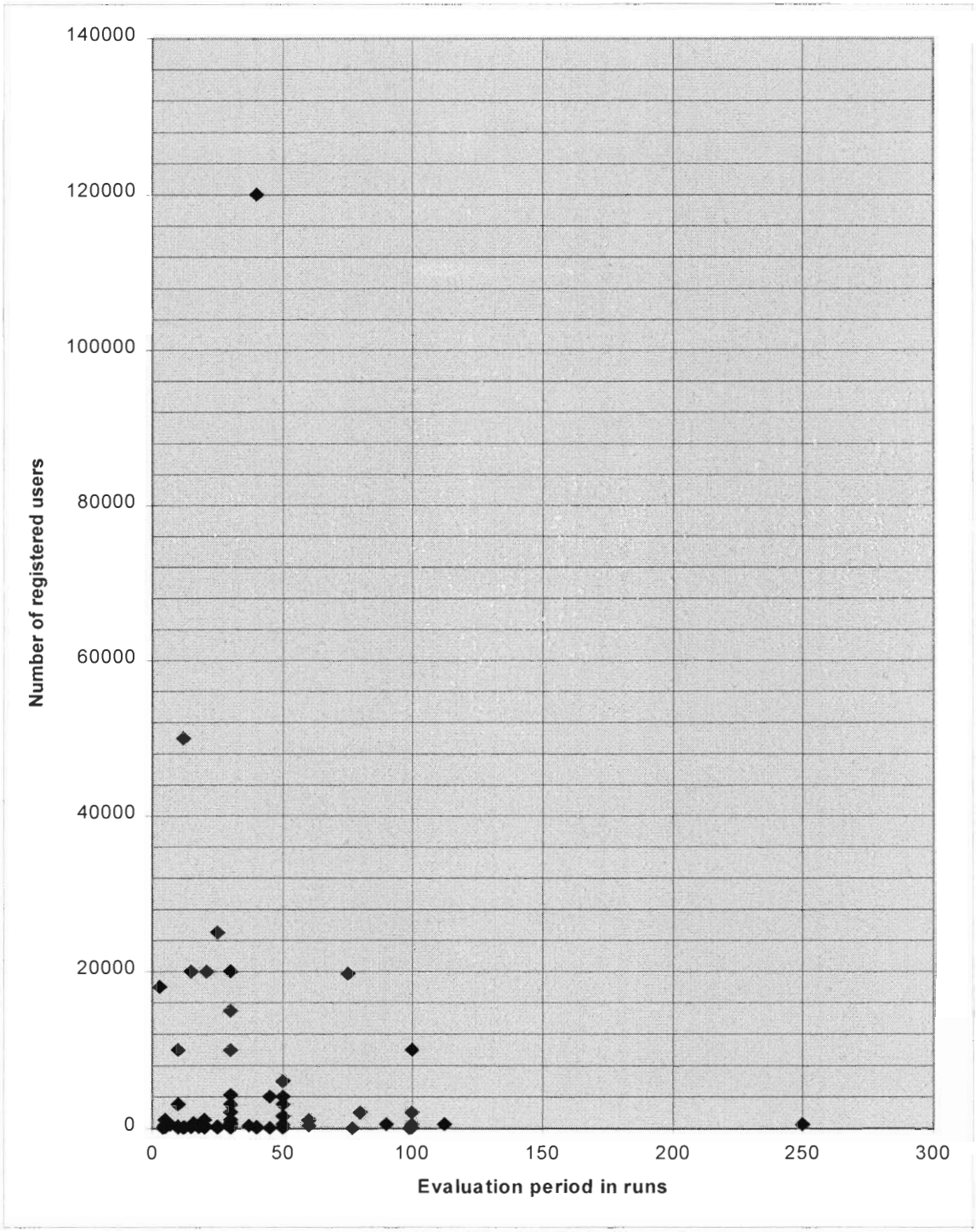
Figure 20: Evaluation Period in Weeks Vs Number of Registered Users



Evaluation period in number of runs:

Number of responses examined: 115

Figure 21: Limited Number of Runs Vs Number of Registered Users



"Unlimited" responses:

Number of responses examined: 483

Table 23: Unlimited Evaluation Vs Number of Registered Users

MEAN:	54628.64
MODE:	100.00
MEDIAN:	150.00
RANGE:	1-10000000

QUESTION 4 VS. QUESTION 11:

QUESTION 4: What do you offer with your registered version of the software?

QUESTION 11: Give us your best estimate on the number of users of the full version of your software?

Table 24: Features That Come With Shareware Vs Number of Registered Users

	# OF USERS:				
ANSWER	**MEAN**	**MODE**	**MEDIAN**	**RANGE**	**OCCURRENCES**
Documentation	13179.99	100.00	200.00	1-2000000	841.00
Free support	28132.80	100.00	205.00	1-10000000	992.00
Subscription to news letters or mailing lists	42120.89	500.00	400.00	1-10000000	451.00

Figure 22: Features That Come With Shareware Vs Number of Registered Users

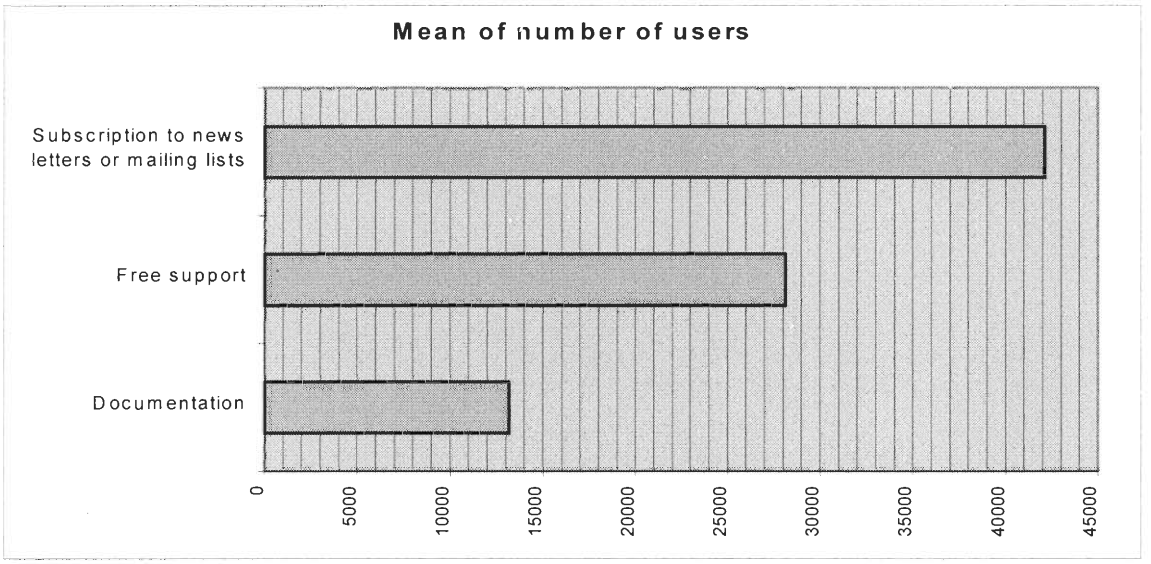
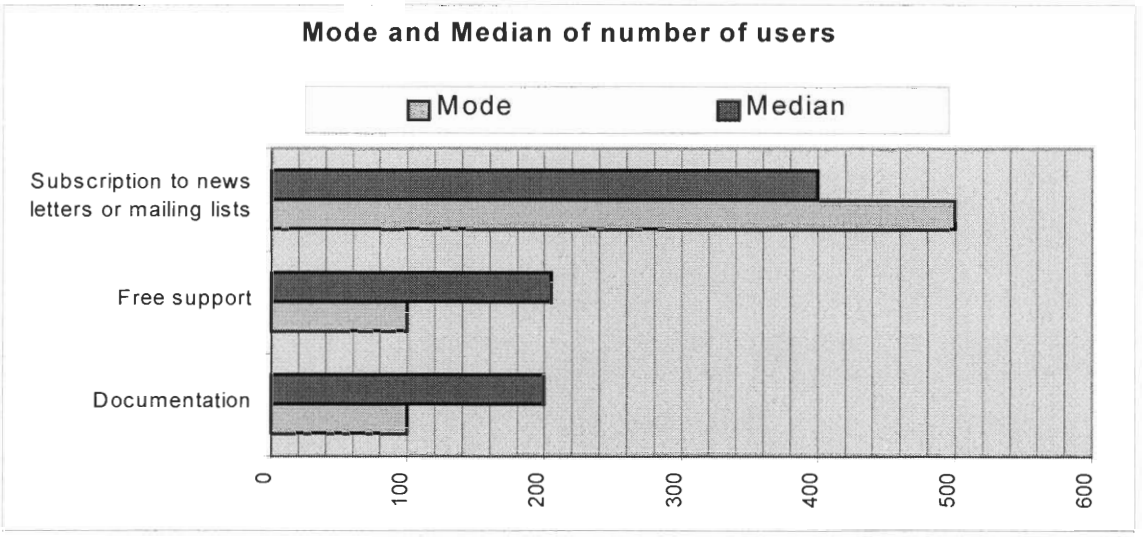


Figure 23: Features That Come With Shareware Vs Number of Registered Users



QUESTION 10 VS. QUESTION 11:

QUESTION 10: Approximately, what is your shareware registration fee?

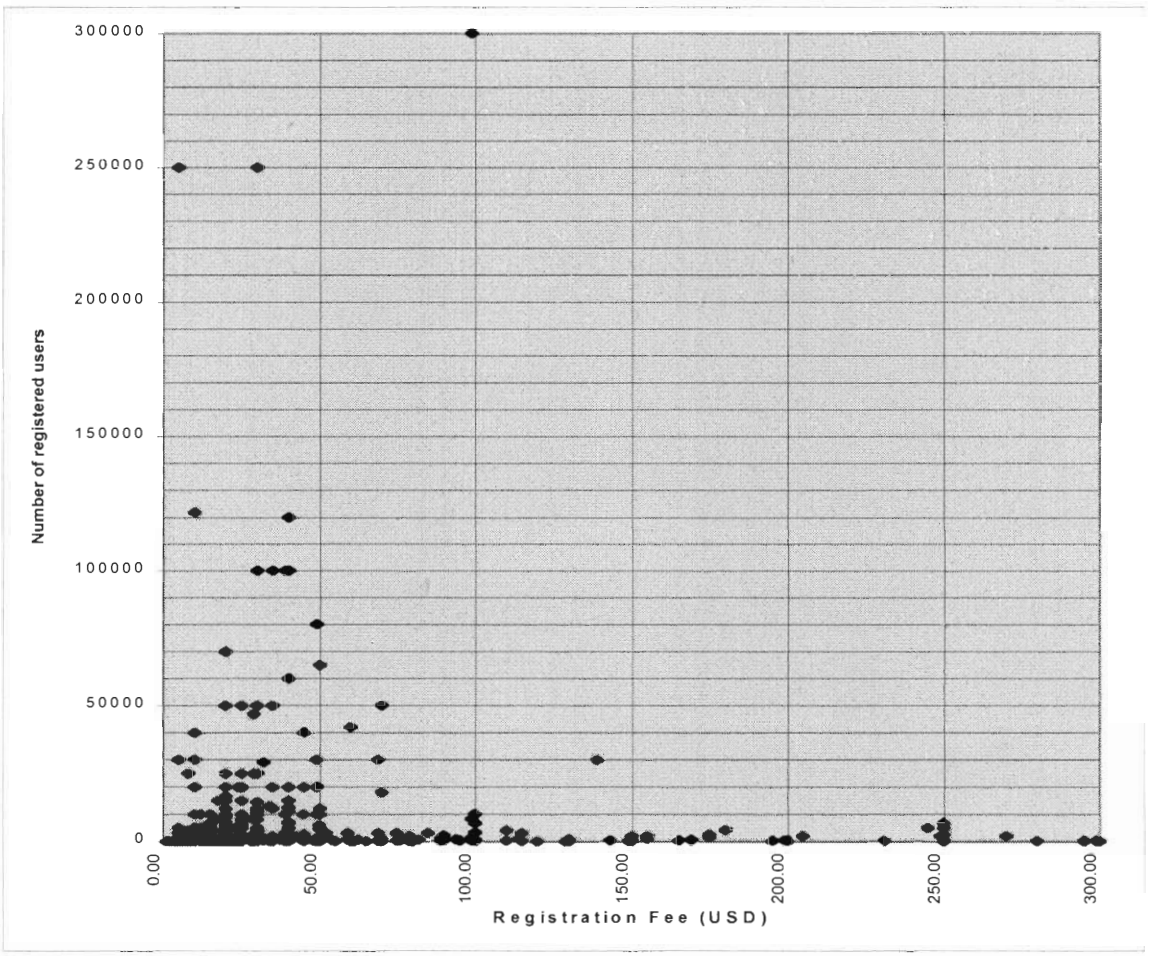
QUESTION 11: Give us your best estimate on the number of users of the full version of your software?

Table 25: Registration Fee Vs Number of Registered Users

Fee range (USD) :	1-1595
Number of users range :	1-10000000
Number of responses examined:	1057

Note: X-axis scale was chopped to improve the visibility of the graph:

Figure 24: Registration Fee Vs Number of Registered Users



(QUESTION 10 * QUESTION 11) VS. QUESTION 12:

QUESTION 10: Approximately, what is your shareware registration fee?

QUESTION 11: Give us your best estimate on the number of users of the full version of your software?

QUESTION 12: Using your own data, is the cost of putting out the shareware worth the results?

Following is (question 10 * question 11) summary in responses where question 12 was answered "Yes":

Table 26: Distribution Income Vs Worth the Results

MEAN:	1126117.40
MODE:	10000.00
MEDIAN:	10000.00
RANGE:	4 – 196000000
OCCURRENCES:	783.00

Following is (question 10 * question 11) summary in responses where question 12 was answered "No":

Table 27: Distribution Income Vs Not Worth the Results

MEAN:	20768.62
MODE:	500.00
MEDIAN:	1000.00
RANGE:	5 – 1687500
OCCURRENCES:	223.00

QUESTION 6 VS. QUESTION 12:

QUESTION 6: What do you find are the benefits of producing the shareware version of your software?

QUESTION 12: Using your own data, is the cost of putting out the shareware worth the results?

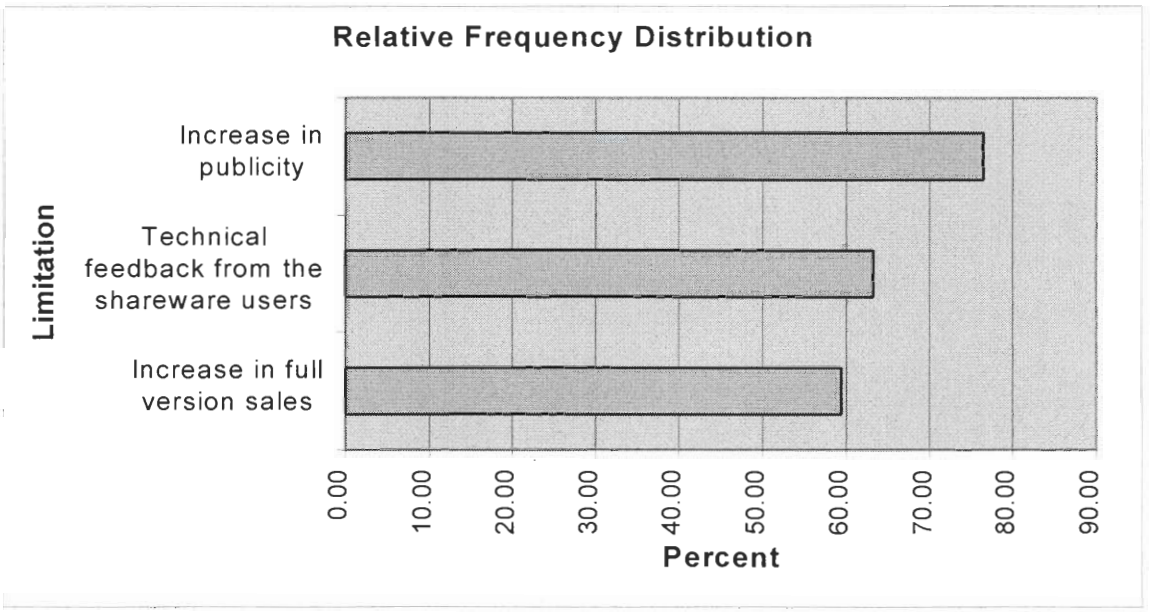
Following is question 6 summary in responses where question 12 was answered "Yes":

Table 28: Distribution Benefits Vs Worth the Results

ANSWER	FREQ.	REL. FREQ. [%]:
Increase in full version sales	498	59.36
Technical feedback from the shareware users	530	63.17
Increase in publicity	641	76.40
COUNTED RESPONSES:	**839**	

Note: The relative frequency above was computed with respect to the subset size of counted responses (see COUNTED RESPONSES above).

Figure 25: Distribution Benefits Vs Worth the Results



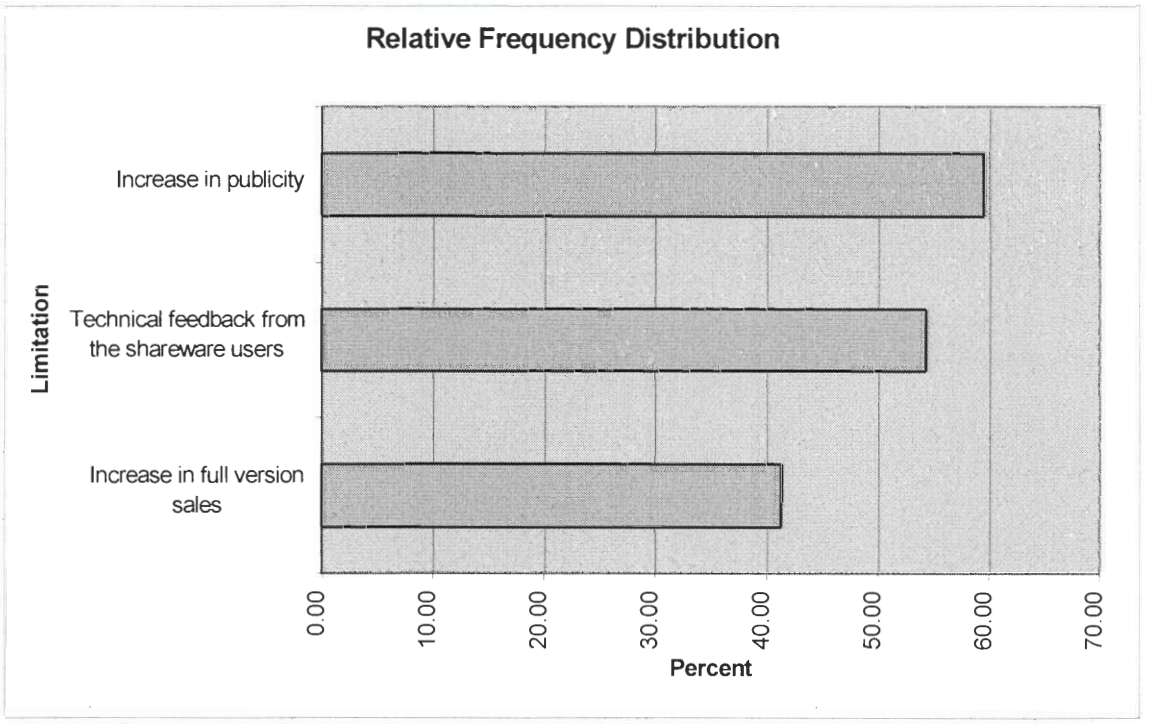
Following is question 6 summary in responses where question 12 was answered "No":

Table 29: Distribution Benefits Vs Not Worth the Results

ANSWER	FREQ.	REL. FREQ. [%]:
Increase in full version sales	95	41.30
Technical feedback from the shareware users	125	54.35
Increase in publicity	137	59.57
COUNTED RESPONSES:	**230**	

Note: The relative frequency above was computed with respect to the subset size of counted responses (see COUNTED RESPONSES above).

Figure 26: Distribution Benefits Vs Not Worth the Results



QUESTION 8 VS. QUESTION 12:

QUESTION 8: How many programmers were involved in the production of the shareware?

QUESTION 12: Using your own data, is the cost of putting out the shareware worth the results?

Following is question 8 summary in responses where question 12 was answered "Yes":

Table 30: Development Team Size Vs Worth the Results

MEAN:	1.63
MODE:	1.00
MEDIAN:	1.00
RANGE:	1 – 35
OCCURRENCES:	815.00

Following is question 8 summary in responses where question 12 was answered "No":

Table 31: Development Team Size Vs Not Worth the Results

MEAN:	1.57
MODE:	1.00
MEDIAN:	1.00
RANGE:	1 – 25
OCCURRENCES:	227.00

QUESTION 9 VS. QUESTION 12:

QUESTION 9: Which of the methods do you provide to pay the registration fee?

QUESTION 12: Using your own data, is the cost of putting out the shareware worth the results?

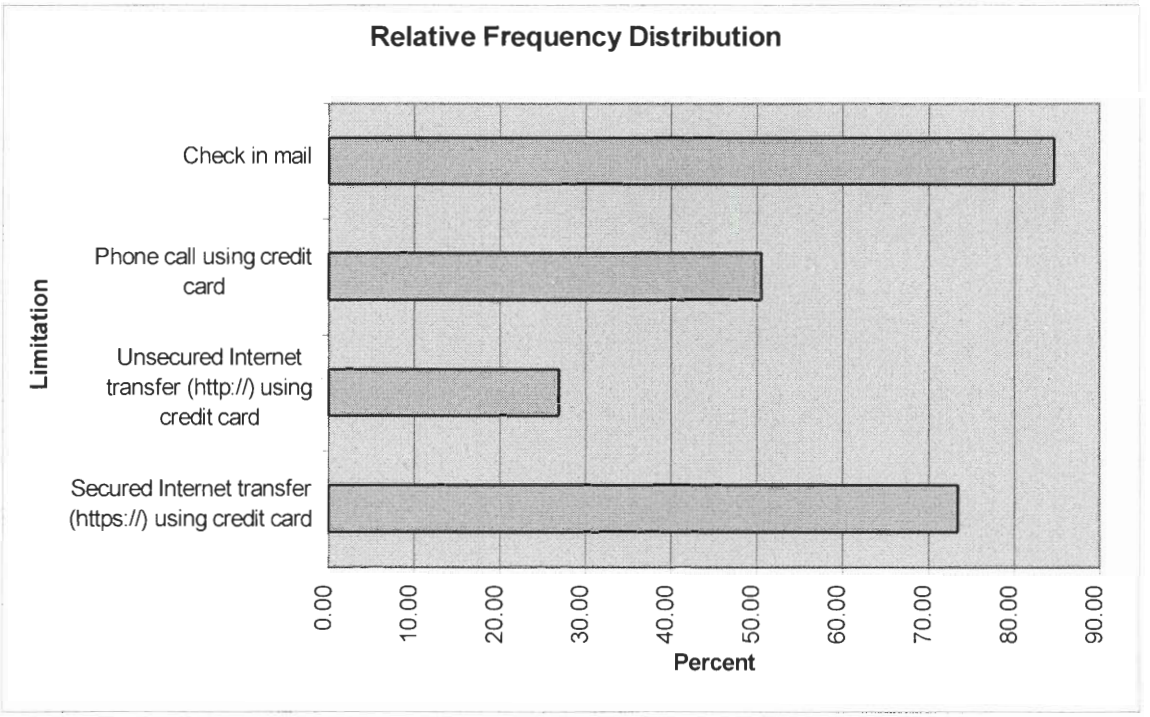
Following is question 9 summary in responses where question 12 was answered "Yes":

Table 32: Registration Payment Methods Vs Worth the Results

ANSWER	FREQ.	REL. FREQ. [%]:
Secured Internet transfer (https://) using credit card	616	73.42
Unsecured Internet transfer (http://) using credit card	225	26.82
Phone call using credit card	424	50.54
Check in mail	710	84.62
COUNTED RESPONSES:	**839**	

Note: The relative frequency above was computed with respect to the subset size of counted responses (see COUNTED RESPONSES above).

Figure 27: Registration Payment Methods Vs Worth the Results



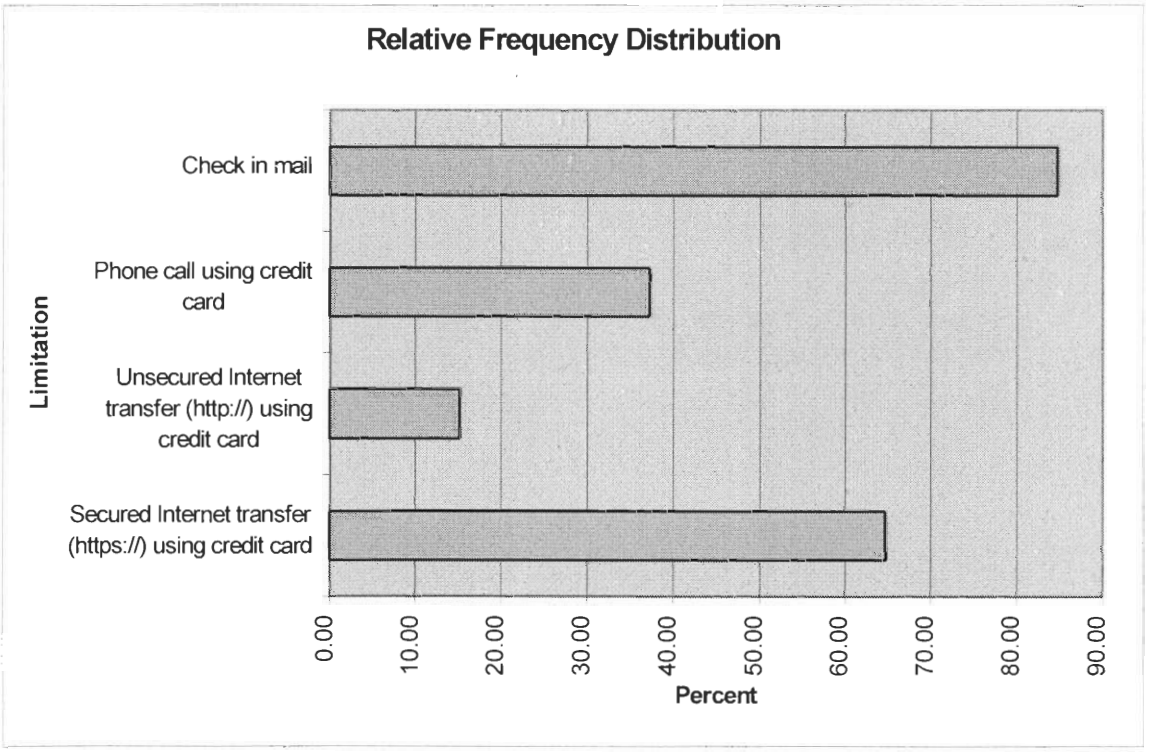
Following is question 9 summary in responses where question 12 was answered "No":

Table 33: Registration Payment Methods Vs Not Worth the Results

ANSWER	FREQ.	REL. FREQ. [%]:
Secured Internet transfer (https://) using credit card	179	64.86
Unsecured Internet transfer (http://) using credit card	42	15.22
Phone call using credit card	103	37.32
Check in mail	234	84.78
COUNTED RESPONSES:	**276**	

Note: The relative frequency above was computed with respect to the subset size of counted responses (see COUNTED RESPONSES above).

Figure 28: Registration Payment Methods Vs Not Worth the Results



4.2 STUDENTS' SURVEY

4.2.1 Survey Summary

Sample set size: 2480

Total responses: 425

Survey response rate: 17%

Number of questions: 17

4.2.2 Questions Summary

Notes:

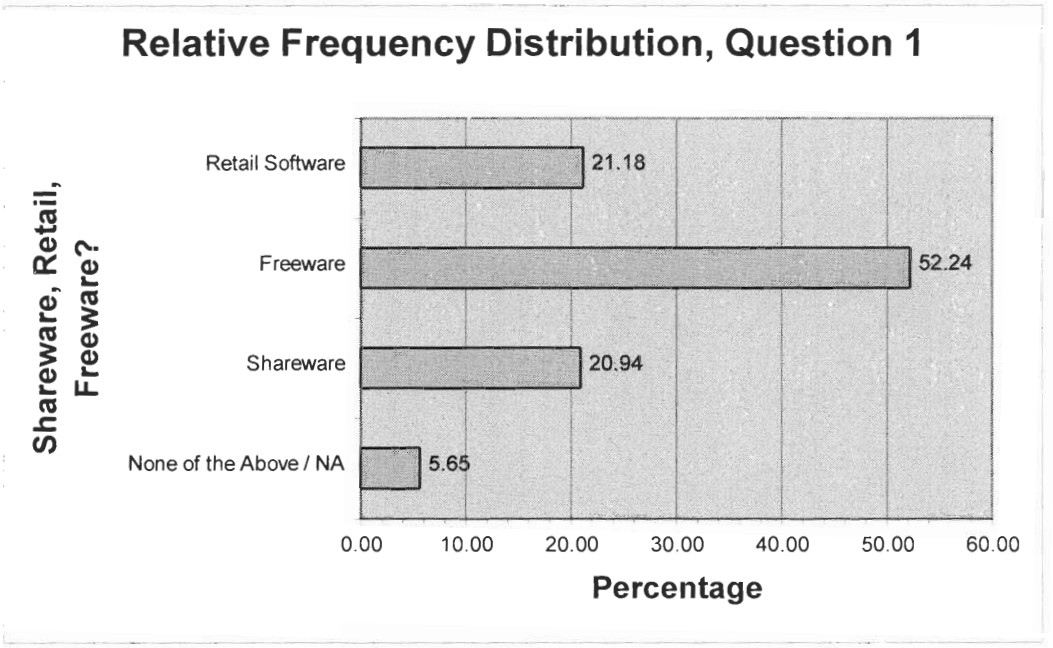
1. For definition and explanation of some of the statistical functions below, please read the Glossary section of this report.
2. All relative response frequencies (marked as 'REL. FREQ.') were computed against the total number of survey responses, equal to 425.
3. All real numbers were rounded to two decimal places
4. In some cases we have limited the X-axis range to improve visualization.

QUESTION 1: "On average, when looking for software with certain features, what type of software do you investigate first?"

Table 34: What Type of Software is Investigated First

Shareware, Retail, Freeware?	FREQ.	REL FREQ: [%]
None of the Above / NA	24	5.65
Shareware	89	20.94
Freeware	222	52.24
Retail Software	90	21.18
QUESTION RESPONSES:	**401**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**94.35**	

Figure 29: Software Investigated First

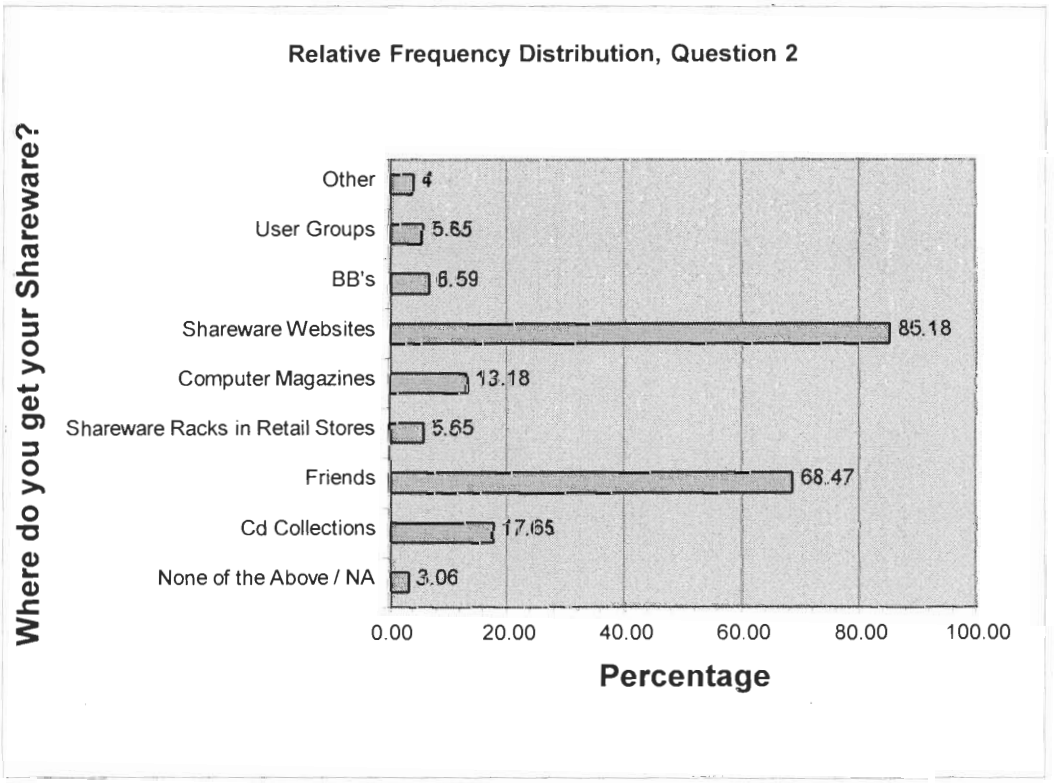


QUESTION 2: "Where do you get your shareware from?"

Table 35: Distribution Media Used

Where do you get your Shareware?	FREQ.	REL FREQ: [%]
None of the Above / NA	13	3.06
Cd Collections	75	17.65
Friends	291	68.47
Shareware Racks in Retail Stores	24	5.65
Computer Magazines	56	13.18
Shareware Websites	362	85.18
BB's	28	6.59
User Groups	24	5.65
Other	17	4
QUESTION RESPONSES:	**412**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**96.94**	

Figure 30: Distribution Media



QUESTION 3: "When using shareware, what limitation do you dislike?"

5 = really hate it, ... 1 = doesn't bother me

Table 36: Limitation-Limited Features

Limited Features	FREQ.	REL FREQ: [%]
None of the Above / NA	10	2.35
1	27	6.35
2	50	11.76
3	79	18.59
4	109	25.65
5	149	35.06
QUESTION RESPONSES:	**415**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**97.65**	

Figure 31: Limited Features

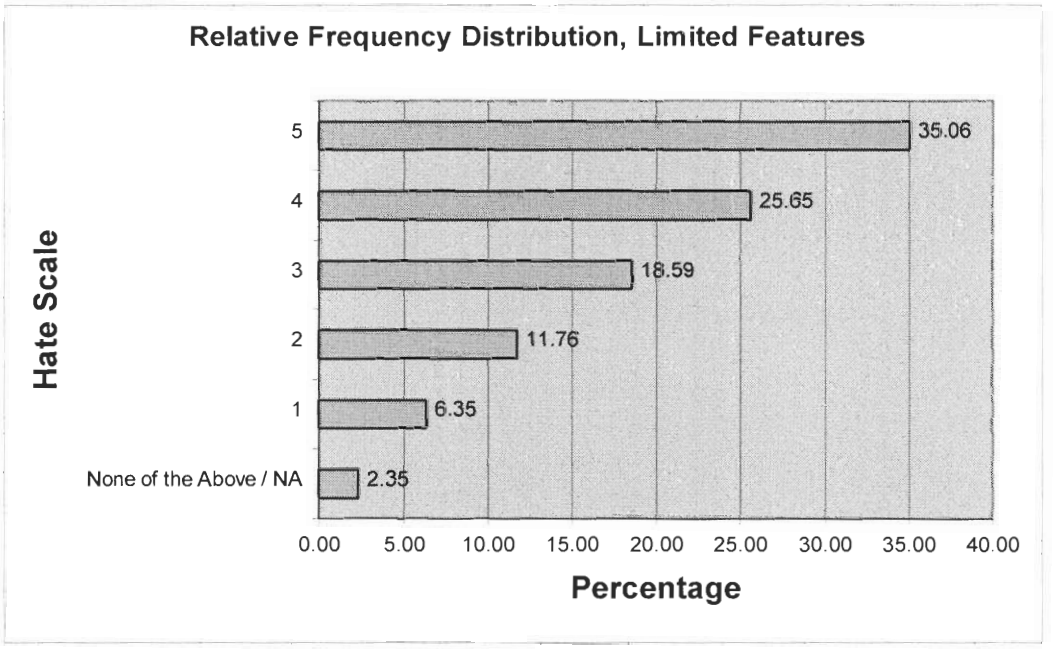


Table 37: Limitation-Limited Evaluation Time

Limited Evaluation Time	FREQ.	REL FREQ: [%]
None of the Above / NA	11	2.59
1	29	6.82
2	44	10.35
3	83	19.53
4	97	22.82
5	160	37.65
QUESTION RESPONSES:	**414**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**97.41**	

Figure 32: Limited Time Period

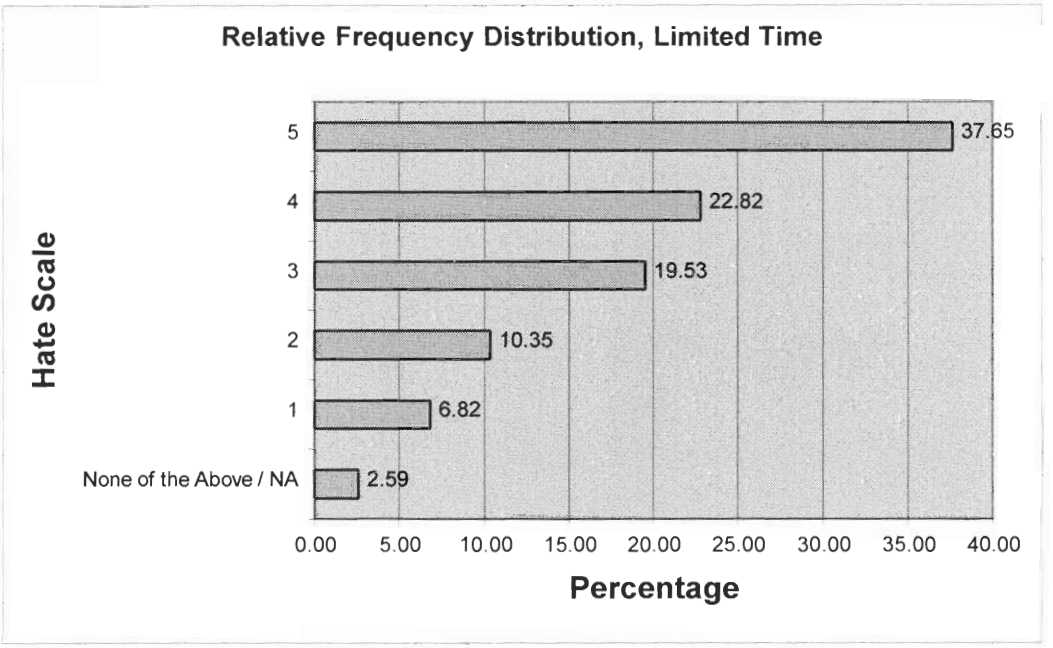


Table 38: Limitation-Limited Number of Runs

Limited Number of Runs	FREQ.	REL FREQ: [%]
None of the Above / NA	12	2.82
1	21	4.94
2	27	6.35
3	57	13.41
4	95	22.35
5	212	49.88
QUESTION RESPONSES:	**413**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**97.18**	

Figure 33: Limited Number of Runs

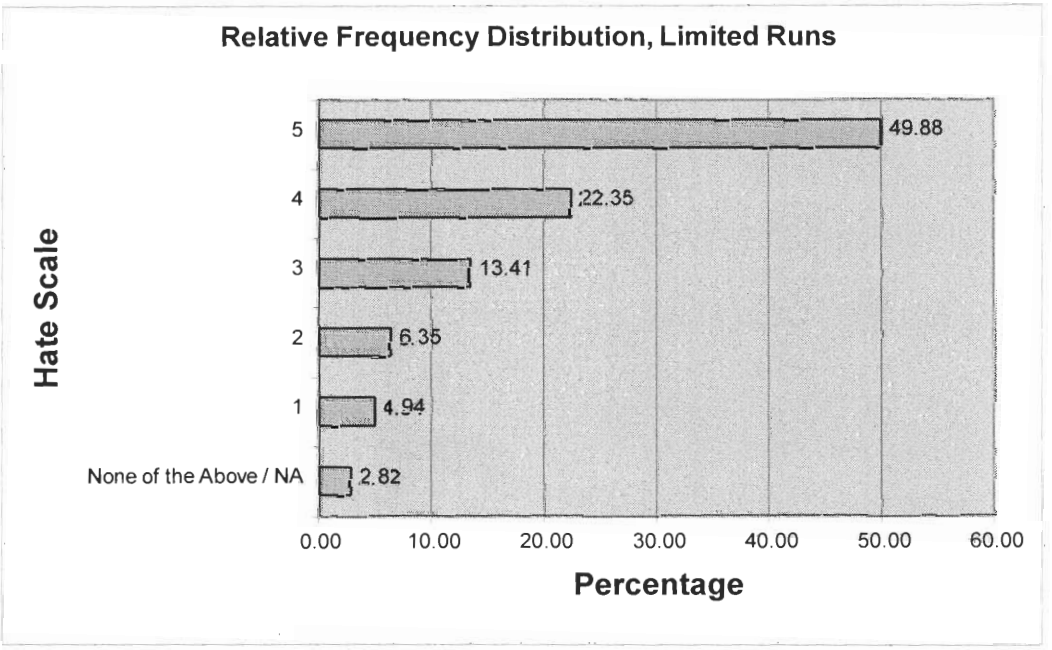


Table 39: Limitation-Nag Screens

Nag Screens Start/End of Program	FREQ.	REL FREQ: [%]
None of the Above / NA	10	2.35
1	104	24.47
2	95	22.35
3	72	16.94
4	53	12.47
5	90	21.18
QUESTION RESPONSES:	**415**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**97.65**	

Figure 34: Nag Screens Start and End of Program

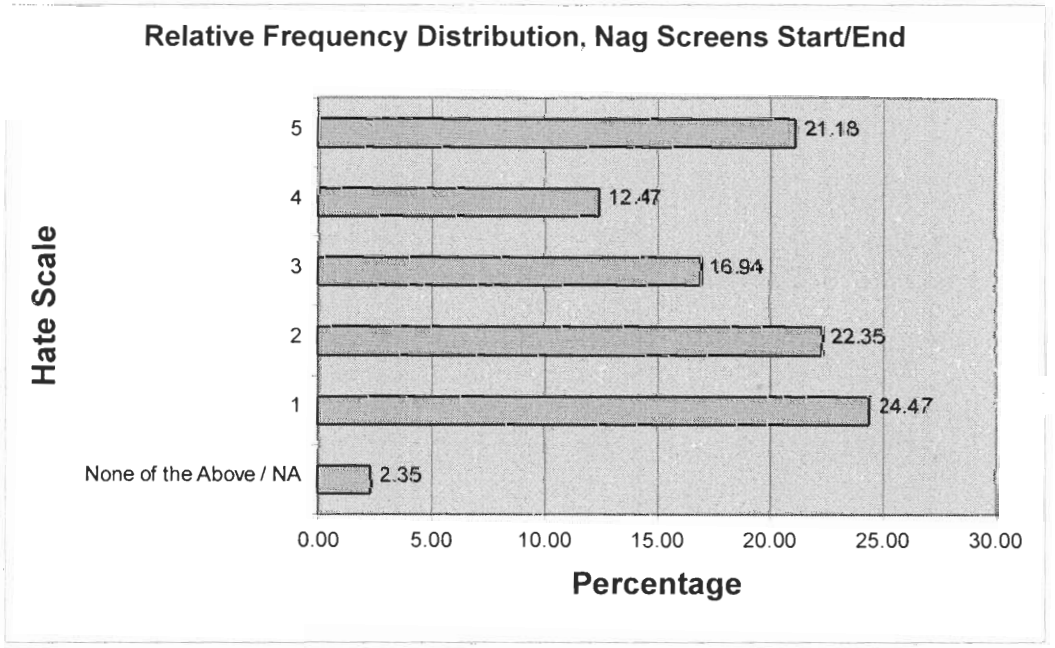


Table 40: Limitation-Random Reminders

Random Reminders	FREQ.	REL FREQ: [%]
None of the Above / NA	12	2.82
1	82	19.29
2	76	17.88
3	92	21.65
4	69	16.24
5	93	21.88
QUESTION RESPONSES:	**413**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**97.18**	

Figure 35: Random Reminders

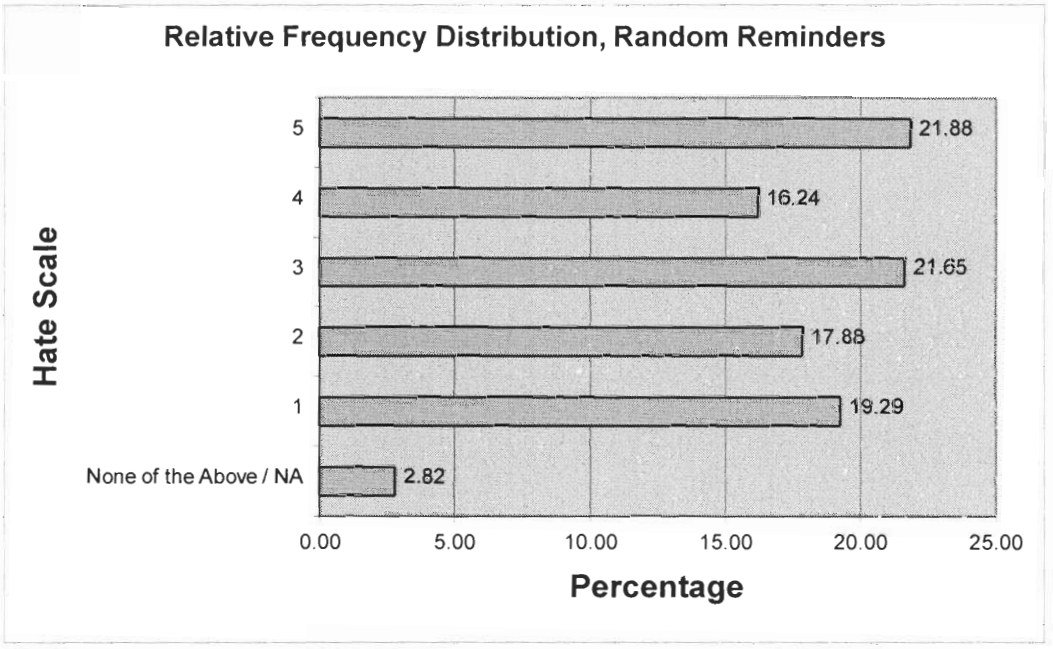


Table 41: Limitation-Lack of Technical Support

Lack of Tech Support	FREQ.	REL FREQ: [%]
None of the Above / NA	12	2.82
1	243	57.18
2	73	17.18
3	52	12.24
4	21	4.94
5	23	5.41
QUESTION RESPONSES:	**413**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**97.18**	

Figure 36: No Technical Support

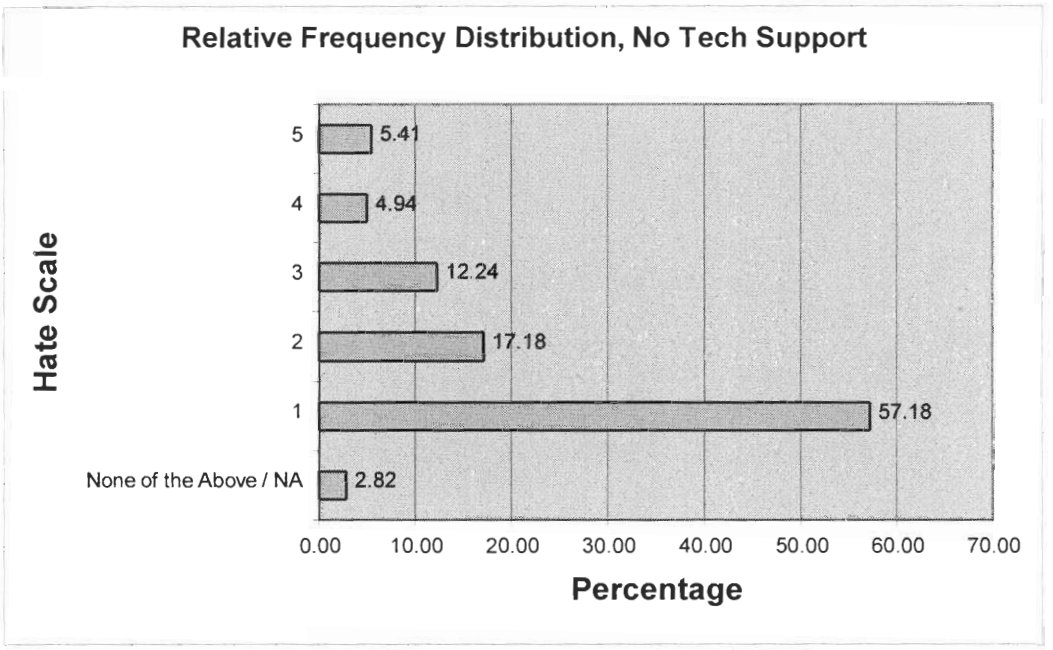
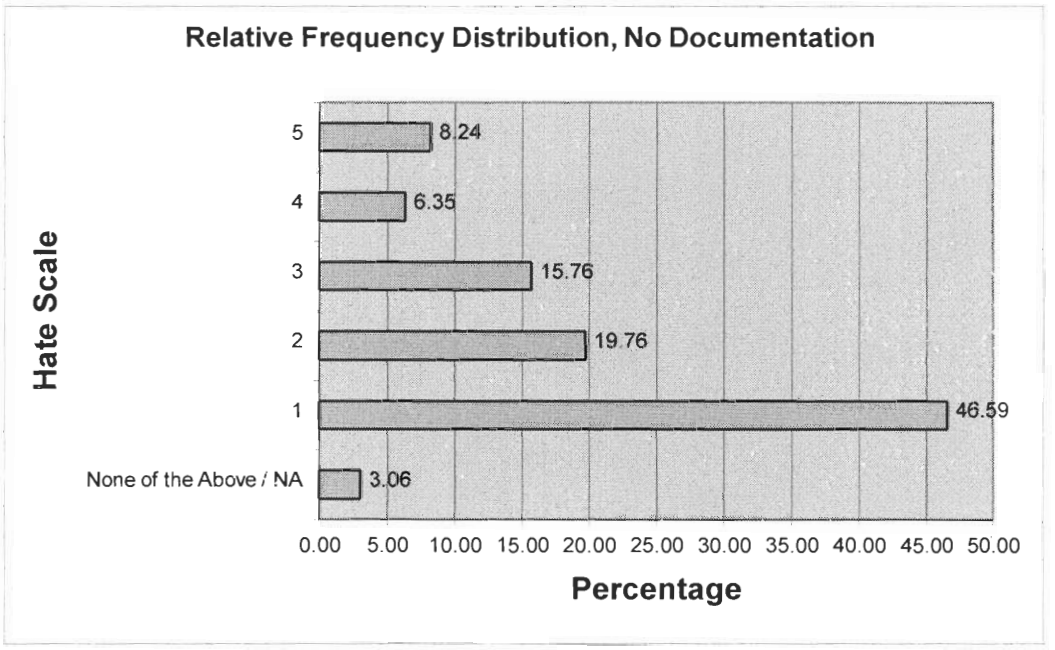


Table 42: Limitation-Absence of Documentation

Absence of Documentation	FREQ.	REL FREQ: [%]
None of the Above / NA	13	3.06
1	198	46.59
2	84	19.76
3	67	15.76
4	27	6.35
5	35	8.24
QUESTION RESPONSES:	**412**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**96.94**	

Figure 37: Lack of Documentation

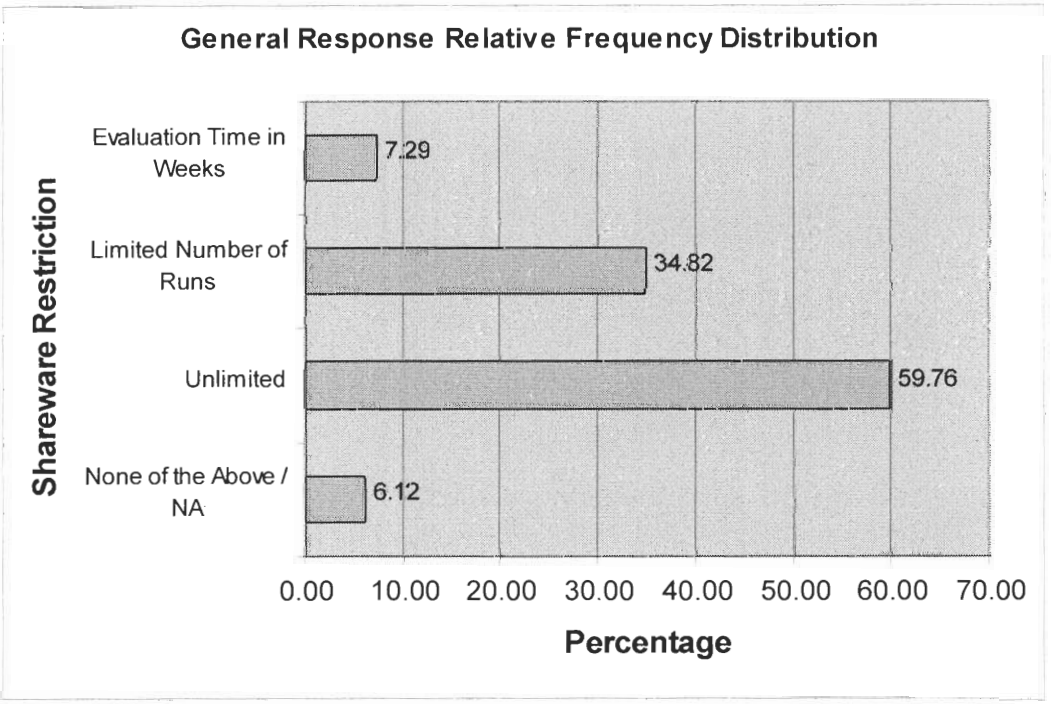


QUESTION 4: "How long do you think an average shareware evaluation restriction should be?"

Table 43: Average Shareware Evaluation

Shareware Evaluation Restriction	FREQ.	REL FREQ: [%]
None of the Above / NA	26	6.12
Unlimited	254	59.76
Limited Number of Runs	148	34.82
Evaluation Time in Weeks	31	7.29
QUESTION RESPONSES:	**399**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**93.88**	

Figure 38: Evaluation Restriction

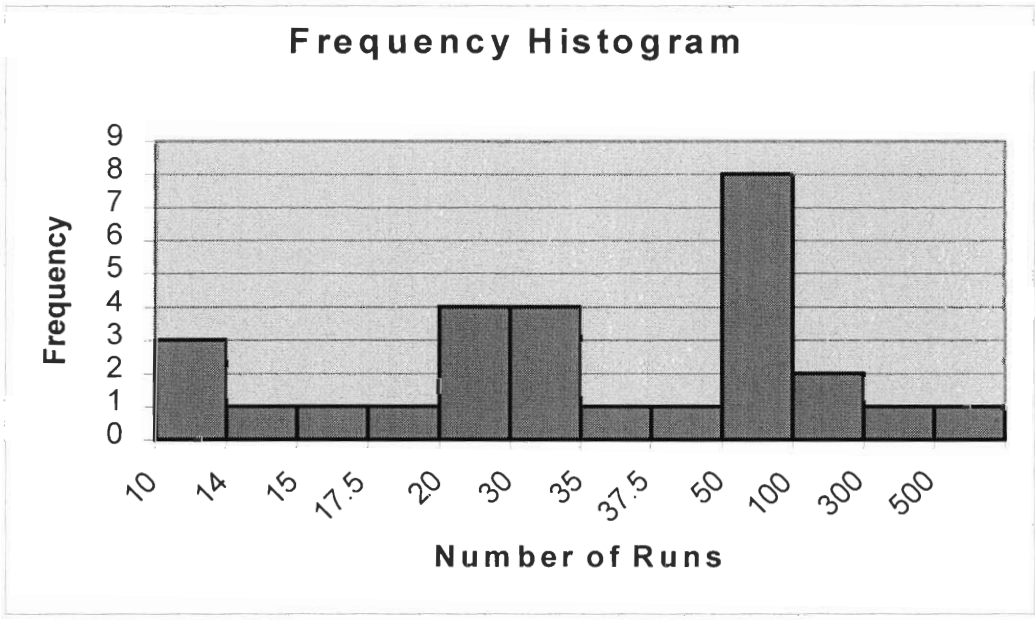


Limited Number of Runs

Table 44: Results-Limited Runs

Limited Runs	
Mean	66.36
Range	10-500
Median	30
Mode	50
St Dev	107.205
Variance	11492.91

Figure 39: Limited Runs

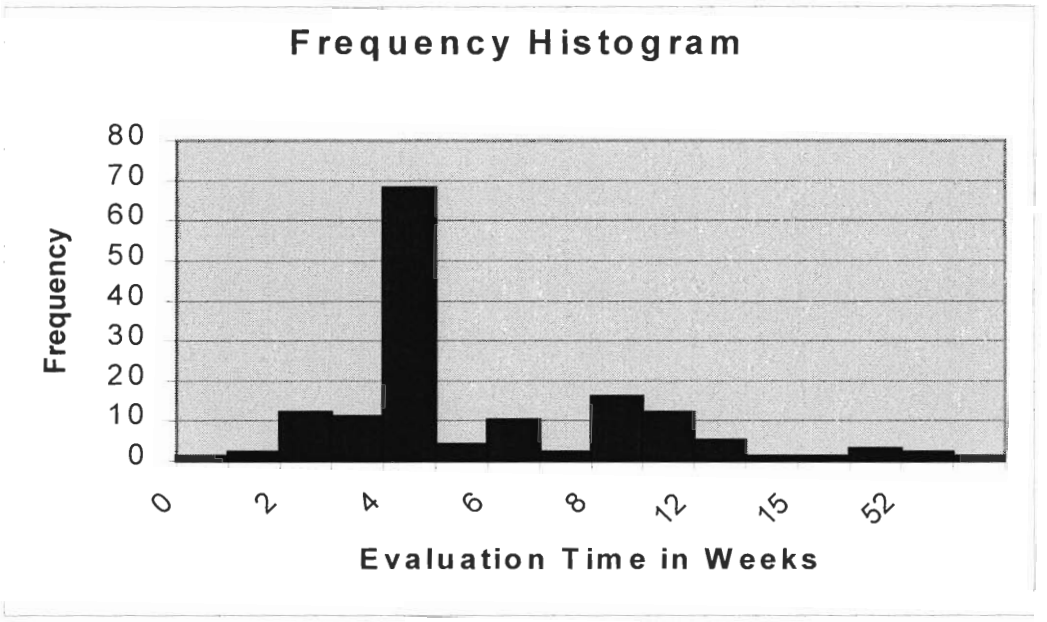


Limited Evaluation Time in Weeks

Table 45: Evaluation Time in Weeks

Evaluation Time in Weeks	
Mean	6.712329
Range	0-60
Median	4
Mode	4
St Dev	8.089976
Variance	65.44771

Figure 40: Evaluation Time in Weeks



QUESTION 5: "What problems do you experience with shareware most often?"

3 = Often, 2 = Sometimes, 1 = Hardly ever or never

Table 46: Problem-Virus Infections

Virus Infections	FREQ.	REL FREQ: [%]
None of the Above / NA	26	6.12
1	344	80.94
2	30	7.06
3	24	5.65
QUESTION RESPONSES:	**399**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**93.88**	

Figure 41: Virus Infections

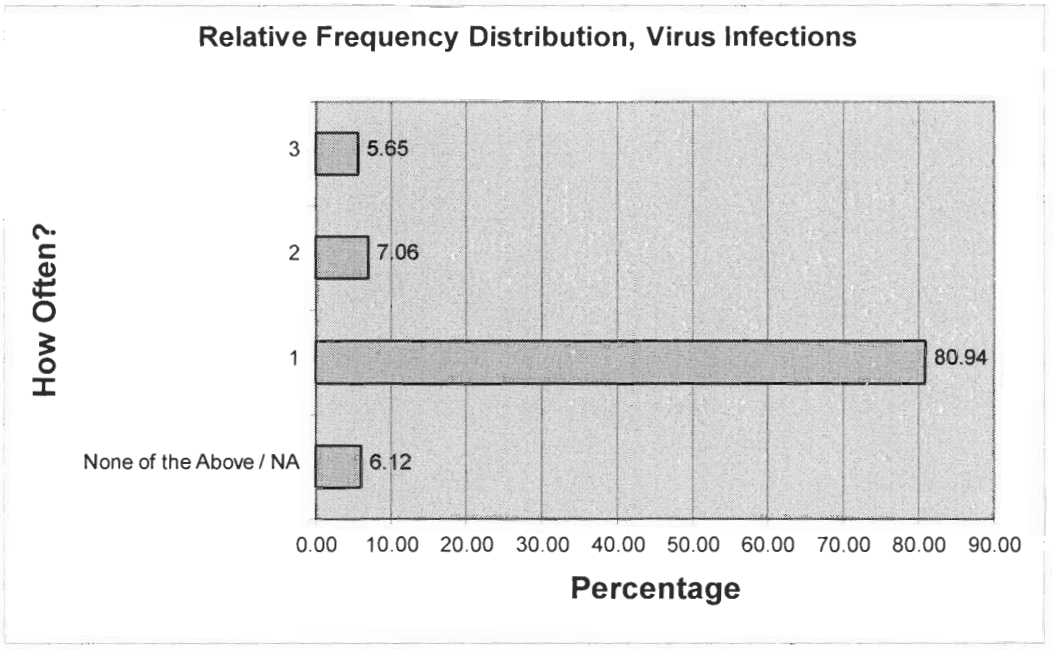


Table 47: Problem, Installation

Installation Problems	FREQ.	REL FREQ: [%]
None of the Above / NA	22	5.18
1	218	51.29
2	141	33.18
3	43	10.12
QUESTION RESPONSES:	**403**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**94.82**	

Figure 42: Installation Problems

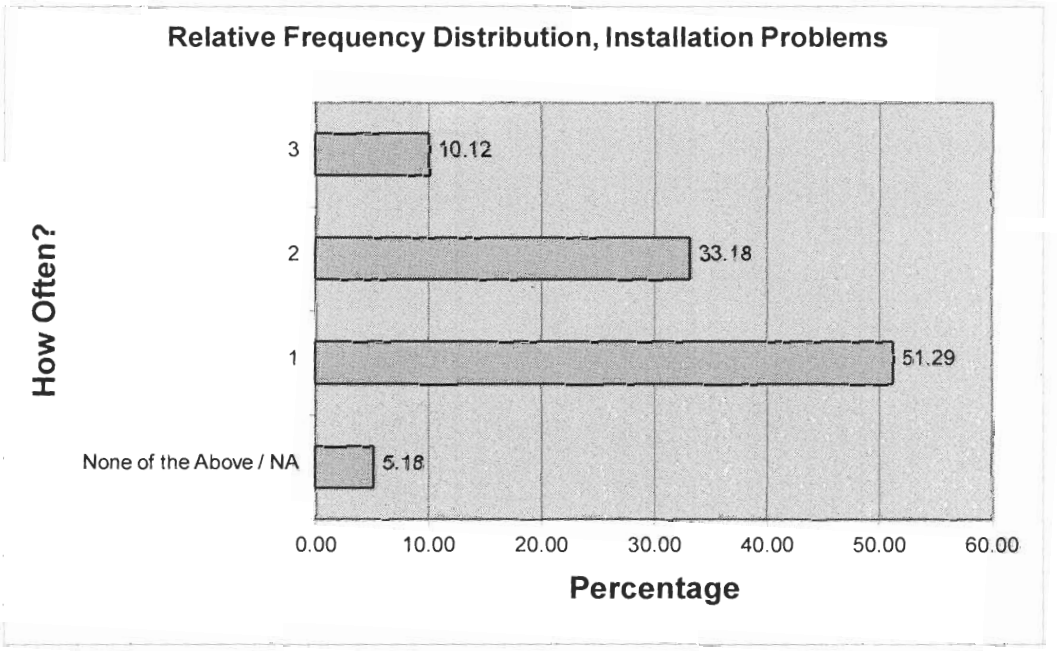


Table 48: Problem, Un-installation

Un-installation Problems	FREQ.	REL FREQ: [%]
None of the Above / NA	21	4.94
1	154	36.24
2	170	40.00
3	79	18.59
QUESTION RESPONSES:	**404**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**95.06**	

Figure 43: Un-installation Problems

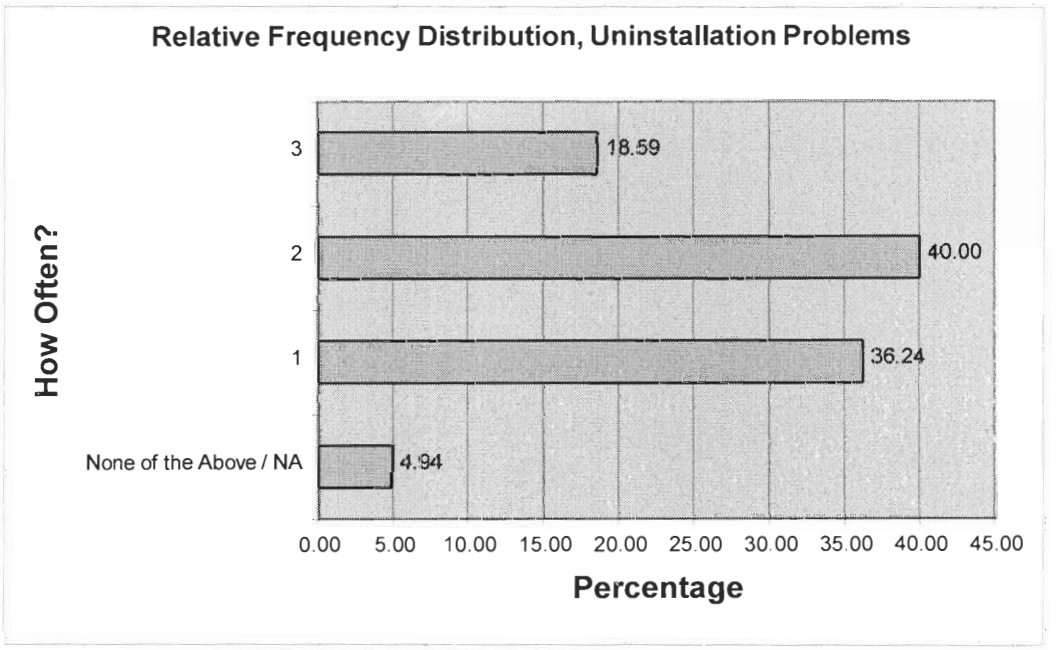


Table 49: Problem-Crashes

Program Crashes	FREQ.	REL FREQ: [%]
None of the Above / NA	22	5.18
1	134	31.53
2	203	47.76
3	65	15.29
QUESTION RESPONSES:	**403**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**94.82**	

Figure 44: Crashes

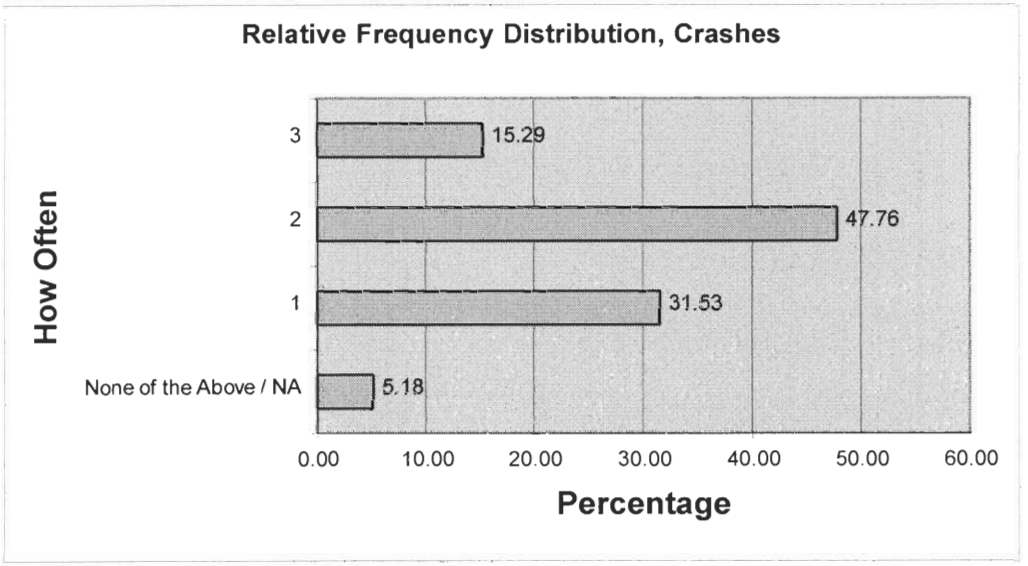


Table 50: Problem, Insufficient Set of Features

Insufficient Set of Features	FREQ.	REL FREQ: [%]
None of the Above / NA	25	5.88
1	72	16.94
2	182	42.82
3	145	34.12
QUESTION RESPONSES:	**400**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**94.12**	

Figure 45: Insufficient Set of Features

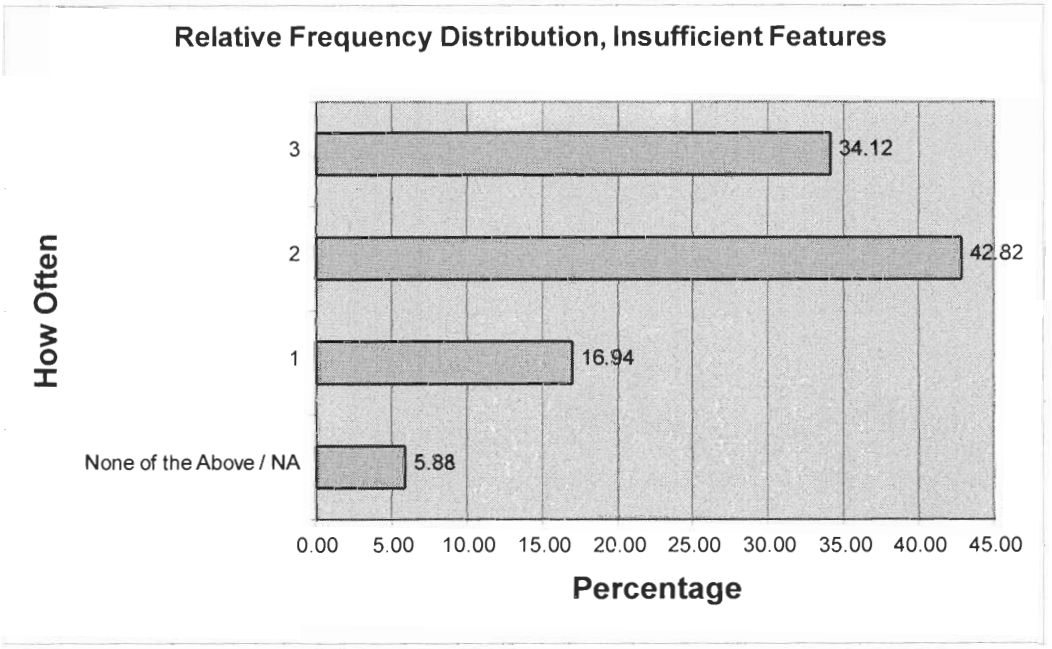


Table 51: Problem-Confusing Interface

Confusing Interface	FREQ.	REL FREQ: [%]
None of the Above / NA	29	6.82
1	119	28.00
2	195	45.88
3	81	19.06
QUESTION RESPONSES:	**396**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**93.18**	

Figure 46: Confusing Interface

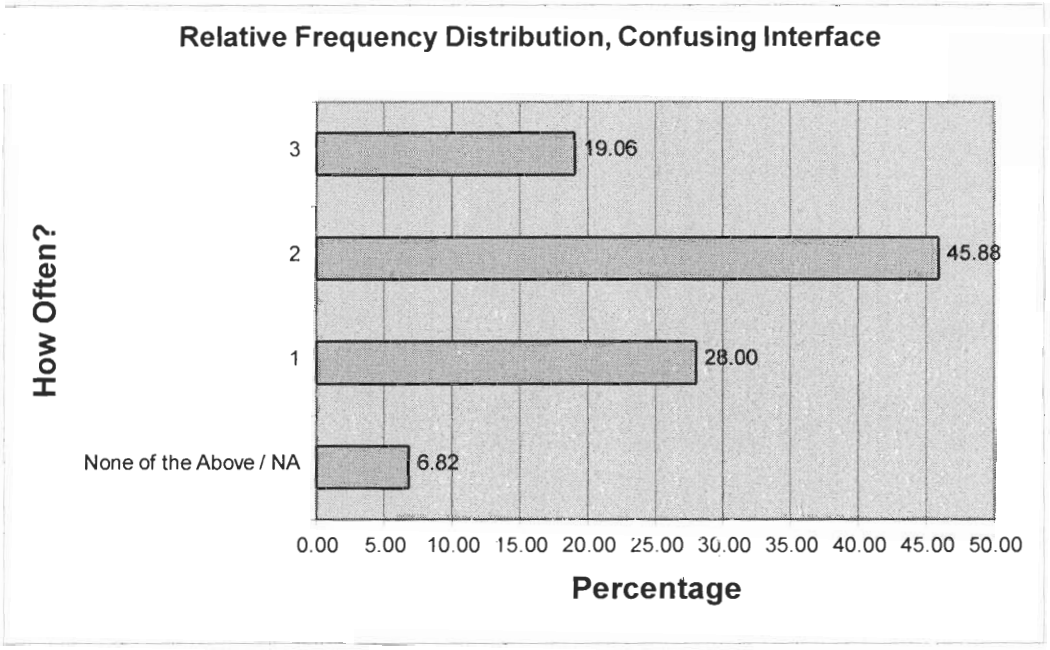


Table 52: Problem-Lack of Technical Support

Lack of Technical Support	FREQ.	REL FREQ: [%]
None of the Above / NA	30	7.06
1	195	45.88
2	114	26.82
3	85	20.00
QUESTION RESPONSES:	**395**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**92.94**	

Figure 47: Lack of Technical Support

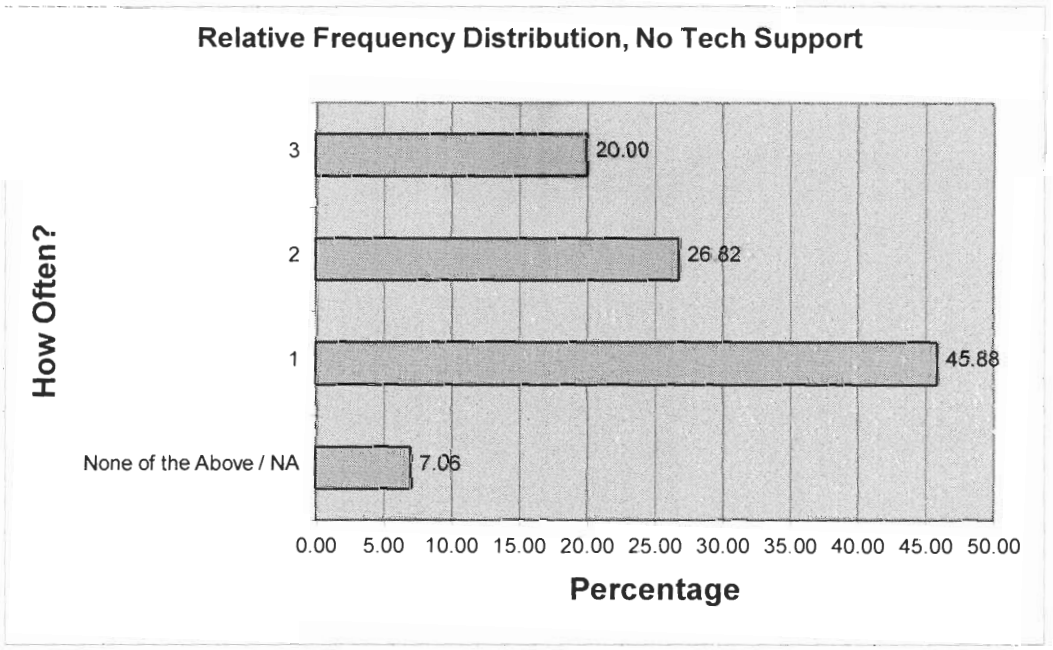


Table 53: Problem-Absence of Documentation

Absence of Documentation	FREQ.	REL FREQ: [%]
None of the Above / NA	29	6.82
1	185	43.53
2	137	32.24
3	73	17.18
QUESTION RESPONSES:	**396**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**93.18**	

Figure 48: Absence of Documentation

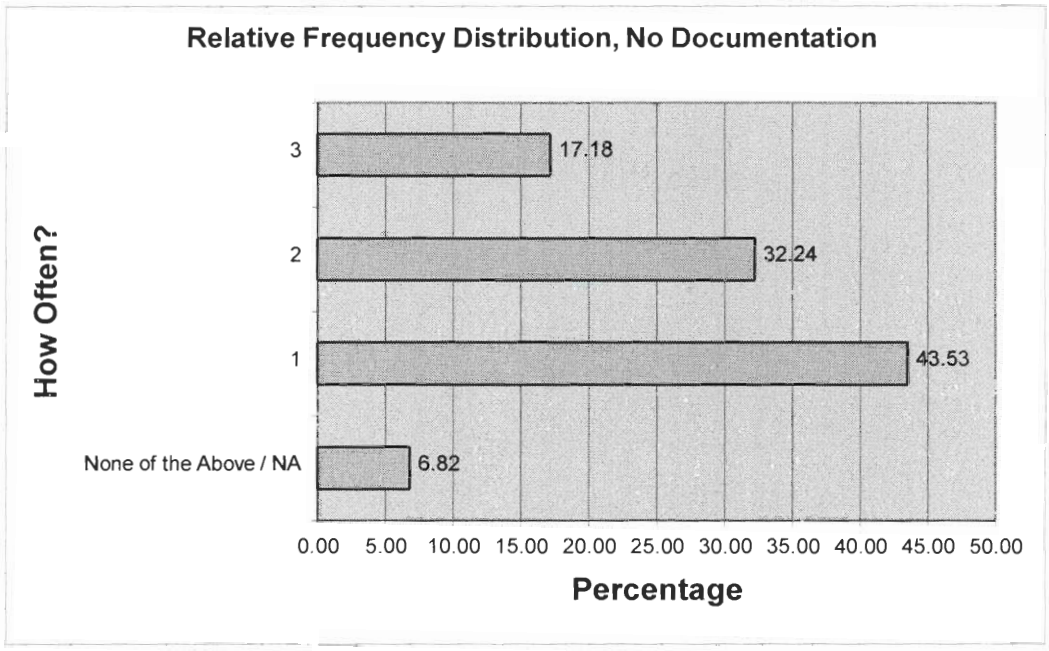


Table 54: Results of Encountered Shareware Problems

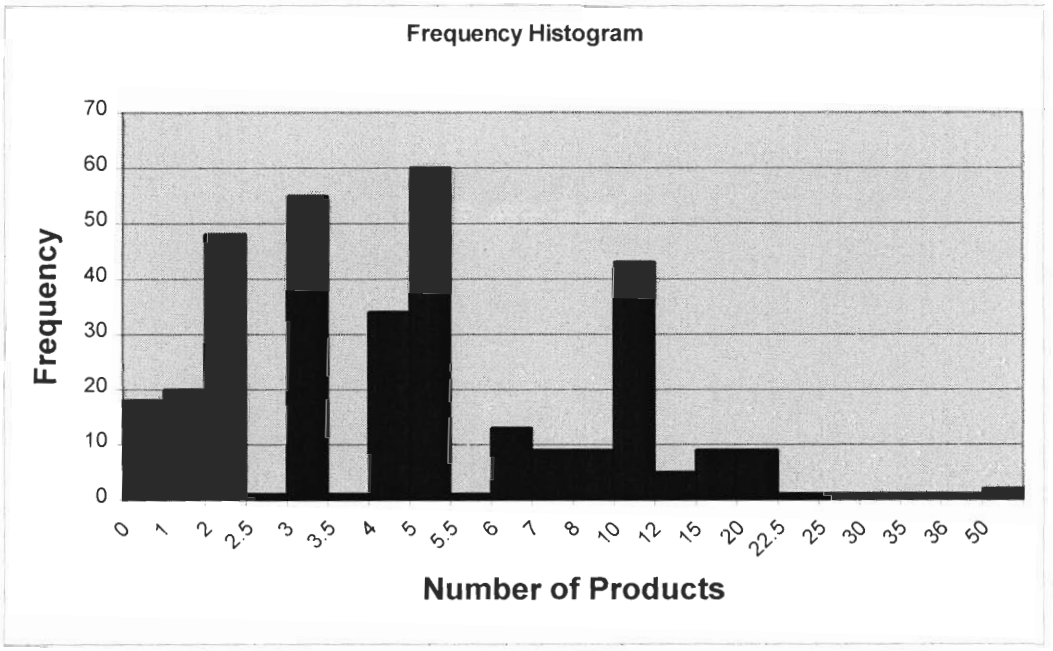
QUESTION 5		
What Problems do you encounter with Shareware?		
1=Never 3=Often	**Average**	**Result**
Virus Infections	1.2	Never
Installation Problems	1.56	Some of the Time
Un-installation Problems	1.81	Some of the Time
Program Crashes	1.83	Some of the Time
Insufficient Set of Features	2.18	Some of the Time
Confusing Interface	1.9	Some of the Time
Lack of Technical Support	1.72	Some of the Time
Absence of Documentation	1.72	Some of the Time

QUESTION 6: "How many unregistered shareware programs do you use?"

Table 55: Statistics of Unregistered Shareware Programs

Range	Median	Mode	Mean	St Dev	Variance
0-50	5	5	6.327586	6.132865	37.61204

Figure 49: Unregistered Shareware Programs

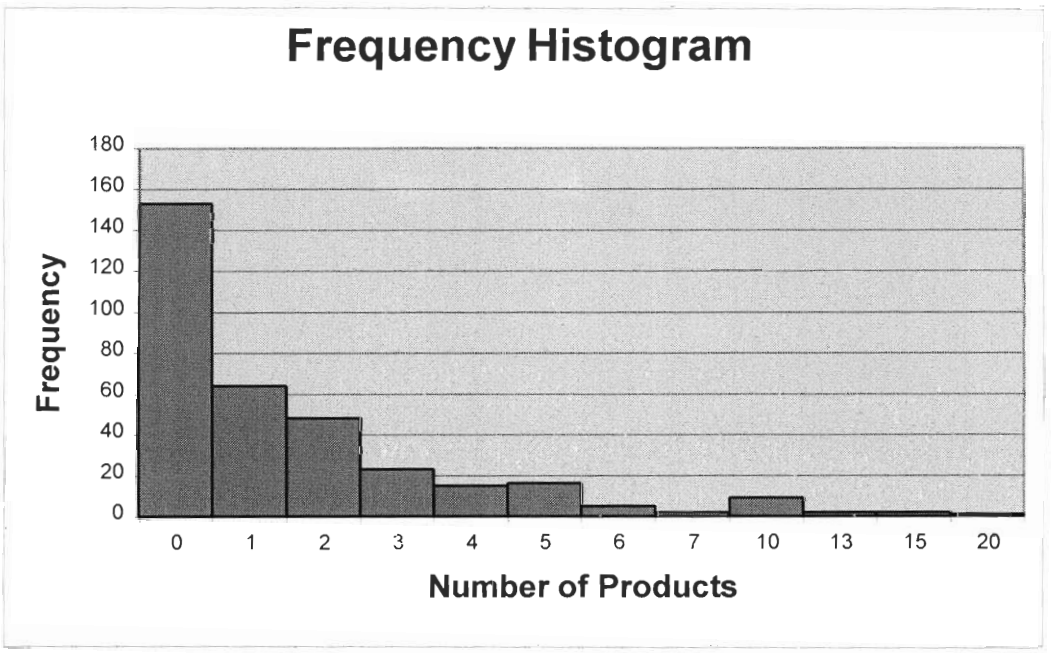


QUESTION 7: "How many registered shareware programs do you use?"

Table 56: Statistics of Registered Shareware Programs

Variance	Range	Median	Mode	Mean	St Dev
7.376425	0-20	1	0	1.675676	2.715957

Figure 50: Registered Shareware Programs

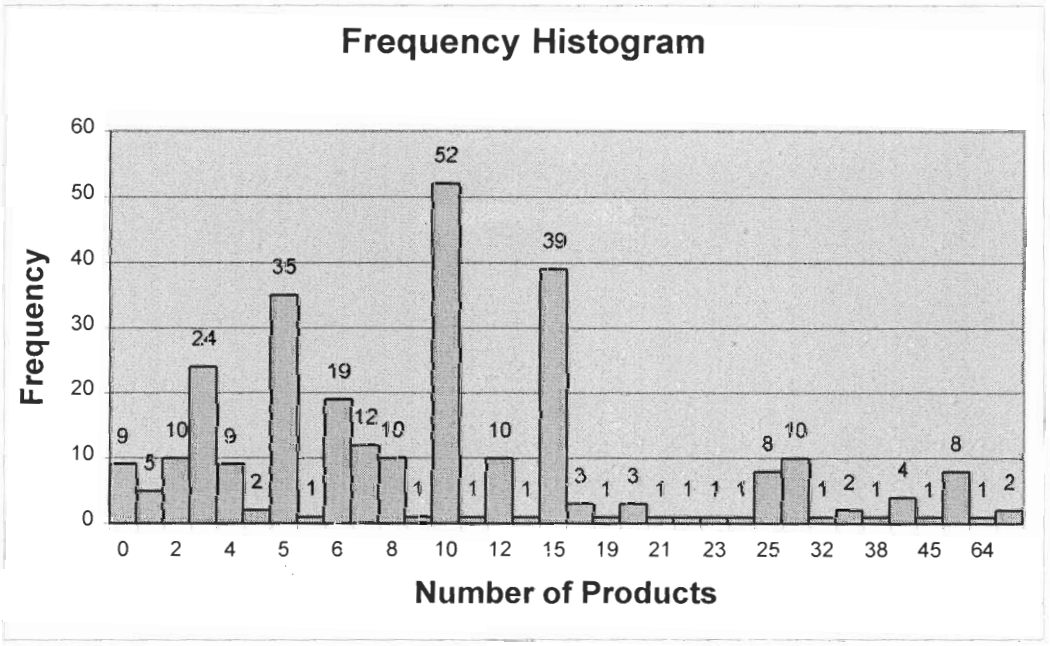


QUESTION 8: "How many other retail programs do you use?"

Table 57: Statistics of Retail Programs

Range	Median	Mean	Mode	St Dev	Variance
0-100	10	13.06109	10	12.62484	159.3866

Figure 51: Retail Programs



QUESTION 9: "Most of the time, why do you register shareware?"

3 = Often, 2 = Sometimes, 1 = Hardly ever or never

Table 58: Why Register-Evaluation Period Ran Out

Evaluation Period Ran Out	FREQ.	REL FREQ: [%]
None of the Above / NA	94	22.12
1	182	42.82
2	83	19.53
3	65	15.29
QUESTION RESPONSES:	**331**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**77.88**	

Figure 52: Evaluation Period Ran Out

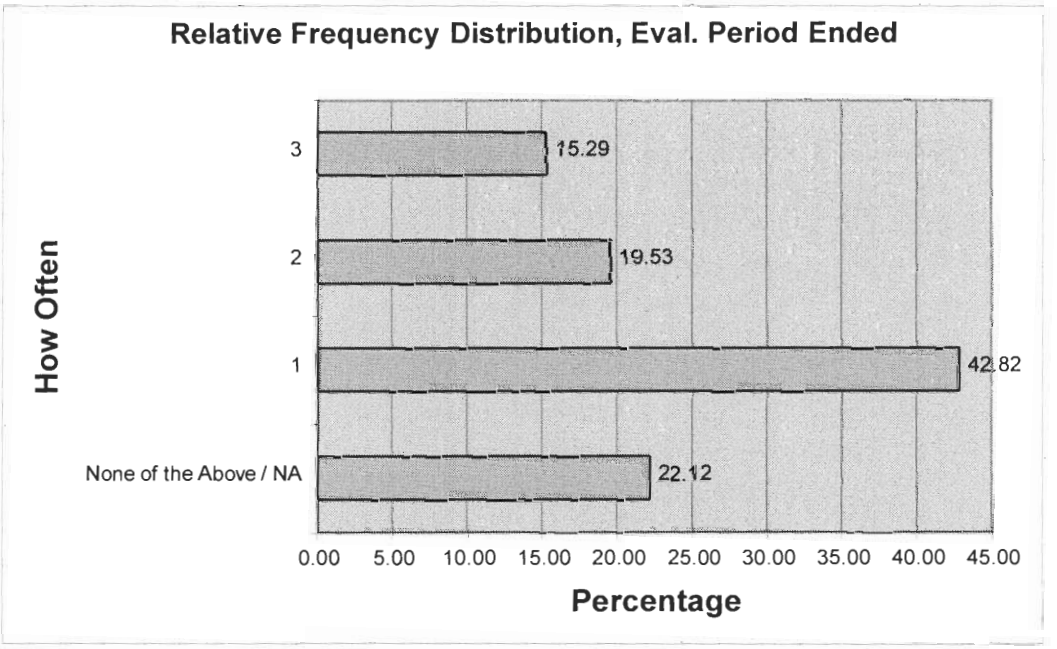


Table 59: Why Register-Need the Locked Features

I Need the Locked Features	FREQ.	REL FREQ: [%]
None of the Above / NA	101	23.76
1	140	32.94
2	90	21.18
3	93	21.88
QUESTION RESPONSES:	**324**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**76.24**	

Figure 53: Need the Locked Features

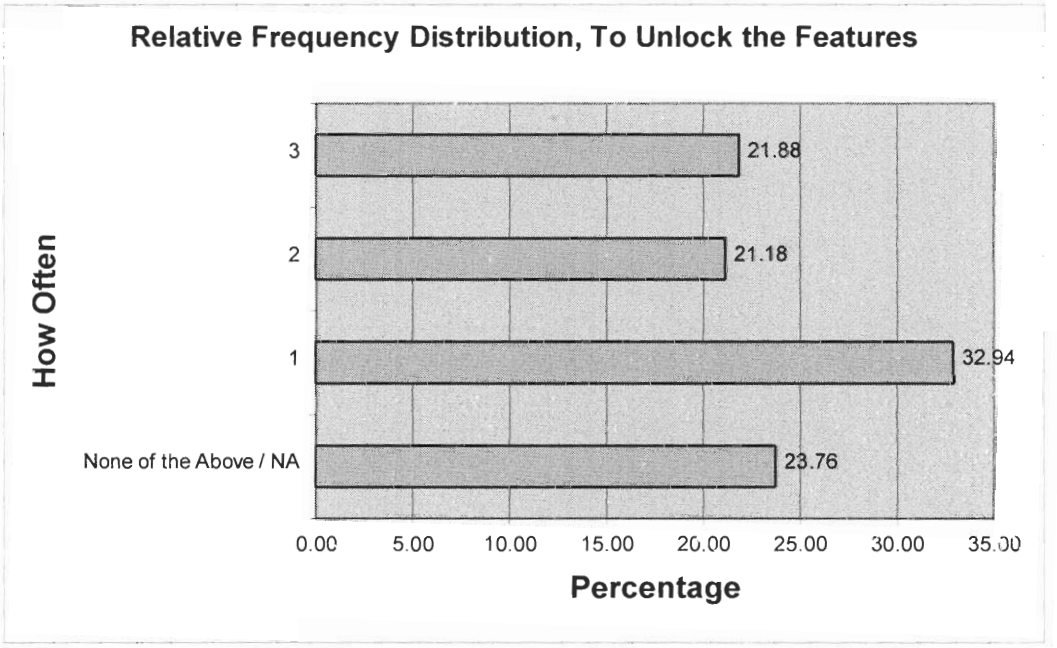


Table 60: Why Register, To Gain Technical Support

To Gain Technical Support	FREQ.	REL FREQ: [%]
None of the Above / NA	105	24.71
1	271	63.76
2	21	4.94
3	27	6.35
QUESTION RESPONSES:	**320**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**75.29**	

Figure 54: To Gain Technical Support

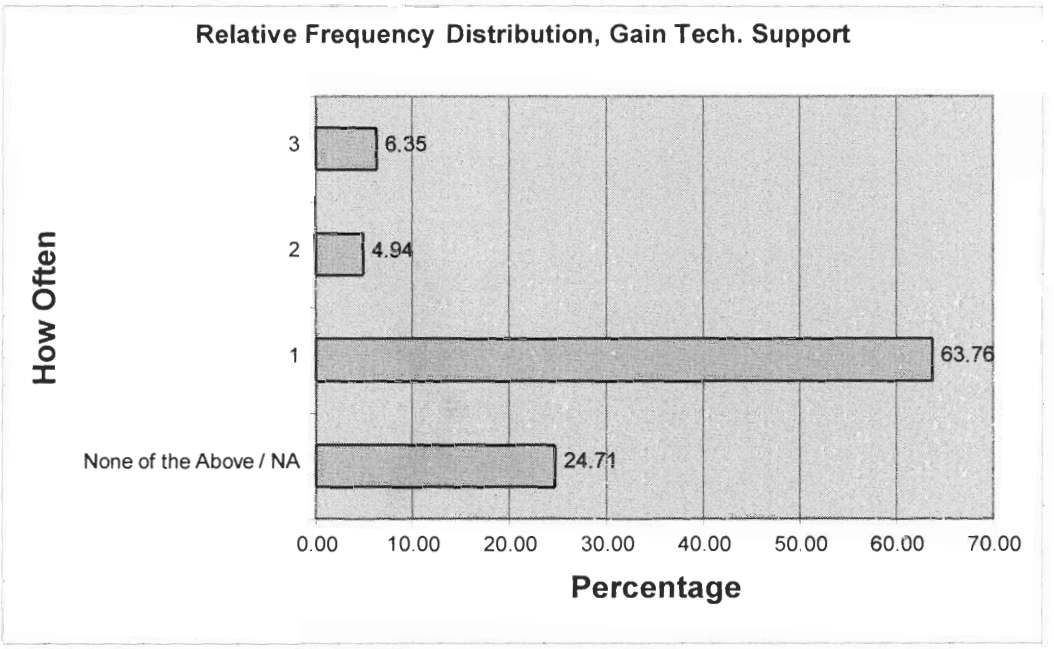


Table 61: Why Register-To Acquire Product Documentation

To Acquire Documentation	FREQ.	REL FREQ: [%]
None of the Above / NA	104	24.47
1	265	62.35
2	23	5.41
3	32	7.53
QUESTION RESPONSES:	**321**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**75.53**	

Figure 55: To Acquire Documentation

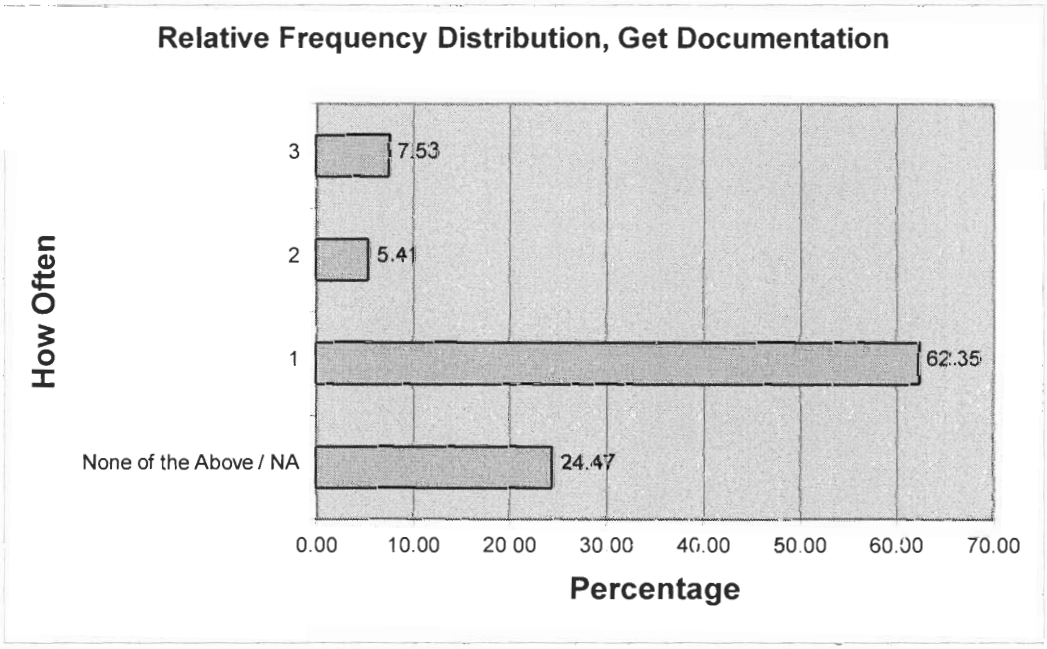


Table 62: Why Register-Agreement to the Legal Statement

Agreed to Legal Statement	FREQ.	REL FREQ: [%]
None of the Above / NA	105	24.71
1	233	54.82
2	39	9.18
3	47	11.06
QUESTION RESPONSES:	**320**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**75.29**	

Figure 56: Agreement to the Legal Statement

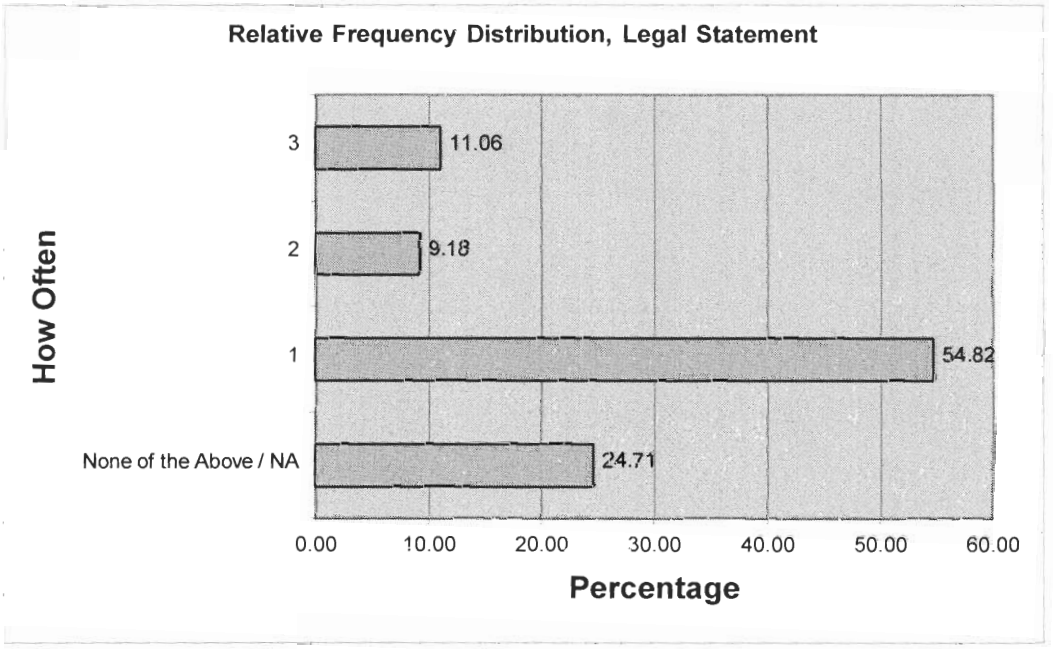


Table 63: Results of Why you Register Shareware

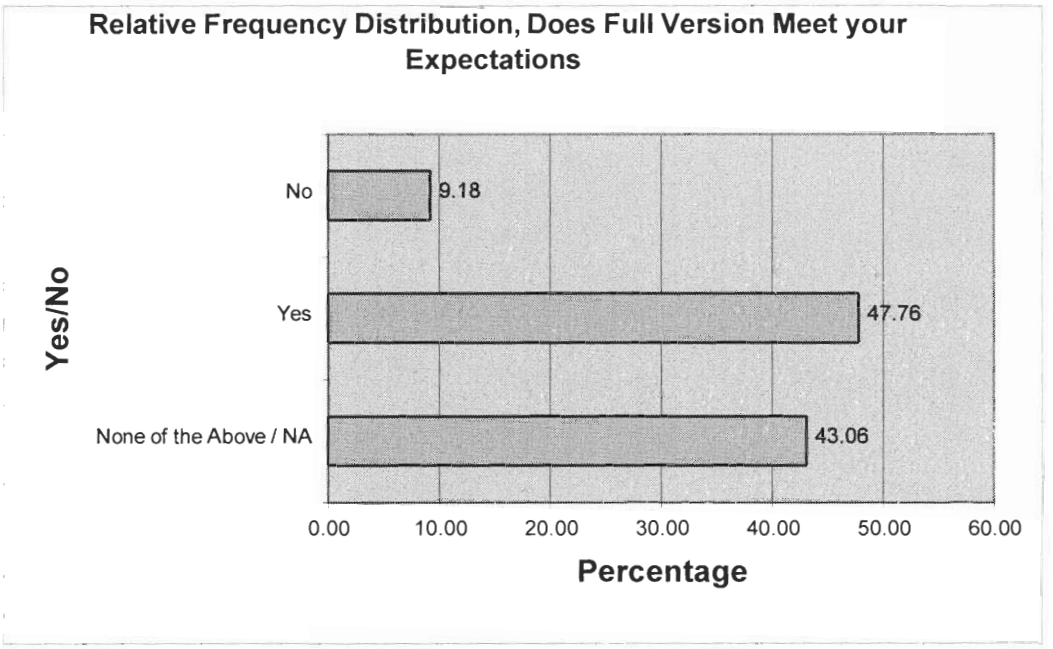
QUESTION 9		
Why do you Register Shareware?		
1=Never 3=Often	**Average**	**Result**
Evaluation Period Ran Out	1.65	Some of the Time
I Need the Locked Features	1.85	Some of the Time
To Gain Technical Support	1.24	Not Often
To Aquire Documentation	1.27	Not Often
Agreed to Legal Statement	1.42	Not Often

QUESTION 10: "On average, after registering the shareware version, does the full version of the software meet your expectations?"

Table 64: Does the Full Version Meet Your Expectations

Does Full Version Meet Your Expectations?	FREQ.	REL FREQ: [%]
None of the Above / NA	183	43.06
Yes	203	47.76
No	39	9.18
QUESTION RESPONSES:	**242**	
TOTAL RESPONSES:	**425**	
QUESTION RESPONSE RATE:	**56.94**	

Figure 57: Does the Full Version Meet Your Expectations

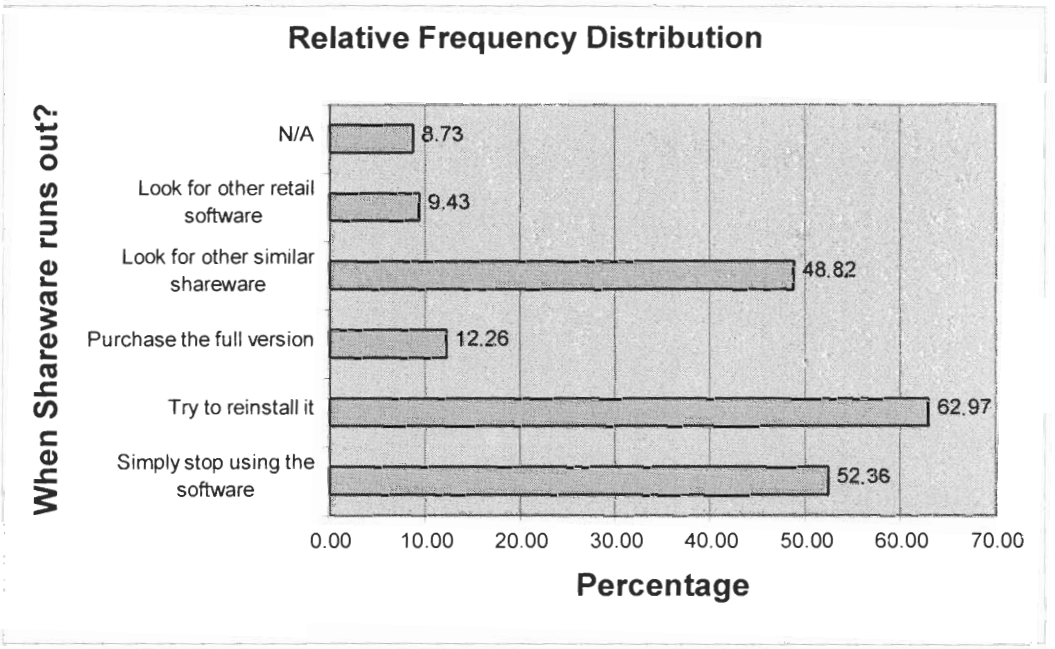


QUESTION 11: "What do you do most of the time when your shareware runs out?"

Table 65: What do you do when Shareware Runs Out

ANSWERS	FREQ.	REL FREQ. [%]
Simply stop using the software	222	52.36
Try to reinstall it	267	62.97
Purchase the full version	52	12.26
Look for other similar shareware	207	48.82
Look for other retail software	40	9.43
N/A	37	8.73
QUESTION RESPONSES:	**387**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE [%]:	**91.27**	

Figure 58: What do you do when Shareware Runs Out



QUESTION 12: "What do you think is a reasonable average shareware registration fee?"

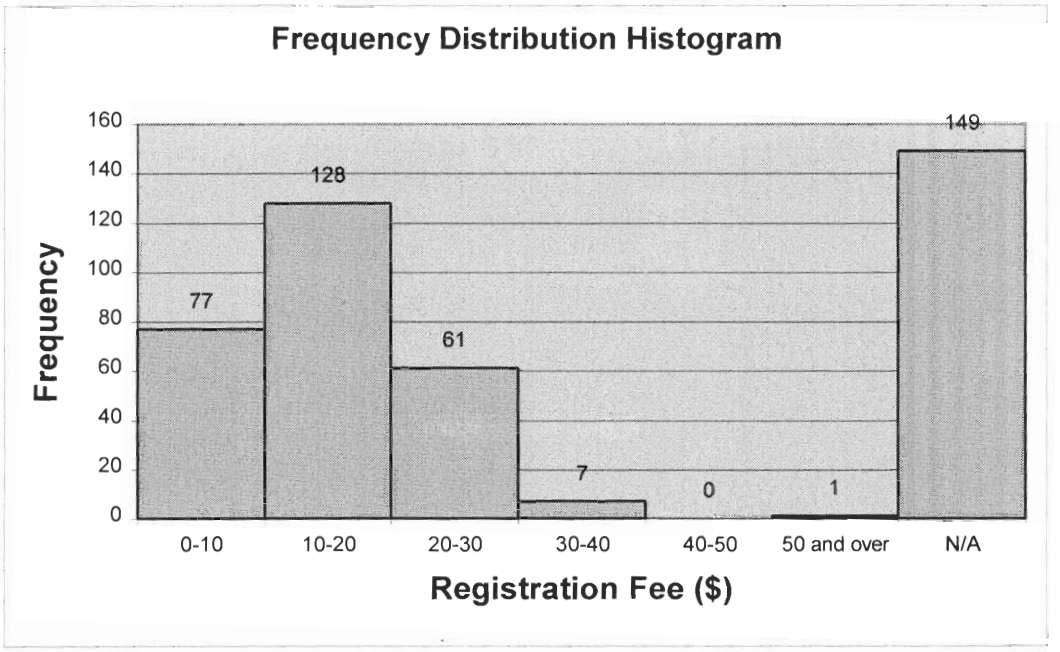
Table 66: Average Shareware Registration Fee

ANSWERS	FREQ.	REL FREQ. [%]
0-10	77	18.16
10-20	128	30.19
20-30	61	14.39
30-40	7	1.65
40-50	0	0.00
50 and over	1	0.24
N/A	149	35.14
QUESTION RESPONSES:	**275**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE [%]:	**64.86**	

Table 67: Average Shareware Registration Fee, Descriptive Statistics

DESCRIPTIVE STATISTICS		
Mean	$ 12.02	
Mode	$ 10.00	
Median	$ 10.00	
Range	$ 0.00	$ 50.00
Variance	$ 57.35	
StdDev	$ 7.57	
Score 25%	$ 5.00	
Score 75%	$ 20.00	

Figure 59: Average Shareware Registration Fee

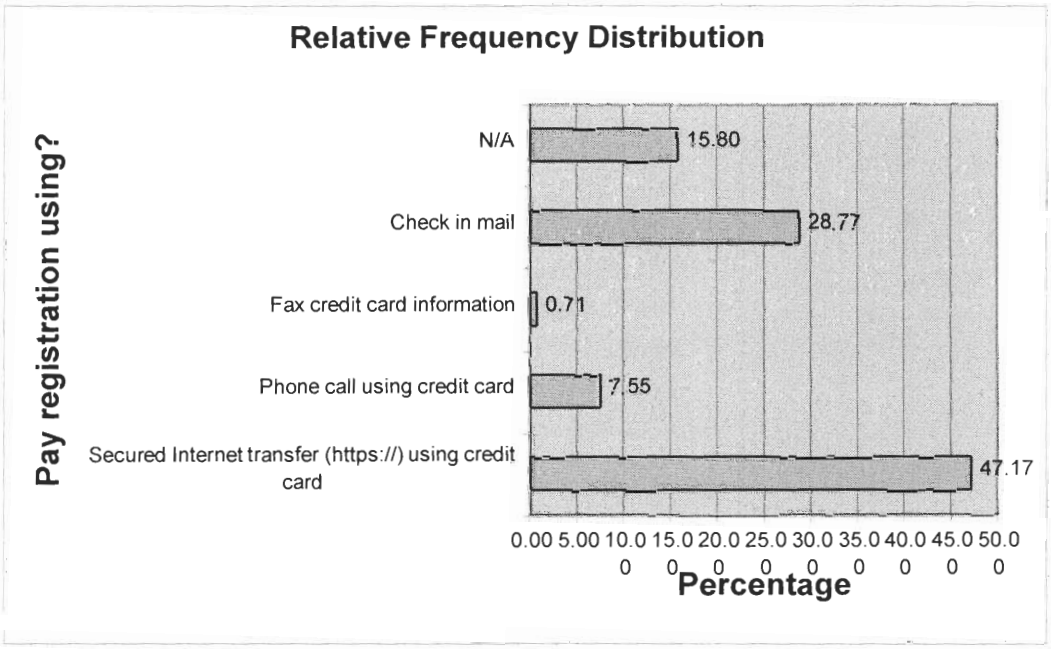


QUESTION 13: "Which of the methods do you feel most comfortable using, to pay the registration fees?"

Table 68: Methods Used to Pay Registration Fees

ANSWERS	FREQ.	REL FREQ. [%]
Secured Internet transfer (https://) using credit card	200	47.17
Phone call using credit card	32	7.55
Fax credit card information	3	0.71
Check in mail	122	28.77
N/A	67	15.80
QUESTION RESPONSES:	**357**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE [%]:	**84.20**	

Figure 60: Methods Used to Pay Registration Fees

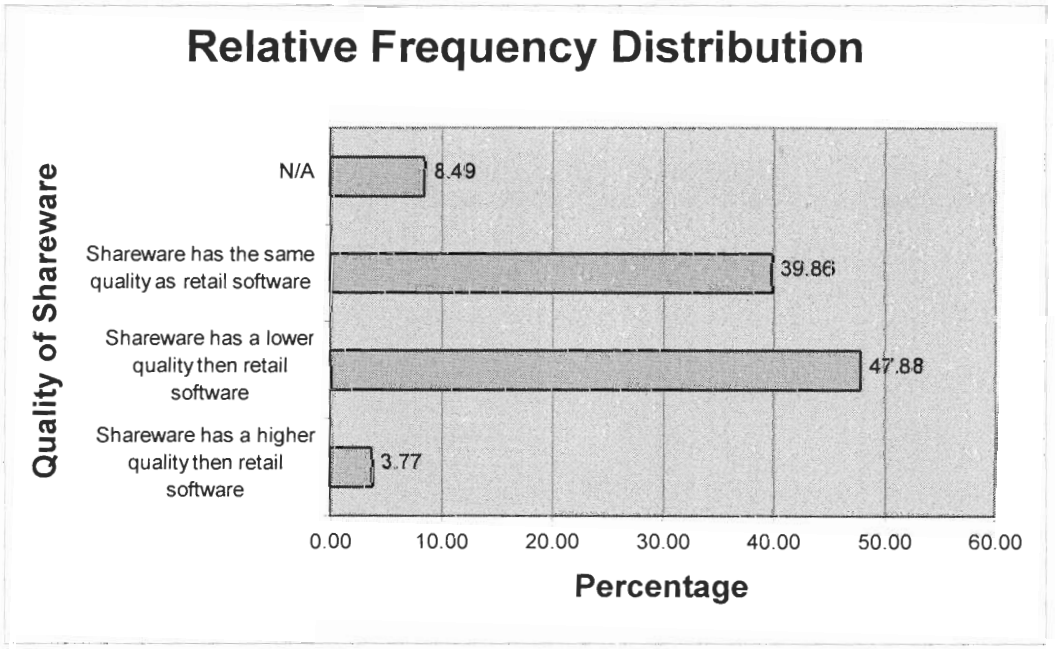


QUESTION 14: "On average, how would you describe the quality of shareware products?"

Table 69: Quality of Shareware

ANSWERS	FREQ.	REL FREQ. [%]
Shareware has a higher quality then retail software	16	3.77
Shareware has a lower quality then retail software	203	47.88
Shareware has the same quality as retail software	169	39.86
N/A	36	8.49
QUESTION RESPONSES:	**388**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE [%]:	**91.51**	

Figure 61: Quality of Shareware

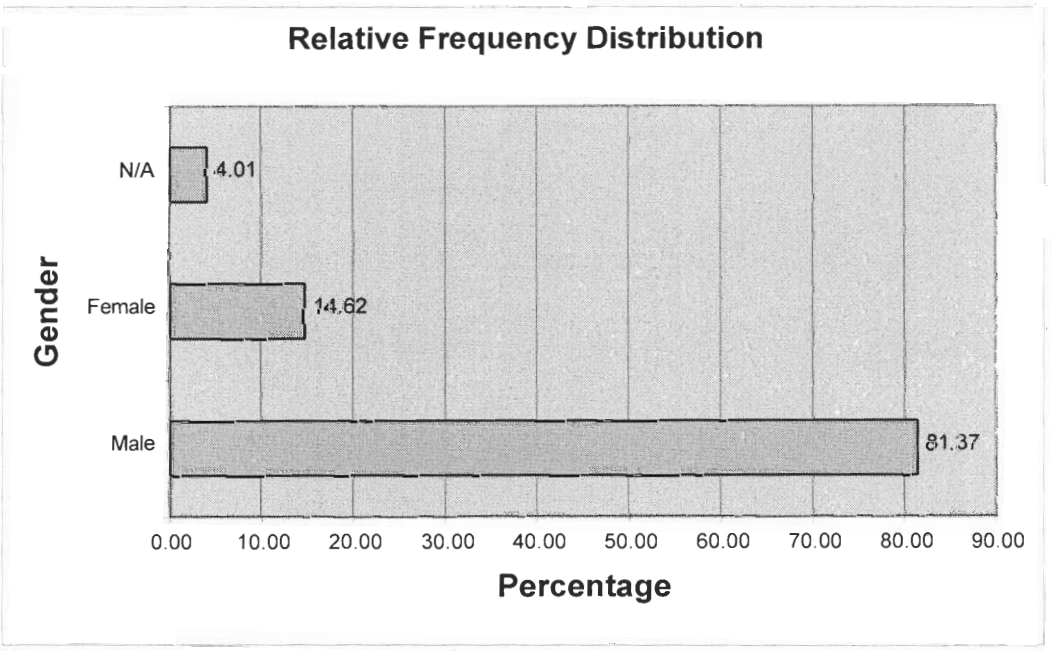


QUESTION 15: "What gender are you?"

Table 70: Students' Gender

ANSWERS	FREQ.	REL FREQ. [%]
Male	345	81.37
Female	62	14.62
N/A	17	4.01
QUESTION RESPONSES:	**407**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE [%]:	**95.99**	

Figure 62: Students' Gender

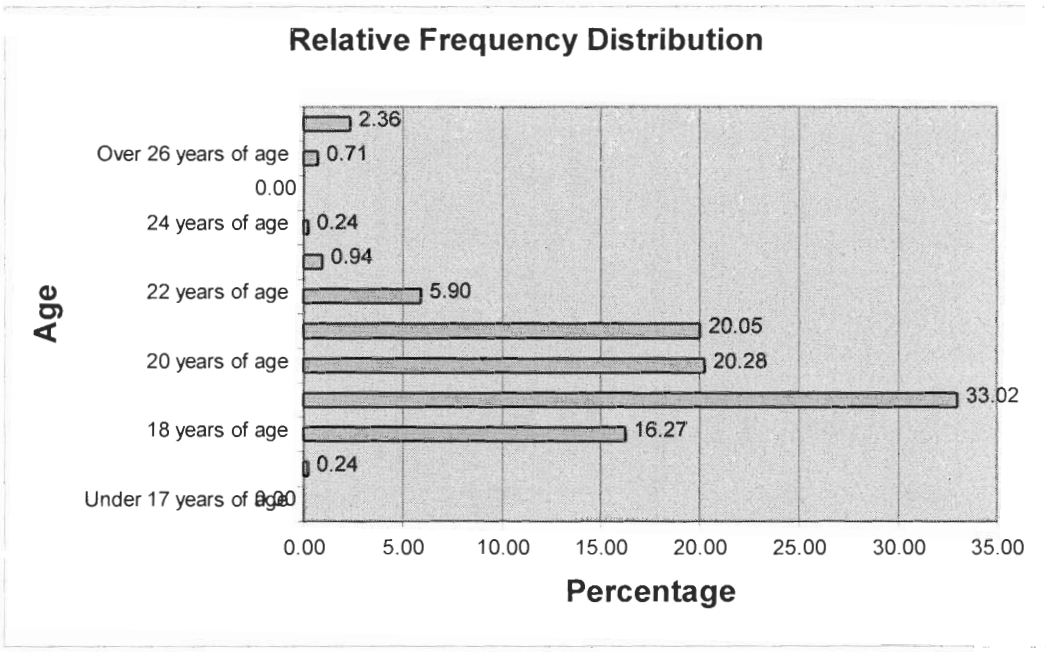


QUESTION 16: "What age are you?"

Table 71:Students' Age

ANSWERS	FREQ.	REL FREQ. [%]
Under 17 years of age	0	0.00
17 years of age	1	0.24
18 years of age	69	16.27
19 years of age	140	33.02
20 years of age	86	20.28
21 years of age	85	20.05
22 years of age	25	5.90
23 years of age	4	0.94
24 years of age	1	0.24
25 years of age	0	0.00
Over 26 years of age	3	0.71
N/A	10	2.36
QUESTION RESPONSES:	**414**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE [%]:	**97.64**	

Figure 63: Students' Age

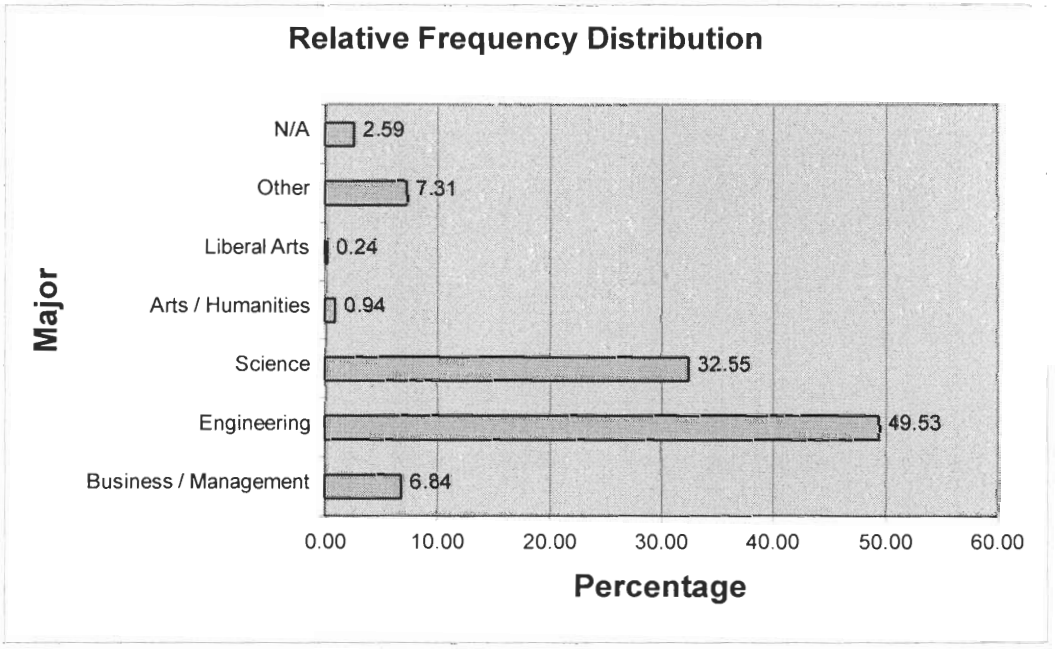


QUESTION 17: "How would you categorize your major?"

Table 72: Students' Major

ANSWERS	FREQ.	REL FREQ. [%]
Business / Management	29	6.84
Engineering	210	49.53
Science	138	32.55
Arts / Humanities	4	0.94
Liberal Arts	1	0.24
Other	31	7.31
N/A	11	2.59
QUESTION RESPONSES:	**413**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE [%]:	**97.41**	

Figure 64: Students' Major



4.2.3 Relational Summary

The relational summary for the Students' Survey takes certain questions and crosses them with other questions to see if there is a relation between them. Some of the questions have the relative frequencies graphed against each other, to examine correlations. Other questions had to go back to the original raw survey data to see what the same individuals said about different questions that we thought were related. The relations follow this introduction and are viewable in the same format as the questions summary. Below is a list of the Students' Survey Questions.

1. On average, when looking for software with certain features, what type of software do you investigate first?
2. Where do you get your shareware?
3. When using shareware, what limitation do you dislike?
4. How long do you think an average shareware evaluation restriction should be?
5. What problems do you experience with shareware most often?
6. How many unregistered shareware programs do you use?
7. How many registered shareware programs do you use?
8. How many other retail programs do you use?
9. Most of the time, why do you register shareware?
10. On average, after registering the shareware version, does the full version of the software meet your expectations?
11. What do you do most of the time when your shareware runs out?
12. What do you think is a reasonable average shareware registration fee?
13. Which of the methods do you feel most comfortable using, to pay the registration fees?
14. On average, how would you describe the quality of shareware products?
15. What gender are you?
4. What age are you?
5. How would you categorize your major

QUESTION 2 VS. QUESTION 13:

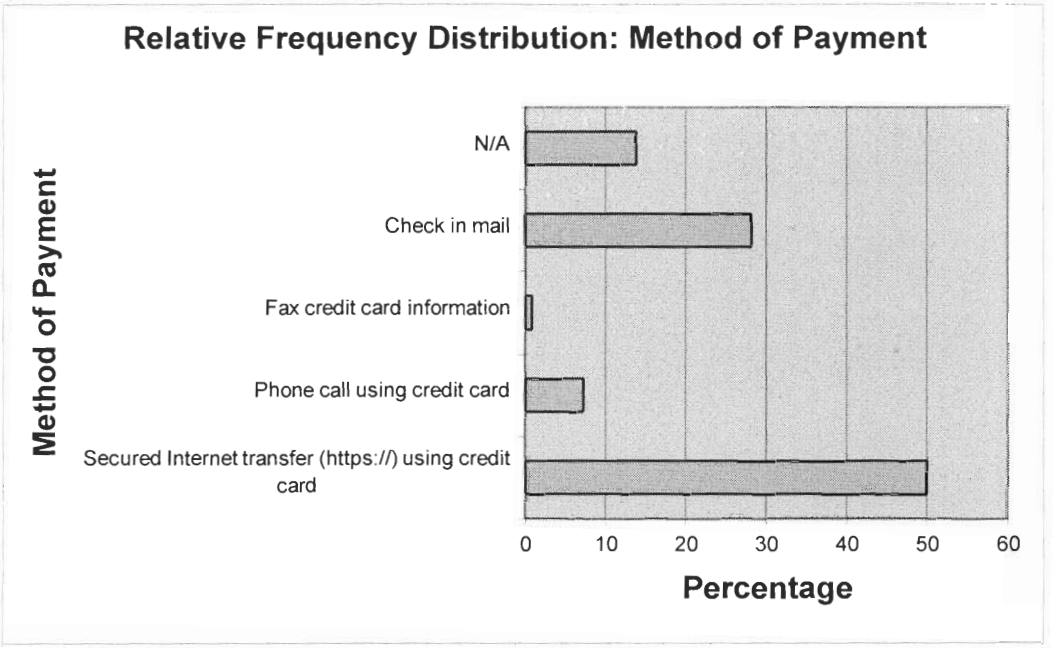
2. "Where do you get your Shareware from?" Vs 13. "Which method do you feel most comfortable paying the registration fees?"

The following is question 13's summary in responses where question 2 was answered "Shareware Websites":

Table 73: Method of Payment-When Receive Shareware through Websites

CATEGORIES	FREQ.	REL FREQ. [%]
Secured Internet transfer (https://) using credit card	181	50.00
Phone call using credit card	26	7.18
Fax credit card information	3	0.83
Check in mail	102	28.18
N/A	50	13.81
QUESTION RESPONSES:	**312**	
TOTAL RESPONSES:	**362**	
QUESTION RESPONSE RATE:	**86.19**	

Figure 65: Method of Payment-When Receive Shareware through Websites

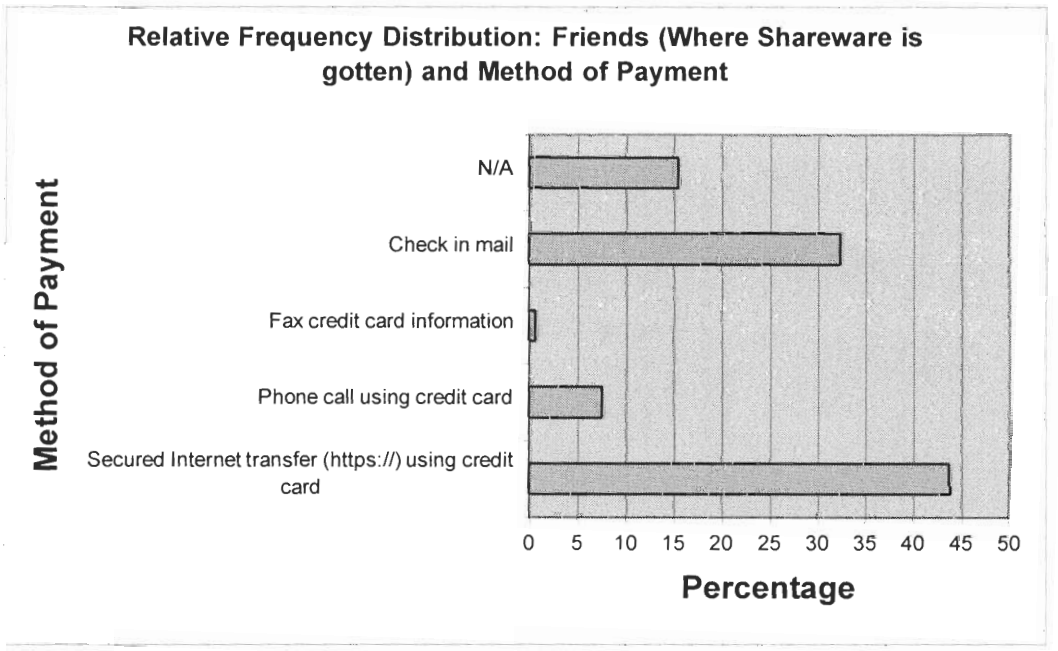


The following is question 13's summary in responses where question 2 was answered "Friends":

Table 74: Method of Payment-When Receive Shareware from Friends

CATEGORIES	FREQ.	REL FREQ. [%]
Secured Internet transfer (https://) using credit card	127	43.79
Phone call using credit card	22	7.59
Fax credit card information	2	0.69
Check in mail	94	32.41
N/A	45	15.52
QUESTION RESPONSES:	**245**	
TOTAL RESPONSES:	**290**	
QUESTION RESPONSE RATE:	**84.48**	

Figure 66: Method of Payment-When Receive Shareware from Friends

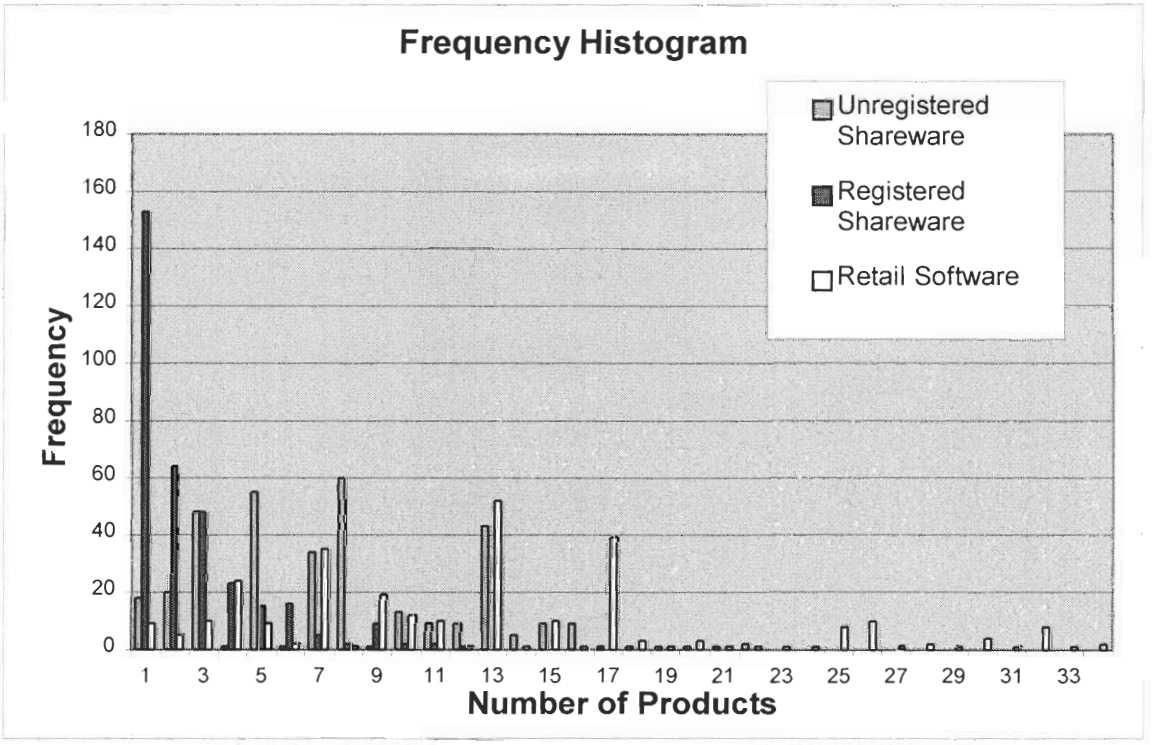


QUESTION 6 VS. QUESTION 7 VS. QUESTION 8:

"How many unregistered shareware, registered shareware, and retail programs do you use?"

The following is questions 6, 7, 8's frequency histograms graphed on the same axis.

Figure 67: Total number of Shareware and Retail Programs Used



QUESTION 9 VS. QUESTION 11:

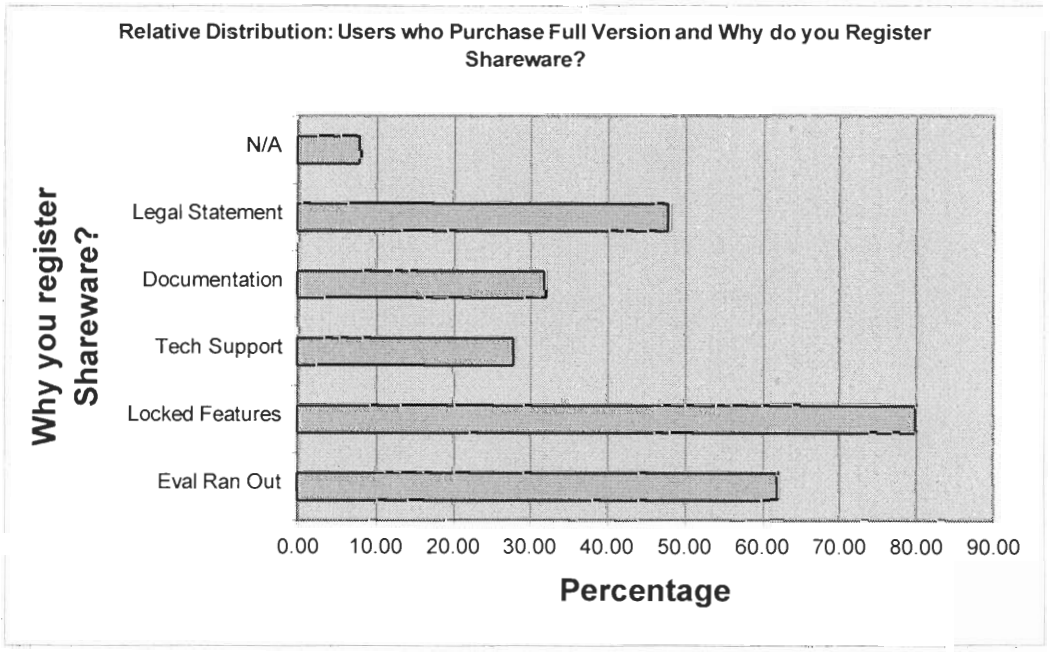
9. "Most of the time why do you register Shareware?" Vs 11."What do you do most of the time when your Shareware runs out?"

The following is question 9's summary in responses where question 11 was answered "Purchase Full Version":

Table 75: Users who Purchase Full Versions and why

CATEGORIES	FREQ.	REL FREQ. [%]
Eval Ran Out	31	62.00
Locked Features	40	80.00
Tech Support	14	28.00
Documentation	16	32.00
Legal Statement	24	48.00
N/A	4	8.00
QUESTION RESPONSES:	**46**	
TOTAL RESPONSES:	**50**	
QUESTION RESPONSE RATE:	**92.00**	

Figure 68: Users who Purchase Full Versions and why

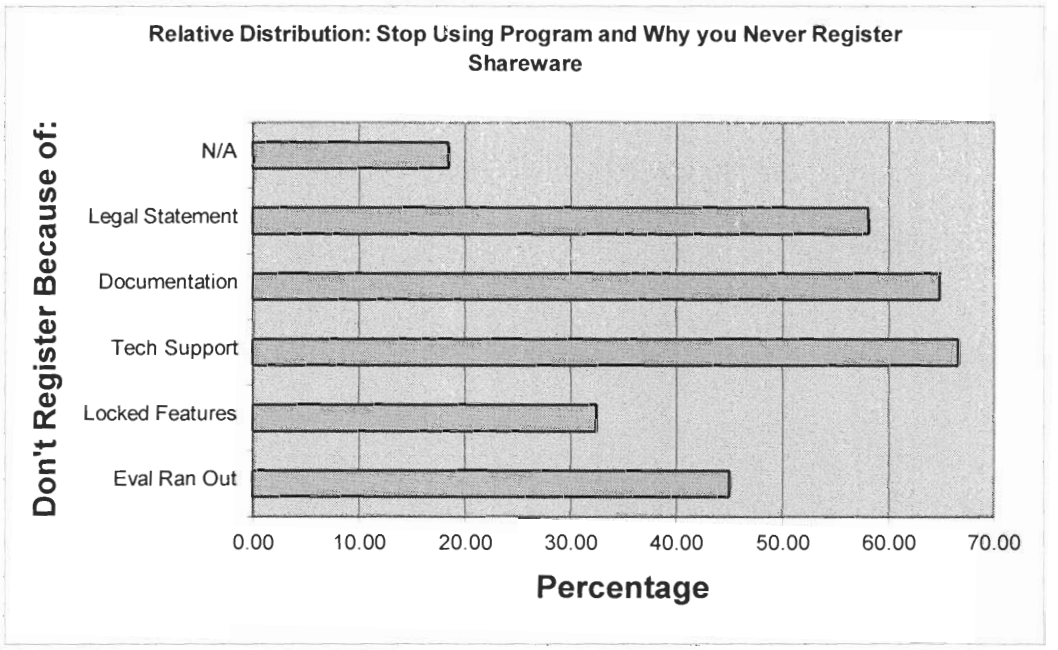


The following is question 9's summary in responses where question 11 was answered "Simply Stop Using It":

Table 76: Users who Stop Using the Program and why

CATEGORIES	FREQ.	REL FREQ. [%]
Eval Ran Out	100	45.05
Locked Features	72	32.43
Tech Support	148	66.67
Documentation	144	64.86
Legal Statement	129	58.11
N/A	41	18.47
QUESTION RESPONSES:	**181**	
TOTAL RESPONSES:	**222**	
QUESTION RESPONSE RATE:	**81.53**	

Figure 69: Users who Stop Using the Program and why



QUESTION 10 VS. QUESTION 14:

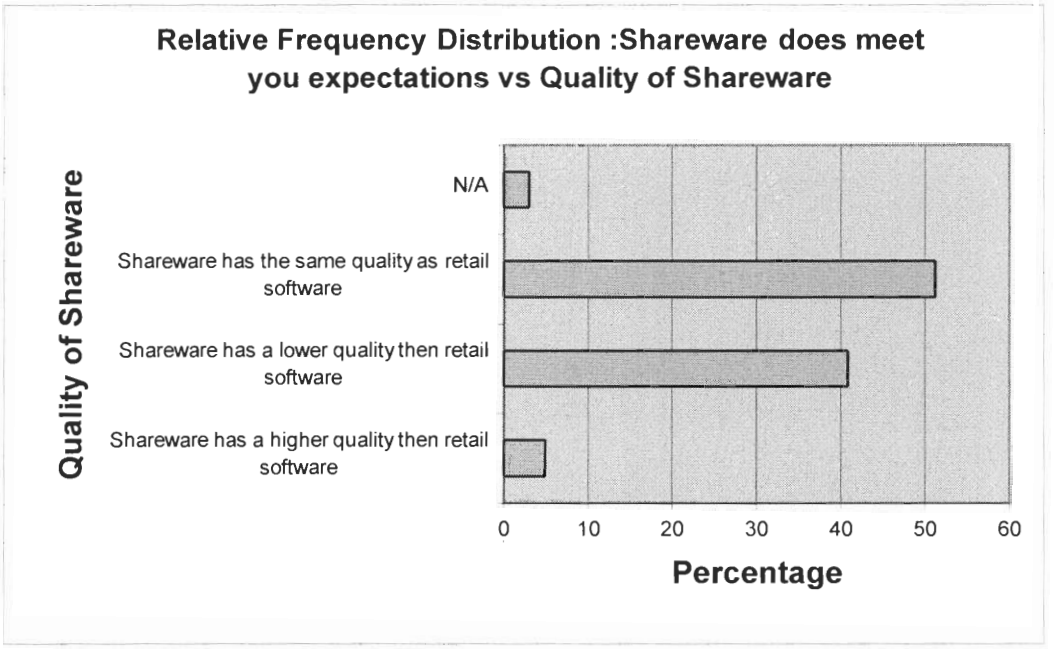
10. "Does the full version meet your expectations?" Vs 14. "On Average, how would you describe the quality of Shareware products?"

The following is question 14's summary in responses where question 10 was answered "Yes":

Table 77: Quality of Shareware Vs Full Version meeting Expectations

CATEGORIES	FREQ.	REL FREQ. [%]
Shareware has a higher quality then retail software	10	4.93
Shareware has a lower quality then retail software	83	40.89
Shareware has the same quality as retail software	104	51.23
N/A	6	2.96
QUESTION RESPONSES:	**197**	
TOTAL RESPONSES:	**203**	
QUESTION RESPONSE RATE:	**97.04**	

Figure 70: Quality of Shareware Vs Full Version meeting Expectations

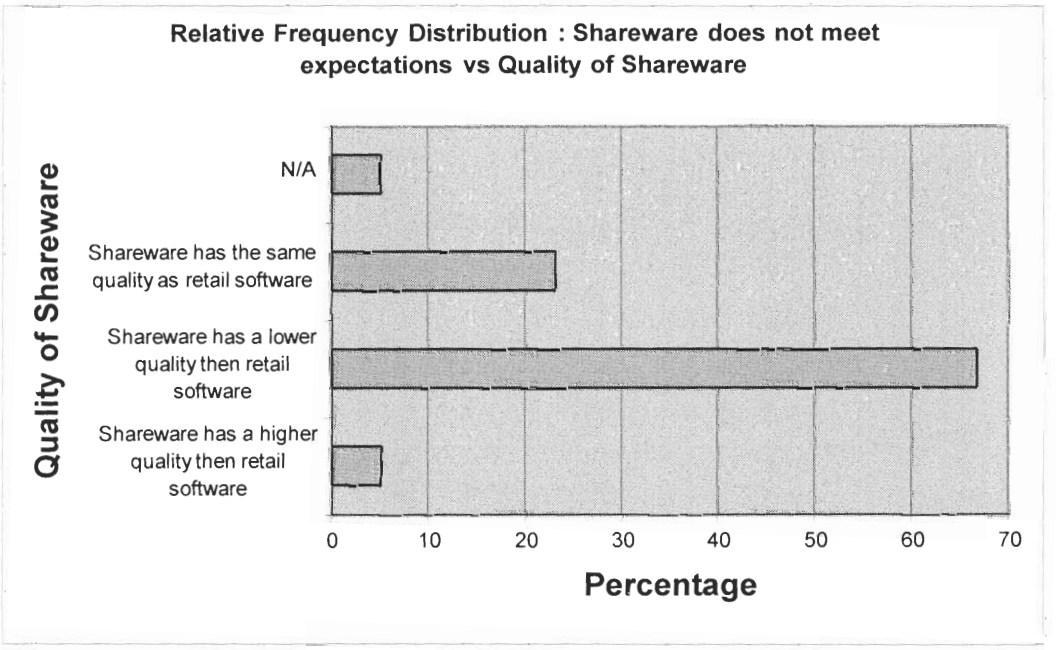


The following is question 14's summary in responses where question 10 was answered "No":

Table 78: Shareware Quality Vs Full Version Does not Meet Expectations

CATEGORIES	FREQ.	REL FREQ. [%]
Shareware has a higher quality then retail software	2	5.13
Shareware has a lower quality then retail software	26	66.67
Shareware has the same quality as retail software	9	23.08
N/A	2	5.13
QUESTION RESPONSES:	**37**	
TOTAL RESPONSES:	**39**	
QUESTION RESPONSE RATE:	**94.87**	

Figure 71: Shareware Quality Vs Full Version Does not Meet Expectations



QUESTION 3 VS. QUESTION 6

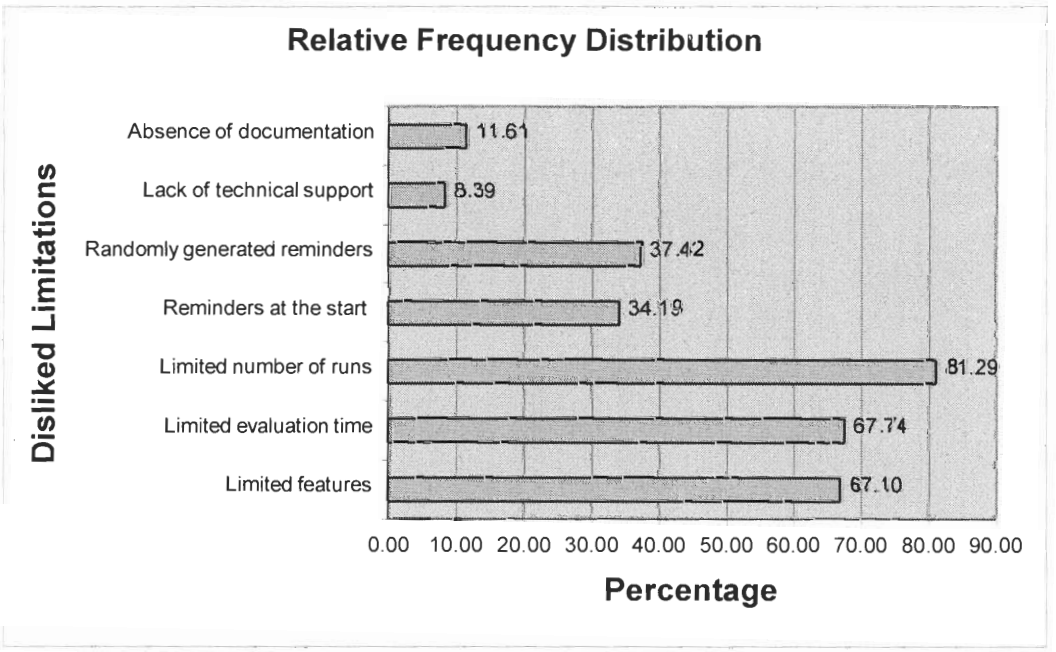
3. When using shareware, what limitation do you dislike? Vs 6. How many unregistered shareware programs do you use?

The following is question 3's summary in responses where question 6 was answered above the mode value of 5:

Table 79: Disliked Limitations by Users with Many Unregistered Programs

ANSWERS:	FREQ.	REL FREQ: [%]
Limited features	104	67.10
Limited evaluation time	105	67.74
Limited number of runs	126	81.29
Reminders at the start	53	34.19
Randomly generated reminders	58	37.42
Lack of technical support	13	8.39
Absence of documentation	18	11.61
QUESTION RESPONSES:	**155**	
TOTAL RESPONSES:	**155**	
QUESTION RESPONSE RATE [%]:	**100.00**	

Figure 72: Disliked Limitations by Users with Many Unregistered Programs



QUESTION 3 VS. QUESTION 7

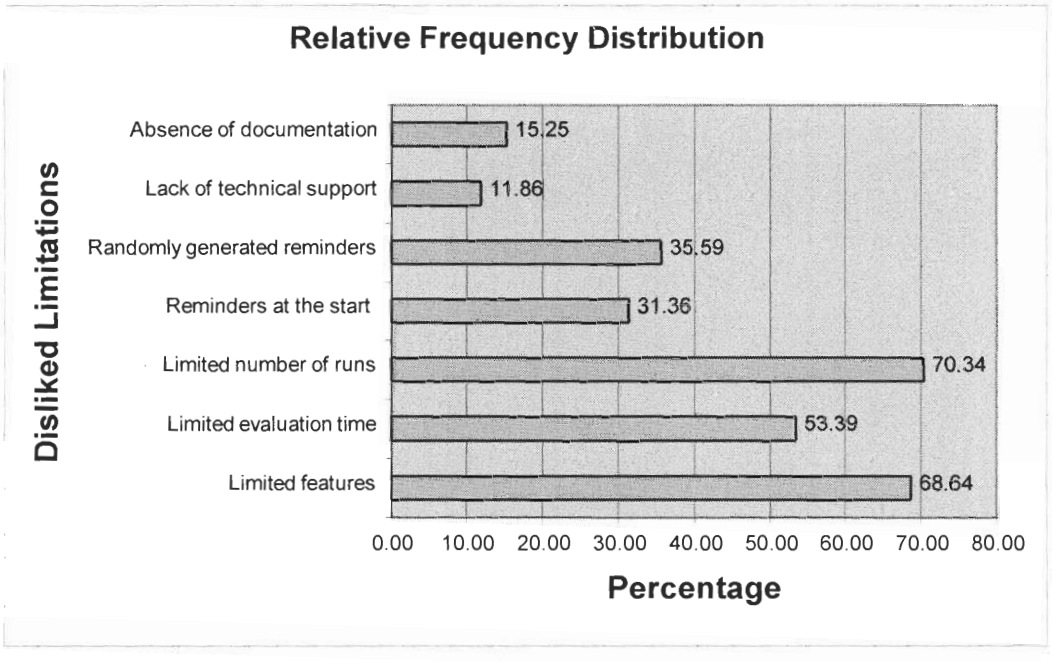
3. When using shareware, what limitation do you dislike? Vs 7. How many registered shareware programs do you use?

The following is question 3's summary in responses where question 7 was answered above the mean value of 1.68:

Table 80: Disliked Limitations by Users with Many Registered Programs

ANSWERS:	FREQ.	REL FREQ: [%]
Limited features	81	68.64
Limited evaluation time	63	53.39
Limited number of runs	83	70.34
Reminders at the start	37	31.36
Randomly generated reminders	42	35.59
Lack of technical support	14	11.86
Absence of documentation	18	15.25
QUESTION RESPONSES:	**118**	
TOTAL RESPONSES:	**118**	
QUESTION RESPONSE RATE [%]:	**100.00**	

Figure 73: Disliked Limitations by Users with Many Registered Programs



QUESTION 5 VS. QUESTION 6

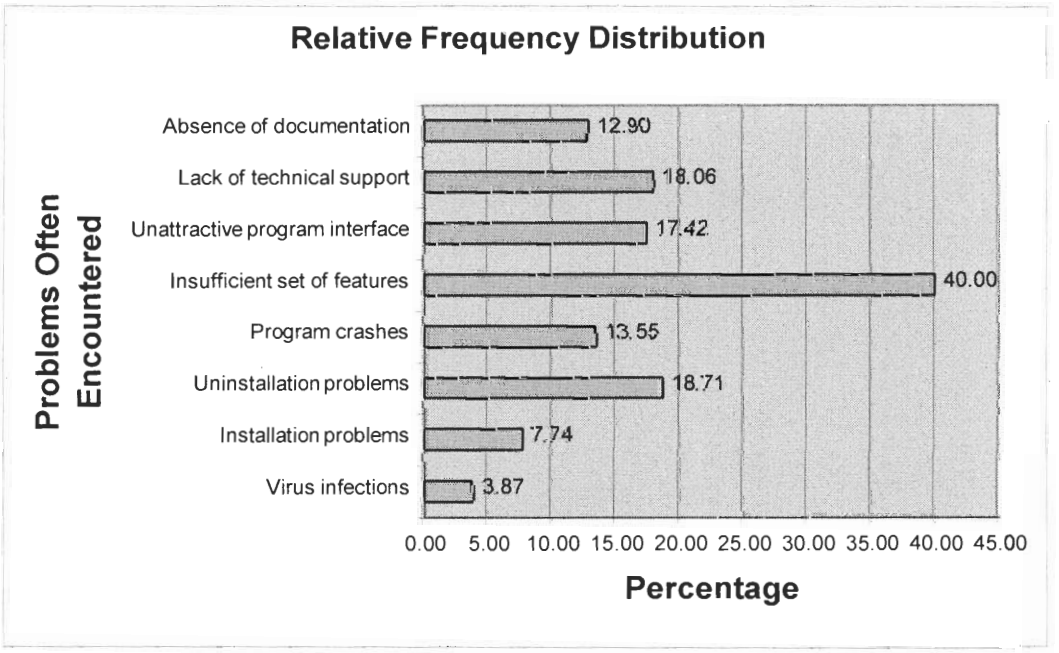
5. What problems do you experience with shareware most often? Vs 6. How many unregistered shareware programs do you use?

The following is question 5's summary in responses where question 6 was answered above the mode value of 5:

Table 81: Problems Often Encountered by Users with Many Unregistered Programs

ANSWERS:	FREQ.	REL FREQ: [%]
Virus infections	6	3.87
Installation problems	12	7.74
Uninstallation problems	29	18.71
Program crashes	21	13.55
Insufficient set of features	62	40.00
Unattractive program interface	27	17.42
Lack of technical support	28	18.06
Absence of documentation	20	12.90
QUESTION RESPONSES:	**155**	
TOTAL RESPONSES:	**155**	
QUESTION RESPONSE RATE [%]:	**100.00**	

Figure 74: Problems Often Encountered by Users with Many Unregistered Programs



QUESTION 5 VS. QUESTION 7

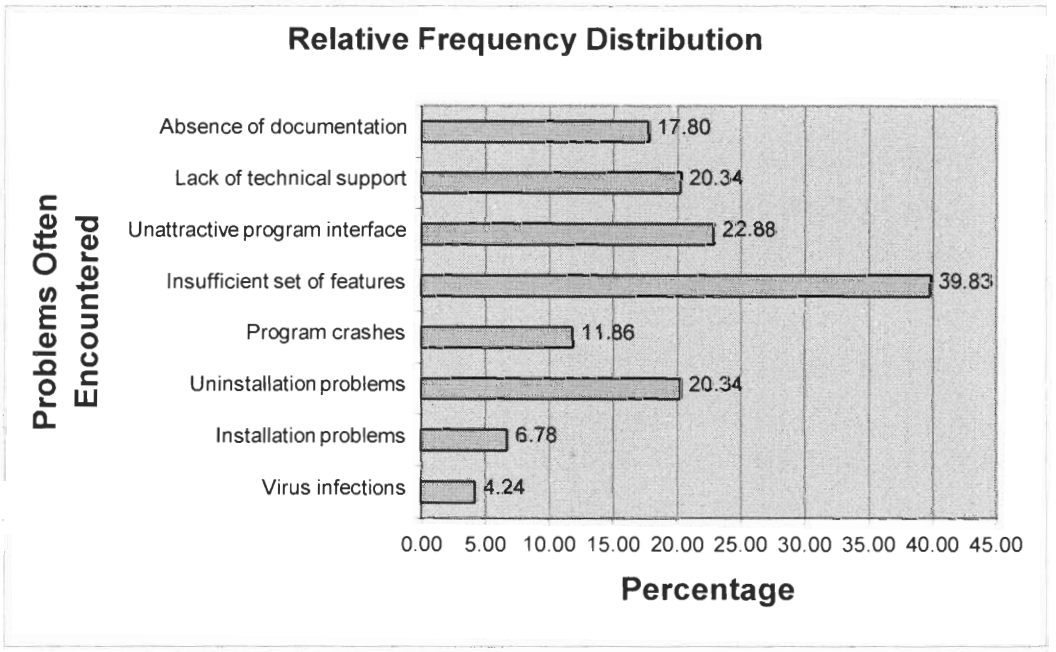
5. What problems do you experience with shareware most often? Vs 7. How many registered shareware programs do you use?

The following is question 5's summary in responses where question 7 was answered above the mean value of 1.68:

Table 82: Problems Often Encountered by Users with Many Registered Programs

ANSWERS: Q5 = 3	FREQ.	REL FREQ: [%]
Virus infections	5	4.24
Installation problems	8	6.78
Uninstallation problems	24	20.34
Program crashes	14	11.86
Insufficient set of features	47	39.83
Unattractive program interface	27	22.88
Lack of technical support	24	20.34
Absence of documentation	21	17.80
QUESTION RESPONSES:	**118**	
TOTAL RESPONSES:	**118**	
QUESTION RESPONSE RATE [%]:	**100.00**	

Figure 75: Problems Often Encountered by Users with Many Registered Programs



QUESTION 14 VS. QUESTION 1

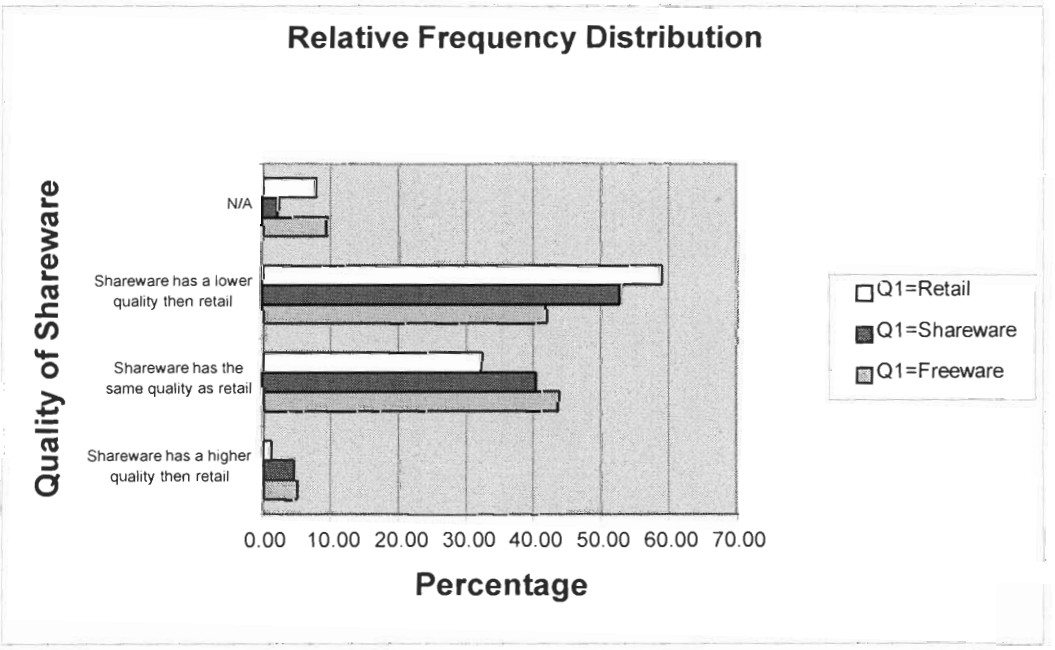
14. On average, how would you describe the quality of shareware products? Vs 1. On average, when looking for software with certain features, what type of software do you investigate first?

The following is question 14's summary in responses where question 1 was answered "Freeware", then "Shareware", and then "Retail Software":

Table 83: Quality of Shareware Vs Type of Software Investigated First

	Q1=Freeware		Q1=Shareware		Q1=Retail	
ANSWERS: Q14	FREQ.	REL FREQ: [%]	FREQ.	REL FREQ: [%]	FREQ.	REL FREQ: [%]
Shareware has a higher quality then retail	11	4.95	4	4.49	1	1.11
Shareware has the same quality as retail	97	43.69	36	40.45	29	32.22
Shareware has a lower quality then retail	93	41.89	47	52.81	53	58.89
N/A	21	9.46	2	2.25	7	7.78
QUESTION RESPONSES:	**201**		**87**		**83**	
TOTAL RESPONSES:	**222**		**89**		**90**	
QUESTION RESPONSE RATE [%]:	**90.54**		**97.75**		**92.22**	

Figure 76: Quality of Shareware Vs Type of Software Investigated First



4.3 WINFILES.COM SUMMARY

The following section of the results summarizes the data extracted from WinFiles.com. Expiration options refer to the period of time after which a specific shareware product expires. WinFiles Registration specifies whether or not a shareware can be registered with WinFiles.com. Installation options specify whether a shareware product has an installation program, a un-installation program, or other means of installation. The shareware product prices summarize prices of shareware products found off the WinFiles.com website.

WINFILES.COM EXPIRATION PERIOD

Table 84: WinFiles.com Expiration Period

EXPIRATION	FREQ.	REL FREQ. [%]
1-10	59	0.94
10-30	416	6.65
30-60	1251	20.00
60-90	74	1.18
90 and more	49	0.78
Never Expires	650	10.39
N/A	3755	60.04
RESPONSES:	**2499**	

Figure 77: WinFiles.com Expiration Period

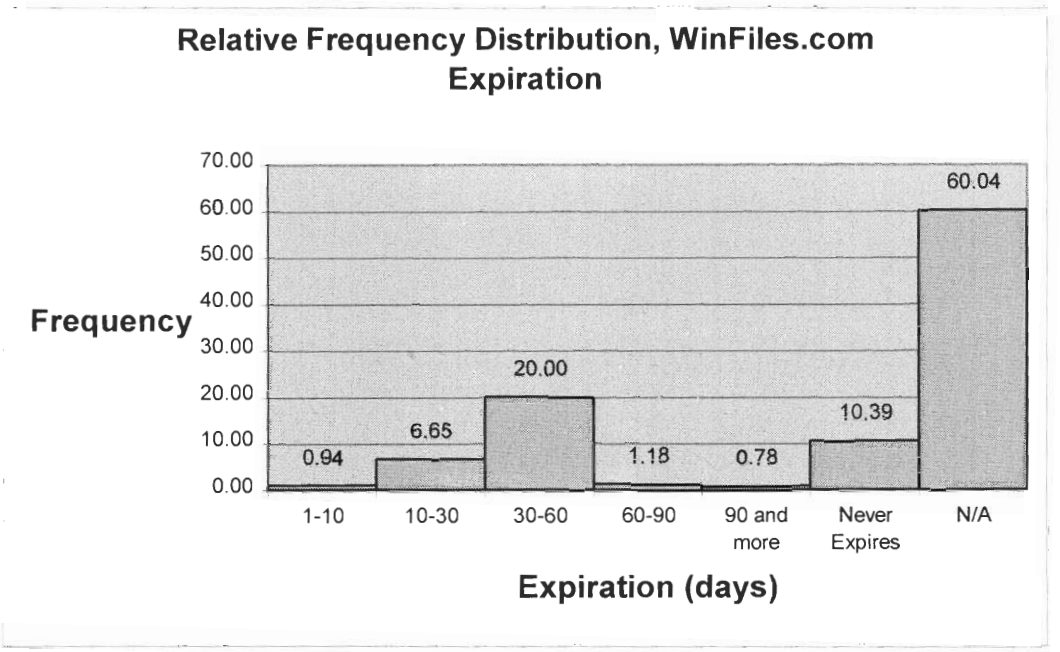


Table 85: WinFiles.com Expiration Period, Descriptive Statistics

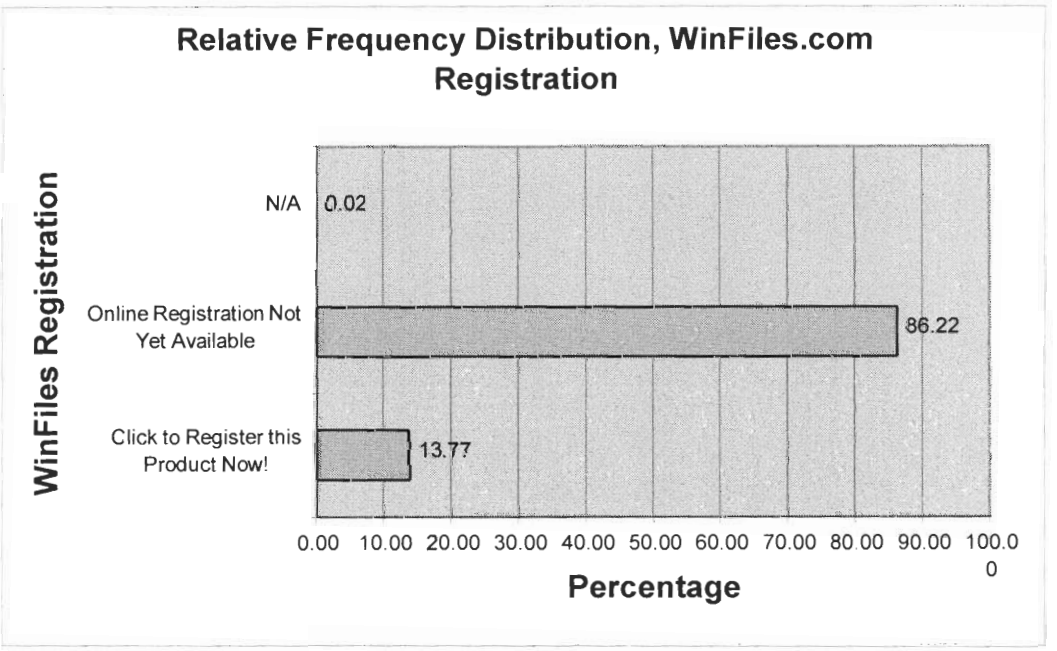
DESCRIPTIVE STATISTICS		
Mean	30.5	
Mode	30.0	
Median	30.0	
Range	3.0	360.0
Variance	584.7	
StdDev	24.2	
Score 25%	25.0	
Score 75%	30.0	

WINFILES.COM REGISTRATION

Table 86: WinFiles.com Registration

REGISTRATION	FREQ.	REL FREQ. [%]
Click to Register this Product Now!	861	13.77
Online Registration Not Yet Available	5392	86.22
N/A	1	0.02
RESPONSES:	**6253**	

Figure 78: WinFiles.com Registration

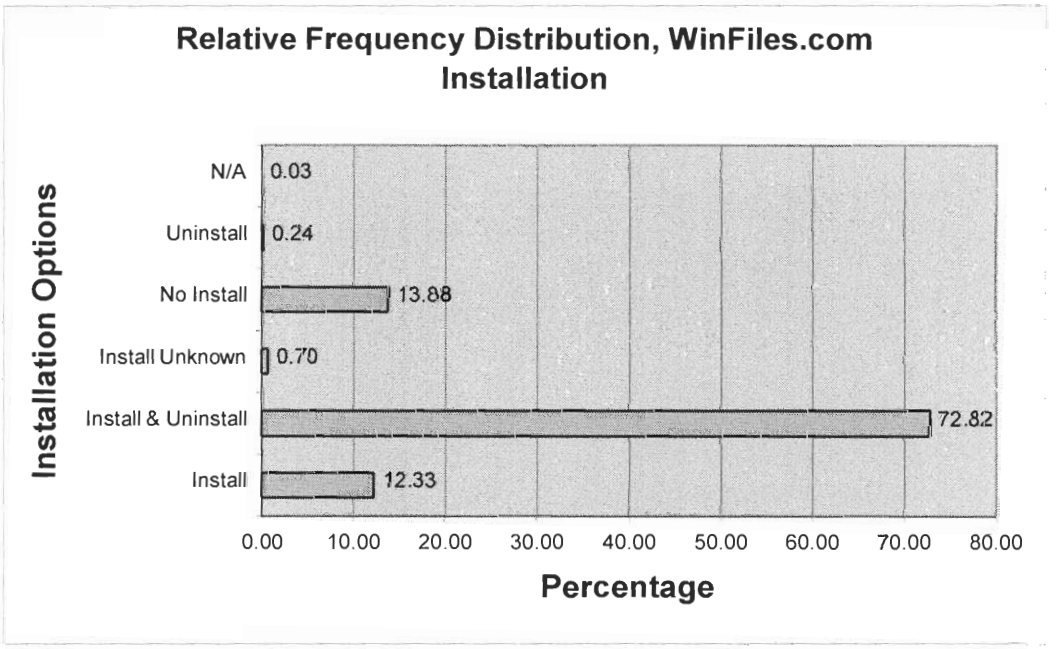


WINFILES.COM INSTALLATION OPTIONS

Table 87: WinFiles.com Installation Options

INSTALLATION	FREQ.	REL FREQ. [%]
Install	771	12.33
Install & Uninstall	4554	72.82
Install Unknown	44	0.70
No Install	868	13.88
Uninstall	15	0.24
N/A	2	0.03
RESPONSES:	**6252**	

Figure 79: WinFiles.com Installation Options



WINFILES.COM SHAREWARE PRODUCT PRICES

Table 88: WinFiles.com Shareware Product Prices

PRICES ($)	FREQ.	REL FREQ. [%]
0-10	667	10.70
10-20	2344	37.62
20-30	1560	25.04
30-40	527	8.46
40-50	299	4.80
50 and over	834	13.38
TOTAL RESPONSES:	**6231**	

Figure 80: WinFiles.com Shareware Product Prices

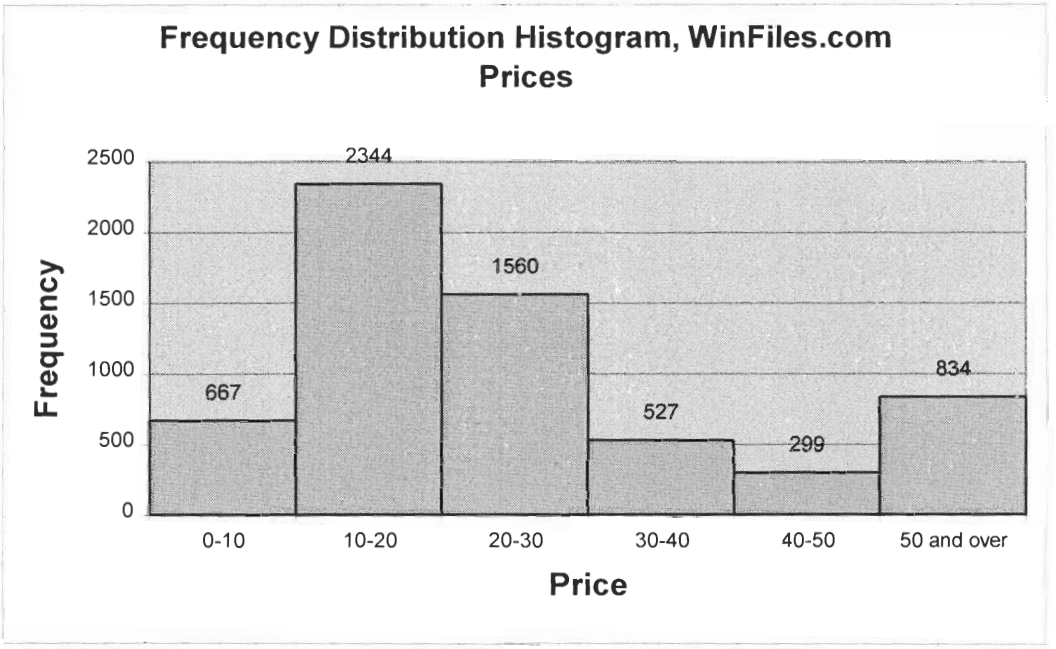


Table 89: WinFiles.com Shareware Product Prices, Descriptive Statistics

DESCRIPTIVE STATISTICS		
Mean	$ 36.71	
Mode	$ 10.00	
Median	$ 20.00	
Range	$ 0.50	$1,995.00
Variance	5972	
StdDev	$ 77.28	
Score 25%	$ 12.00	
Score 75%	$ 30.00	

5 ANALYSIS OF THE RESULTS

5.1 DEVELOPERS' SURVEY

5.1.1 Descriptive Analysis

To perform the descriptive analysis of the survey, the survey results were examined, and conclusions were drawn. Please note that the following conclusions refer to the sample characteristics. Analysis of the fit between the sample set and the population can be found in the Inferential Analysis section of this report. To find the supporting data for the following arguments, please refer to section 4.1.

5.1.1.1 Development Team

The team sizes reported in our survey ranged from 1 to 100 people. According to our research, individual programmers develop the majority of shareware. The average size of the development team was found to be 1.68, and the most frequent team size was found to be 1 person (see Question 8 summary). It is our belief that a significant amount of shareware is initially created by the developers for their own use. When the developer finds the tool helpful, he or she might decide to create a shareware version of it. As stated by Doug Johnson (Maximum Output Software), "Looking back, I developed the program for myself, I did not intend on selling it. ... I showed it to a couple of friends and they said 'you should try selling it...'." "It's primarily just me doing the developing here..." [25].

The average team sizes of the developers who said they believe creating the shareware is worth the results were not different from the team sizes of those developers who said it was not. The values of median and mode were the same as well. This brings us to the conclusion that a multi-developer effort to create shareware does not promise

success any more than a single-developer effort (see Question 8 Vs Question 12 summary).

5.1.1.2 Shareware Limitations

Registration reminder screens (nag screens) generated at the start or the end of the program run were found to be the most common limitation. The second most commonly used limitation was restricted evaluation time. The average and most common evaluation period was 4 weeks, and the most commonly found limitation on the number of program runs before shareware expiration was 30 (see Question 1 summary).

We have also observed, that on average the developers that reported being satisfied with the shareware distribution were using the nag screens and limited features more often then the unsatisfied developers (see Question 1 Vs Question 7 summary). Using the evaluation period as the limitation method did not show to have any contribution to the success of the shareware distribution. However, developers who reported their dissatisfaction with shareware distribution and who were using limited number of runs as their limitation method were allowing around 33 percent fewer runs then the satisfied developers. We argue, that limiting the number of runs is more likely to influence the distribution success then limiting the evaluation period (see Question 2 Vs Question 7 summary).

Shareware programs that were using registration reminder screens at the start or the end of the program and programs that were using limited evaluation time were reported to have more registered users then programs that include other limitations. This conclusion was made considering the combination of the mean, the mode and the median. Shareware programs that carried limited features were found to have smaller numbers of

registered users (see Question 1 Vs Question 11 summary). However we could not identify any relation between the number of registered users and the length of the evaluation period, or the number of allowed program runs (see Question 2 Vs Question 11 summary).

5.1.1.3 Distribution and Registration

According to our survey, the most popular distribution media of shareware today is the Internet (shareware websites) and CD collections. Computer magazines are third on the list (see Question 5 summary). Due to its popularity and ease of use, the Internet became the first choice for cheap and efficient distribution media. The cost effectiveness is particularly important for individual shareware developers, who might not have large investment resources at the start of their shareware development career. Bob Ellison (Syntrillium Software Corporation) said, "We use those [distribution] methods because they are free. That's what shareware is all about. It's free distribution, no cost of goods, and getting the word of mount out.... That's what makes shareware successful in my view." [26]. Developers who reported being satisfied with their shareware distribution were found to be using computer magazines and CD collections more often then the unsatisfied developers (see Question 5 Vs Question 7 summary). Doug Johnson stated, "[The most important thing] in successful shareware is wide distribution, getting it out there into the hands of as many people as possible" [25]. According to Bob Ellison, "To distribute the shareware we focus heavily on making it available on our own website, as well as making sure that the products are posted and reviewed on shareware compilation sites ... We work pretty hard at that." [26].

We also found that developers were using the "check in mail" more then any other fee payment method. Using credit card payments over secured HTTP connections came in second (see Question 9 summary). Credit card accounts can be fairly expensive. Often setup and monthly charges are applied along with charges per transaction. Multi-developer companies can usually afford such accounts, but the majority of shareware is created by single developers. Check-based payments are the least expensive solution. The tradeoff is the transaction delay. However, according to the survey results, developers that generally think developing shareware is worth the results use credit cards as the mean of registration payment more often then the developers that do not think so (see Question 9 Vs Question 12 summary).

An important factor to consider in shareware distribution is the registration fee. According to Bob Ellison, "The perception is that [shareware] shouldn't be expensive ..." [26]. Practically any software product produced for a horizontal market can be transformed into a shareware version. In our survey, shareware prices ranged from $1 to $1,595. The majority of registration fees were at $20 (see Question 10 summary). Bob also said, "Prices for shareware are very low" [26]. We found that shareware products below $75 were gathering the largest numbers of users. However, low registration fees of $10 and below did not carry larger number of users compared to the $10-$75 range. This brings us to a conclusion that lowering your shareware price to below $10, would not necessarily mean an increase in the number of sales and the number of users (see Question 10 Vs Question 11 summary). This however might not always be the case, such as when your product has a heavy competition among shareware and freeware. Doug

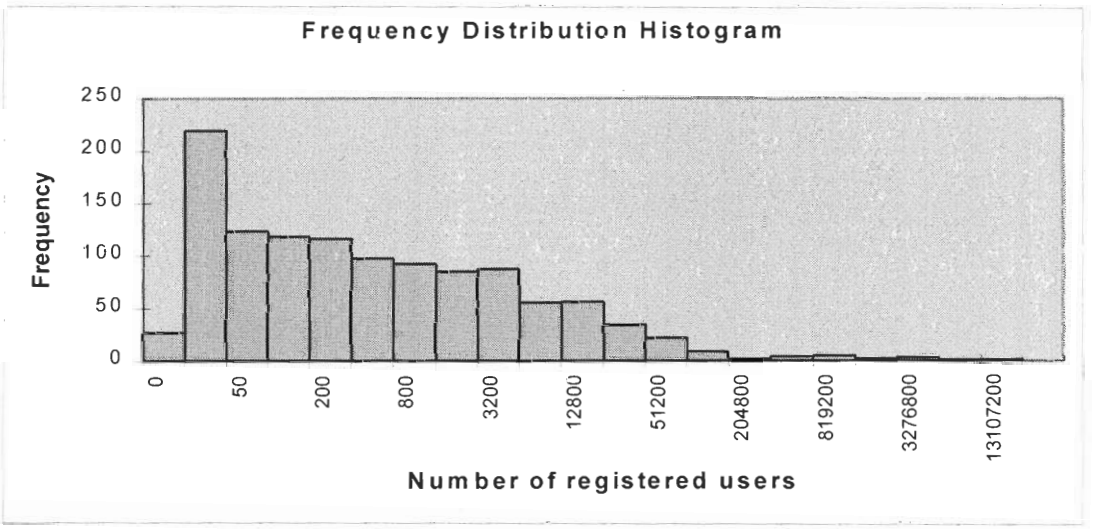
Johnson said, "I have to figure out what I would be willing to pay for something like [my shareware]" [25]. Bob Ellison also stated:

> "If you put out a shareware application for $200, you may sell a few units, but not very many, even if it's the kind of thing that normally sells in retail for $2000. So the [registration fee] has to be fairly low I think to make it successful" [26].

5.1.1.4 Customer Care

A relatively large number of developers reported to have between 25 and 50 users (see Question 11 summary):

Figure 81: Frequency Distribution Histogram for the Number of Registered Users



Although this seems to be a very small number, one has to remember that single programmers develop the majority of shareware. This in turn puts limits on the complexity of the shareware. Therefore it would make sense to argue that most of today's shareware is less complex then retail software (also known as "shelf-software"). With that comes an argument that shareware products most often focus on performing some task or function, rather then become fully powered professional multi-purpose tools. Again, our argument is that such function-specific products are often originated

from the developer's personal need for particular functionality. The more specific the product functionality is, the more likely it is, that the number of users will be small.

It's much easier to provide support and technical assistance to a smaller number of users. Free technical support was reported to be provided to unregistered users by 53 percent of the developers. That number goes up to 82 percent for the registered users. Subscription to newsletters or mailing lists goes from 23 to 38 percent. Interestingly, software documentation comes with only 70 percent of the shareware (see Question 3 and Question 4 summaries). Peter Volpa (Circuit Systems, Inc.) said, "Some people wouldn't give the full documentation. ... That's sort of like limiting features" [27].

Developers who reported providing subscription to newsletters or mailing lists with the registered version of the shareware were found to have on average much more registered users then developers who reported providing free support or documentation (see Question 4 Vs Question 11 summary). This is not to say however, that including subscription services would increase the number of your sales.

There are many shareware developers out there. It usually does not require much to get started with shareware production, and with the use of the Internet, the distribution proves to be inexpensive. It is important to show to your potential users that you not only produced better software then your competition, but also that you are serious about the effort of acquiring customers, providing assistance and advice. Availability of free technical support, well written documentation and subscription to other free services such as periodical updates, news have a better chance of convincing your future customers about your level of responsibility and dedication.

5.1.1.5 Expectations and Benefits

Surprisingly, publicity was the most often reported benefit of shareware development and distribution. The technical feedback from the users took the second place. According to Bob Ellison:

> "Users are giving us feedback on what to do with the tool, and even sometimes marketing issues. There is a constant communication. We are trying to keep the communication extremely open ... It's a valuable resource for us and for the users obviously" [26].

Financial benefits took a relatively distant third place (see Question 6 summary). One of the main reasons for such strange distribution could be high competition or low interest in registering the shareware and paying the fee. Read the Students' Survey Analysis for more information on user tendencies. Around 60 percent of the developers said the distribution of the shareware met their expectations. A relatively large number (27 percent) of developers said that it did not (see Question 7 summary). Similar responses were gathered through Question 12, which asked if the cost of putting out the shareware was worth the results. For this question, 70 percent of the developers said "Yes" and around 18 percent said "No" (see Question 7 summary).

We arrived with an approximate income figure for each of the survey responses by multiplying the reported number of uses (Question 11) and the reported registration fee (Question 10). Then we compared the computed income to the responses for Question 12 (asking if the cost of putting out the shareware worth the results). The average computed sales income for developers who answered "Yes" to Question 12 was $1,126,117.40 with the mode and median at $10,000. The mode and the median seem to be more representative due to a few large extreme values of income computed. The average of the estimated incomes for developers who answered "No" was at $20,768.62

with mode at $500.00 and median at $1,000.00. Again, due to a few extreme income scores, one needs to look at the mode and median to get a better idea of the variable distribution (see Question 10 Vs Question 11 Vs Question 12 summary). We could argue that if one produces an average shareware product, obtaining an income of over $10,000 is a success. The expenses obviously need to be taken into consideration as well, but they are beyond the reach of the survey.

Interestingly, the responses to Question 6 (benefits of producing shareware) acquired from the developers that think the cost of putting out the shareware is worth the results (Question 12), do not differ much from the responses from the developers that do not. Around 59 percent of the developers that answered "Yes" for Question 12 consider the "Increase in full version sales" as one of the benefits. On the other hand, out of all the developers who do not think putting out shareware is worth the results, still 41 percent consider the "Increase in full version sales" as one of the benefits (see Question 6 Vs Question 12 summary). This brings us to a general argument, that even though shareware is considered a marketing tool providing publicity and feedback from users, it does not necessarily serve well as a sales tool. Bob Ellison stated it is:

> "Very, very hard to make any money ... with the discount fees on credit cards and all the processing and handling, and maintaining and the tech support that you want to attach to it ..." [26].

5.1.2 Inferential Analysis

There are two shareware population scores that were used to conduct the inferential analysis:

- Evaluation period in weeks
- Registration fee

Both scores sets were acquired from WinFiles.com, which was assumed to be a good representation of the general shareware population. Although compatibility between these scores in the Developers' Survey and WinFiles.Com does not guarantee that other answers can be, with full confidence, interpreted as population characteristics, it's an approximate measure of the sample fitness to the general population. Below are the characteristics of the two scores, that will help us determine the survey's fitness:

5.1.2.1 Evaluation Period

As we can see the "Expiration in Days" variable does not form a normal distribution in the population (WinFiles.com). Therefore we cannot visualize the sample set fitness based on parametric testing. However, by looking at the strong central tendencies of both population and sample scores, we notice that the data is fairly compatible:

WinFiles.com Population [days]:

Distribution type: N/A

Central tendency: At mean

Mean: 30.50

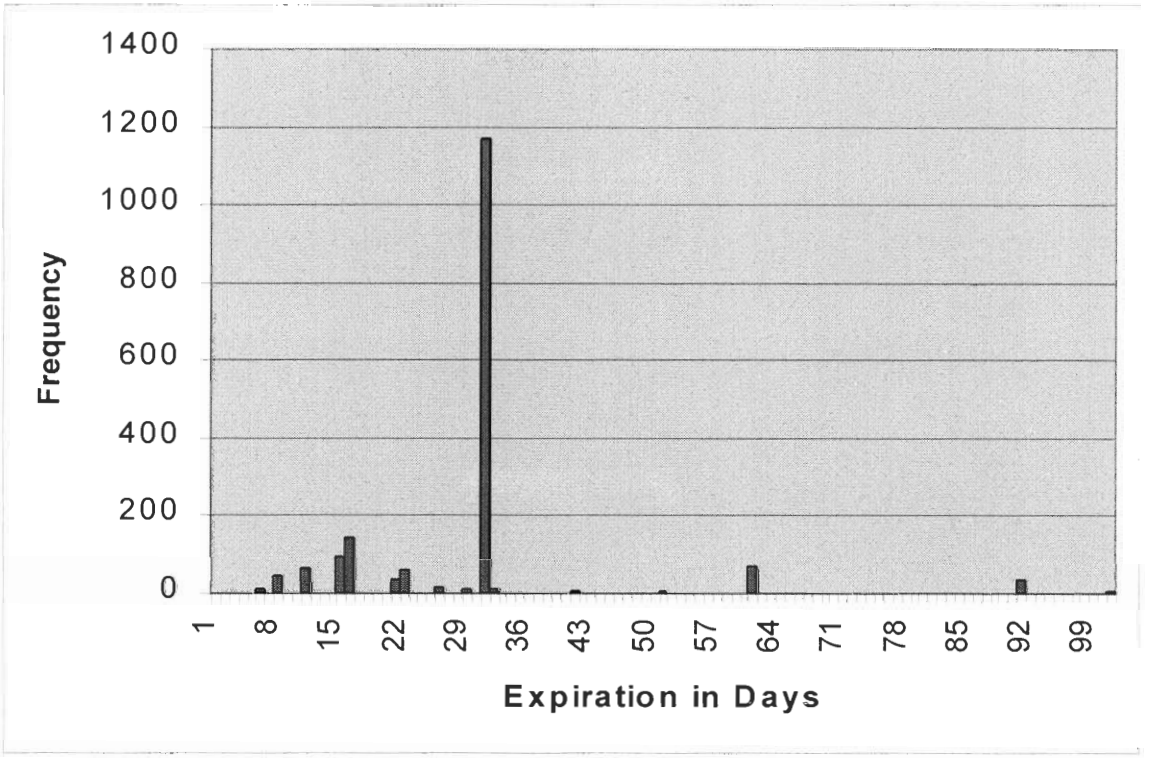
Mode: 30.00

Median: 30.00

Range: 3.00-360.00

Standard Deviation: 24.20

Figure 82: Shareware Expiration in Days (WinFiles.com)



Developers' Survey Sample [weeks]:

Distribution type: N/A

Central tendency: At mean

Mean: 4.39

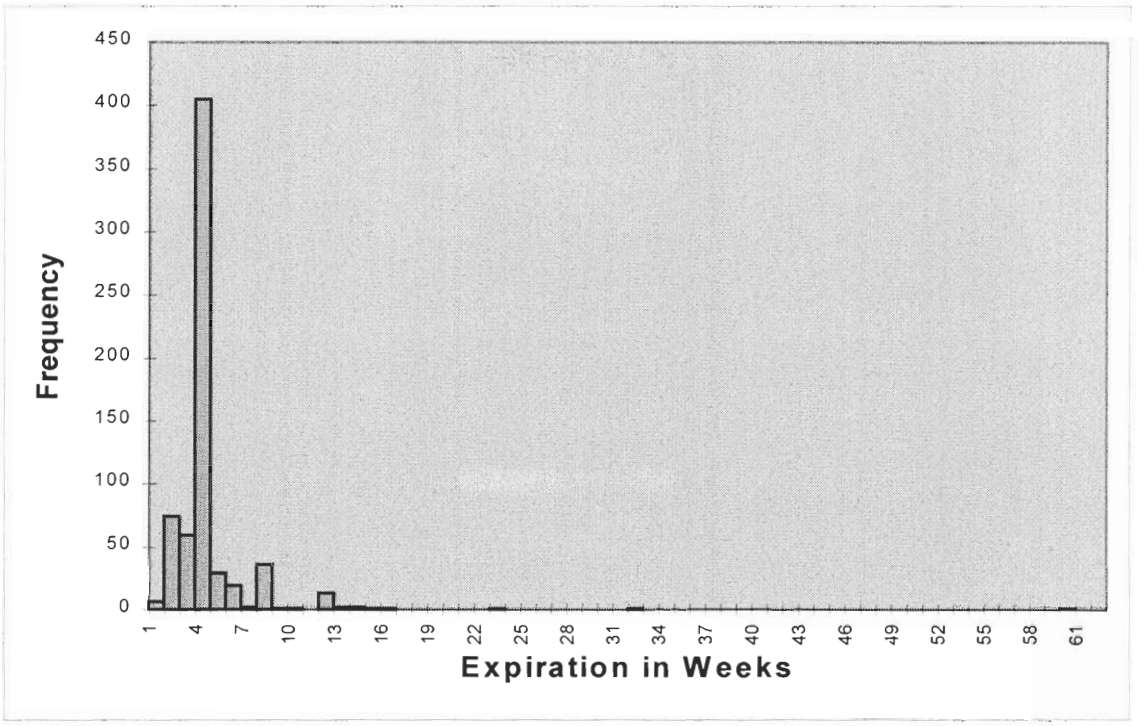
Mode: 4.00

Median: 4.00

Range: 1.00 – 60.00

Standard Deviation: 3.23

Figure 83: Shareware Expiration in Weeks (Developers' Survey)

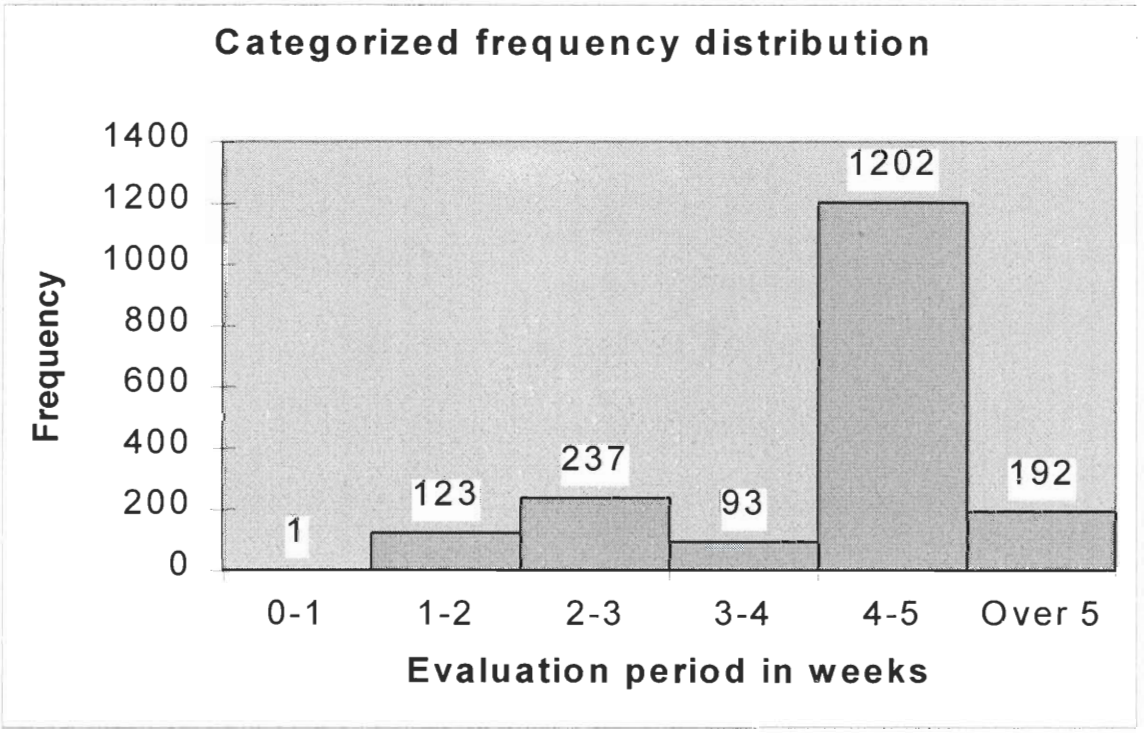


The mean, mode and median of both data sets are almost identical, and equal to 4 weeks (30 days).

Since the distribution of the variable was not normal, we used a non-parametric inferential analysis procedure called the One-way Chi Square (χ^2):

WinFiles.com (population):

Figure 84: Shareware Expiration in Weeks (WinFiles.com), Six Categories



Note: We have divided the number of days from WinFiles.Com by 7 to get the number of weeks. We then rounded the computed number, so that it's on the same scale as the scores from the Developers' Survey.

Table 90: Shareware Expiration in Weeks (WinFiles.com), Six Categories

Category	WinFiles.com frequency
0-1	1
1-2	123
2-3	237
3-4	93
4-5	1202
5 and over	192

Developers' Survey (sample):

Figure 85: Shareware Expiration in Weeks (Developers' Survey), Six Categories

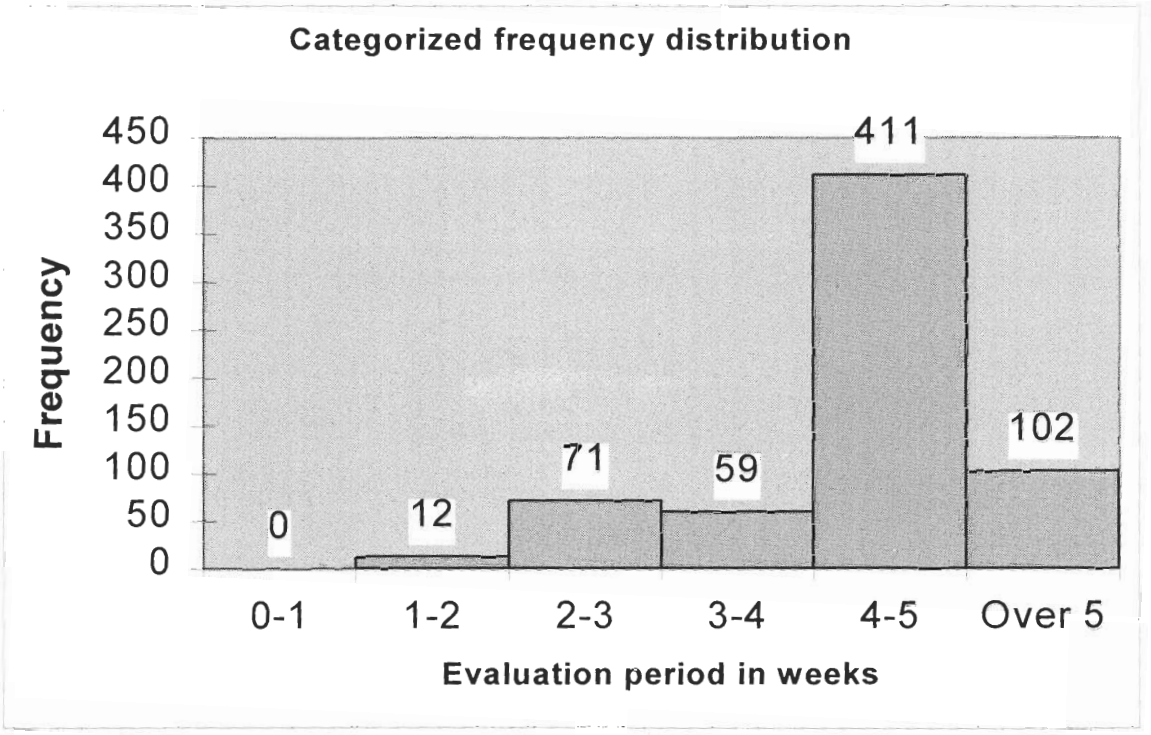


Table 91: Shareware Expiration in Weeks (Developers' Survey), Six Categories

Category	Survey frequency
0-1	0
1-2	12
2-3	71
3-4	59
4-5	411
5 and over	102

Table 92: Chi Square Procedure Data for Expiration in Weeks

Category	Obtained frequency	Expected frequency	$\chi 2$
0-1	0	0.35	0.35
1-2	12	43.57	22.88
2-3	71	83.95	2.00
3-4	59	32.94	20.61
4-5	411	425.80	0.51
5 and over	102	68.01	16.98

Number of categories (k) = 6

Degrees of freedom (df) = k – 1 = 5

$\Sigma(\chi 2) = \chi 2(df) = 63.33$

Critical $\chi 2 = 11.07$ (taken from a Critical Values of Chi Square table [7] assuming $\alpha = 0.05$)

Result: Our sample is outside of the acceptance region 0 … Critical $\chi 2$

Conclusion: The One-way Chi Square (χ^2) on the Registration Fee variable showed that our sample does not represent the variable distribution in the population scores well (WinFiels.com), and therefore our sample is biased. The bias comes mostly from higher relative frequency of shareware software with evaluation period of 3-4 weeks (excluding 4 weeks and over).

5.1.2.2 Registration Fee

The variable of the shareware Registration Fee does not form a normal distribution either. Both the sample set and the population appear however to have similar distribution pattern:

WinFiles.com Population:

Distribution type: N/A

Central tendency: At mean

Mean: 36.71

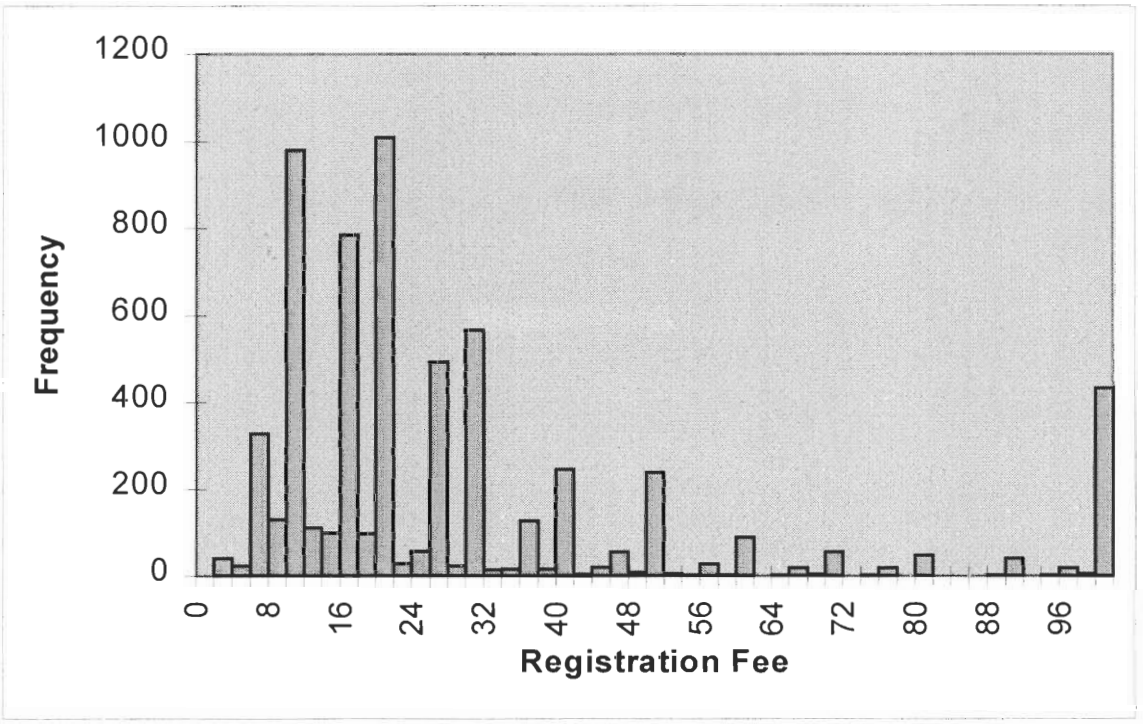
Mode: 10.00

Median: 20.00

Range [$]: 0.50 – 1995.00

Standard Deviation: 77.28

Figure 86: Registration Fee in USD (WinFiles.com)



Developers' Survey (sample):

Distribution type: N/A

Central tendency: At mean

Mean: 44.61

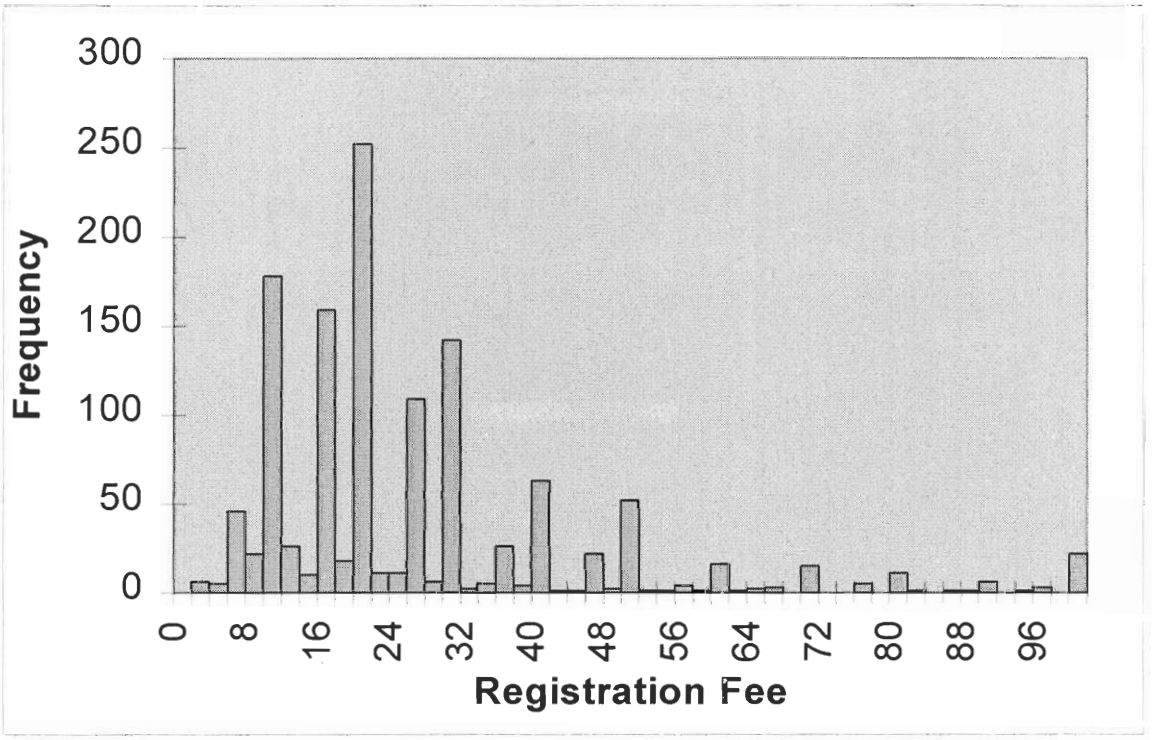
Mode: 20.00

Median: 20.00

Range [$]: 1.00 – 1595.00

Standard Deviation: 108.98

Figure 87: Registration Fee in USD (Developers' Survey)



(Note: The X-axis range was limited to cut off the extreme scores, and to better visualize the distribution near the central tendency)

The population means are off by almost $8. A few extreme scores in the sample are shifting the mean to a higher value. The median of the population scores and the median of scores from the sample are the same. Another fact to note is that the mode of the sample is equal to the median of the population.

In this case, we also used the One-way Chi Square (χ^2) as our non-parametric inferential analysis procedure:

WinFiles.com (population):

Figure 88: Registration Fee in USD (WinFiles.com), Six Categories

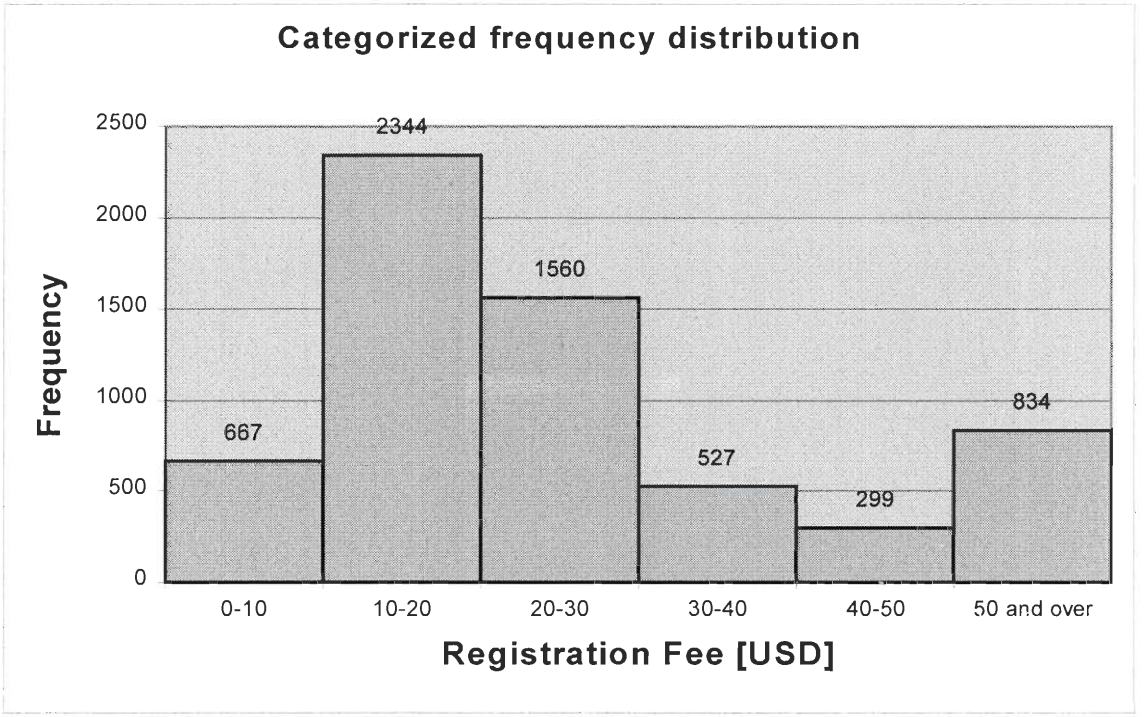


Table 93: Registration Fee in USD (WinFiles.com), Six Categories

Category	WinFiles.com frequency
0-10	667
10-20	2344
20-30	1560
30-40	527
40-50	299
50 and over	834

Developers' Survey (sample):

Figure 89: Registration Fee in USD (Developers' Survey), Six Categories

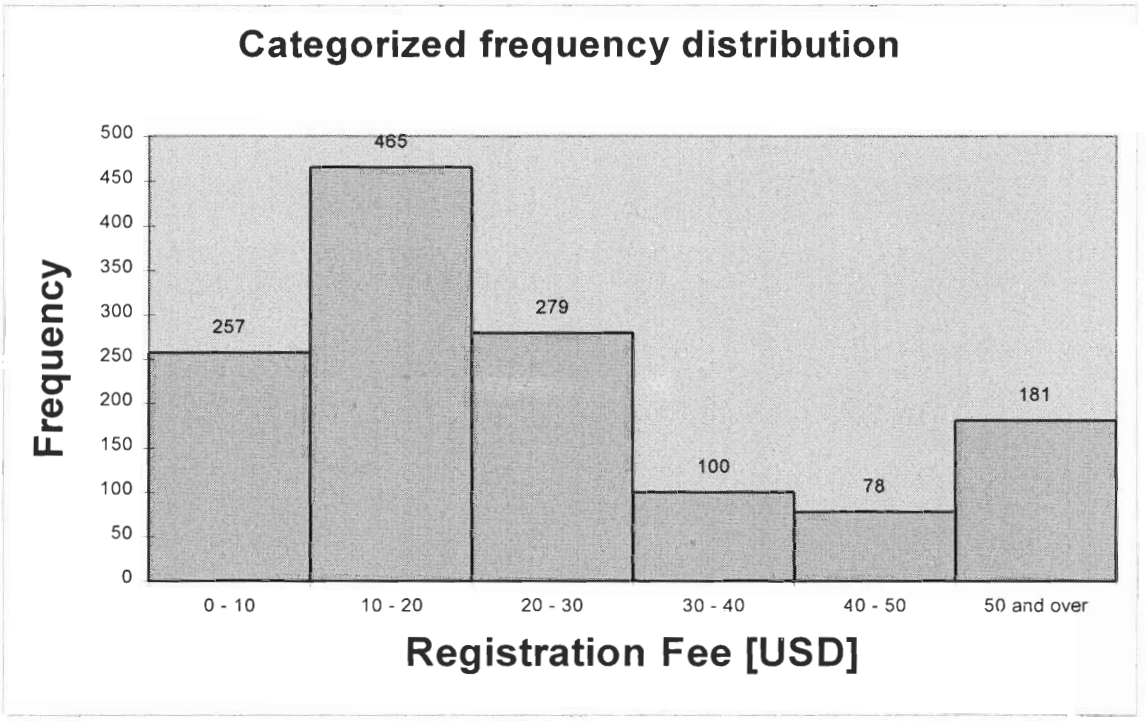


Table 94: Registration Fee in USD (Developers' Survey), Six Categories

Category	Survey frequency
0-10	257
10-20	465
20-30	279
30-40	100
40-50	78
50 and over	181

Table 95: Chi Square Procedure Data for Registration Fee

Category	Obtained frequency	Expected frequency	$\chi 2$
0-10	257	145.52	85.40
10-20	465	511.63	4.25
20-30	279	340.54	11.12
30-40	100	115.05	1.97
40-50	78	65.28	2.47
50 and over	181	181.96	0.00

Number of categories (k) = 6

Degrees of freedom (df) = k – 1 = 5

$\Sigma(\chi 2) = \chi 2(df) = 105.23$

Critical $\chi 2 = 11.07$ (taken from a Critical Values of Chi Square table [7] assuming $\alpha = 0.05$)

Result: Our sample is outside of the acceptance region (0 … Critical $\chi 2$).

Conclusion: The One-way Chi Square (χ^2) on the Evaluation Period (in weeks) variable showed that our sample does not represent the variable distribution in the population scores well (WinFiles.com), and therefore our sample is biased. The bias comes mostly from higher relative frequency of shareware software in the price range of $0.00 - $10.00.

5.2 STUDENTS' SURVEY

5.2.1 Descriptive Analysis

The analysis of the results of the Students' Survey was accomplished by studying the graphs and looking for relations between questions. The analysis of the results will be discussed on a question-by-question basis, describing the data gathered from the user responses.

Biases:

The Students' Survey took the place of our general Users' Survey. That survey was targeted at a general population of shareware users mostly found on newsgroups. Due to lack of responses, the survey needed to be modified to fit our "new" target audience. The new audience was the undergraduate students at Worcester Polytechnic Institute. This sample set is a good source of information, however it is a biased source. WPI is a technical school; this alone makes the survey results biased, because students here have access to computers and the Internet more than the average individual.

The fact that the sample set is all undergraduate college students puts more than one bias on the responses. These would include ages, majors, and because it is WPI the gender ratio is a big factor. These are just some of the items that must be taken in consideration when evaluating the results and when making conclusions.

5.2.1.1 Question 1

> "On average, when looking for software with certain features, what type of software do you investigate first?"

The results of this question are shown in Figure 29. Freeware had the highest number of responses and thus the highest relative frequency. Freeware can be expected to have the highest number of responses simply because it is free. This result is due to the fact that the sample set was college students. One can assume college students generally do not have lots of extra spending cash. This fact makes the survey biased because the undergraduate student body from WPI cannot accurately represent the general population of software users. The fact that retail software had the second highest number of responses came as a surprise. Retail software is, in comparison to shareware, usually more expensive. The fact that retail software was chosen ahead of shareware means that cost might not be the issue. The issue could be the quality of product. Retail software usually has very high quality, so that could be a reason for the higher frequency for retail.

5.2.1.2 Question 2

"Where do you get your shareware from?"

Figure 30 shows the results of this question graphically. The highest number of responses was awarded to shareware websites. This result makes perfect sense for both the sample set and for the shareware market in general. The students at WPI are encouraged to use computers and therefore are very computer literate. The school incorporates the World Wide Web technology into class work and other student activities. Thus, using the Web to acquire shareware products is very likely. Also, from the Developers' Survey and interviews, shareware websites are the most often used course of distribution media.

The part of this question that was surprising was that 68.5 percent of the responses said that they obtain their shareware from their friends. This means that the developers' lose track of the records of distribution. Developers must take this fact into consideration, when one person obtains a shareware that they like, all of their friends will hear about it and probably get it from that person.

Being a technical school, computer magazines are easily accessible such as in the bookstore. Computer magazines have a small number of WPI students acquiring shareware products from them. A small percentage of the students also acquire their shareware from CD collections.

5.2.1.3 Question 3

"When using shareware, what limitation do you dislike?"

No technical support and no documentation do not seem to bother the majority of the undergraduate students at WPI. A fact that needs to be pointed out is that a small part of the population does have a problem with having no technical support and no documentation. People do take the advantage of technical support for shareware products; this is confirmed by both the Developers' Survey and the one-on-one interviews.

Figures 31 through 37 show the results of Question 3. The most disliked limitations in shareware products according to our sample set were limited evaluation time, limited number of runs, and limited features. This corresponds to one of our interviews; the programmer of CD QuickCache stated it was against their company policy to limit the features. "I believe that you have to give the end user all the features, so that they can see what the software actually does" [27]. You cannot fully evaluate a

product if some of the features are locked out. This shows the value of this question from both the users' and developers' points of view. The most hated limitation was a limited number of runs, bringing in about 50 percent of the sample set. When an individual is looking at a product to evaluate it to his or her needs, having a limited number of runs can be a nuisance. If the program runs out before full evaluation has been commenced then the effort was for nothing because the user will not have a good estimation of whether the program is right for the particular task.

Nag screens had approximately the same number of people responding that they disliked the limitation as having it not bother them. The same distribution was found in the case of random reminders. Nag screens are a good way to remind the user that there is a legal agreement that has been agreed to when the program was installed if it was to be kept under use. They do not change the way the program works or interrupt the process; thus they are not too obtrusive.

5.2.1.4 Question 4

> "How long do you think an average shareware evaluation restriction should be?"

This question was broken down into two different restrictions: time in weeks and number of runs. The general data can be viewed in Figure 38. The answer that received the highest number of responses was an unlimited restriction. This seems to be a very biased answer because if the shareware was unlimited the odds that the registration fee would be paid are not very high. The sample data that was collected from WPI's undergraduate classes had limited number of runs as the higher of the two categories. The average number of runs that the survey set expressed would be in their interests was

fifty (see Figure 39). Fifty runs of a program is an acceptable amount of usage time to see if you like the program, if it does what you need, and if it is going to be worth purchasing the full version.

The latter of the three responses was limited time in weeks. The average answer collected was 4 weeks (see Figure 40). Looking at the WinFiles.com site review, this is an expected number of weeks for a program's evaluation period to last. This will give the user ample time to use and evaluate the program.

5.2.1.5 Question 5

> "What problems do you experience with shareware most often?"

This question was broken down into eight categories for responses Figures 41-48, and Table 46 show the data collected for question 5. A large number of responses stated that shareware never comes with a virus attached. Looking at the other end of the scale twenty percent said that they have often received shareware infected with a virus. This would most likely be due to the distribution type. Specifically, obtaining shareware from their friends, for this is the most common way to transfer a virus from one computer to another. The majority said that they had no problems with installation of shareware; most of the shareware products have an installer built into the distribution.

Un-installation problems had a large response for happening often, this came to us as a surprise. It was realized that a lot of shareware does not come with an un-install program, thus the reason for the trouble with the un-installation. Confusing interfaces, insufficient features, and program crashes all had large responses to happening some of the time. Confusing interfaces and program crashes are quality problems. The actual

code and program may not be designed and implemented up to high quality standards and thus the program will crash and will be hard to use. Insufficient features are linked directly with the type of program and the features not present in that program. If the user needs to do a specific application and the program does not contain a feature needed they would respond that insufficient features showed up some of the time.

No documentation and no technical support are both viewed as almost never being a problem. Most shareware programs come with some type of technical support, whether it is an active link in the program, a help file, or an email or phone number of the developer. The technical support may only be offered with the registered version. It is up to the developer to decide.

5.2.1.6 Question 6

"How many unregistered shareware programs do you use?"

To get the general facts about the users and the types of software that they use most often we incorporated a series of three questions into the Student's Survey. The frequency histogram of the results for Question 6 can be viewed in Figure 49. The central tendency for Question 6 was 5 shareware products. This is not an unreasonable amount of products for a user to have on their computer at one point in time. Using 5 unregistered shareware products could be considered serious if the evaluation periods have ended and the products are still being used. It can be easily justified to have 5 unregistered shareware programs such as an archiver, a photo-editing program, a virus scanner, a screen saver and an email checker all at the same time. These are all common shareware programs that can be evaluated over an extended period of time, depending on the limitations of each.

5.2.1.7 Question 7

"How many registered shareware programs do you use?"

The frequency histogram for Question 7 can be viewed in Figure 50. The most frequently given response to this question from the Students' Survey was 0 registered shareware programs. The central tendency however is one. This means that out of the people that took the survey, on the average, for everyone one registered shareware program they are using 5 unregistered shareware programs. This is a very interesting fact. Registering shareware is determined by many distinct characteristics. Some of these include the users' needs, annoyance of limitation, and obligation to the legal agreement.

5.2.1.8 Question 8

"How many other retail programs do you use?"

These results can be seen in Figure 51. From the people that filled out the survey they have ten full retail programs running on their machines. This is along with the 5 unregistered shareware products and the 1 registered shareware program. These are very interesting statistics, for the respondents have a 2 to 1 ratio of retail programs to unregistered shareware programs. There is also a 10 to 1 ratio of retail to registered shareware products. The fact that there is so much retail software could be due to the fact that retail software has many different options of applications. Shareware also does, but there may not be a shareware in a type of software application that is needed by the user. The quality of retail software is also usually very high, making it a desirable product.

5.2.1.9 Question 9

"Most of the time, why do you register shareware?"

The largest number of responses to most often registering shareware was to unlock the features. The data can be viewed in Figures 52 through 56. Agreement to the legal statement, to gain technical support, and to gain documentation had the most number of responses stating that they never register shareware for these reasons. Looking at the other side of things, there are a small number of people in the data set that register shareware for these reasons. If you are using a program for a specific task at school, work or at home for leisure, and the program is missing features that you need to finish the project at hand, this would be a very good reason to register the program.

A large number of respondents stated that they do not register shareware just because it says the evaluation time has expired. This becomes a legal issue whether or not you will continue to use a program after the agreed time restriction is finished.

5.2.1.10 Question 10

"On average, after registering the shareware version does the full version of the software meet your expectations?"

This question had a remarkably low response rate, only 56.94 people who took the survey answered this question. This data can be viewed in Figure 57. The most common answer given was yes. The majority of the users feel that the full version of shareware meets their expectations of the program when evaluating it. If the program seemed "good enough" in the evaluation period than chances are that after paying the registration fee the user will be happy with the end result. This information is important because the registered version must meet the expectations of the user, for full satisfaction.

On the other hand around 9 percent said that full versions of shareware do not meet their expectations. Having a program not meet your expectations after purchasing the full version can have many different causes. Some of these could include the locked features are not needed or helpful, or having the program for unlimited usage was not worth the fee because it is not used all that much.

5.2.1.11 Question 11

> "What do you do most of the time when your shareware runs out?"

The results of this question are shown in Figure 58. More than 50 percent of the WPI students surveyed responded that they look for alternatives other than registering a shareware product. The most common alternative selected by the students is to try to reinstall the evaluation version of a shareware product. Another two common approaches taken by the students are to simply stop using the program, or look for other similar shareware. Only 12.2 percent of the people indicated that they would purchase a full version of a shareware product once the evaluation version ran out. Since the sample set of this survey consisted of a student body, the relatively low number of people that said they would consider purchasing a full version of a shareware product may reflect limited financial resources of most students. Therefore, limited financial resources would lead users to try options other than paying for a full version of a shareware product, which is clearly visible in the answers given by the students.

5.2.1.12 Question 12

> "What do you think is a reasonable average shareware registration fee?"

The results of this question are shown in Figure 59. The central tendency for this question was $10, which also represent the median and the mode of the answers provided for this question. This is a number that best characterizes the reasonable average shareware registration free, according to the WPI student sample. However, this question has a relatively low response rate of 64.9 percent. The low response rate indicates that one third of the students did not feel comfortable with answering this question. These students did not feel comfortable with assigning a single value for a shareware registration fee, since the price is most often based on the program's capabilities. However, 60 percent of the students who took the survey indicated values below $30. This fact suggests that users expect shareware programs to be priced much more competitively than retail software. The price for retail software found on the shelves of many stores usually starts around $49.99.

5.2.1.13 Question 13

> "Which of the methods do you feel most comfortable using, to pay the registration fees?"

The results of this question are shown in Figure 60. The WPI students feel most comfortable with secured Internet transfer using credit cards to pay the registration fees. This reflects a high level of confidence among WPI students in the security of financial transactions over the Internet, which may be due to the high computer literacy of the WPI student body. As a technically oriented school, WPI students may have been more open to new technologies such as the Internet and therefore more aware of the actual dangers associated with a medium such as the Internet. Another popular method of registration payment among WPI students is sending a check in the mail. This is still a popular

method partially due to a fairly large distrust in the security of transactions over the Internet. This method offers the convenience that an unauthorized person will not gain an access to one's personal credit information such as credit card numbers. Less than 10 percent of the students rely on the phone and less than 1 percent rely on fax to make the registration payments, suggesting that those two methods may not be as convenient as using secure internet transaction or a check in the mail.

5.2.1.14 Question 14

"On average, how would you describe the quality of shareware products?"

The results of this question are shown in Figure 61. Almost half of the WPI student sample answered that shareware has lower quality than retail software. This fairly large number reflects a problem that shareware industry has faced for a long time. The movement to increase the quality of shareware programs, fueled by the formation of the Association of Shareware Professionals, has started to target the issue of poor quality of shareware products.

There is still a strong association of shareware with low quality, as reflected by the results of this question. However, the image of shareware is evolving to a more positive one. The rest of the students who responded to this question feel that shareware has either the same or higher quality than retail software.

5.2.1.15 Question 15, 16, 17

"What gender are you?"

"What age are you?"

"How would you categorize your major?"

These three questions target the demographic data of the students who have taken the survey. The results for each one of these questions can be seen in Figures 62, 63 and 64.

5.2.2 Relational Analysis

The analysis of the results of the student relational summary was accomplished by studying the graphs and seeing if there were in fact relations between the questions being crossed. The analysis of the relational results will be displayed in the same question-by-question format as the question results analysis. Please refer back to the list of questions in the question summary.

5.2.2.1 Question 2 Vs Question 13

> "2. Where do you get your shareware from?" Vs "13. Which of the methods do you feel most comfortable using, to pay the registration fees?"

The results of this relation can be viewed in Figures 65-66. When relating shareware websites as the place of receiving shareware and the method of payment chosen for registration, it is easy to see the relation. Shareware websites are part of the Internet, the World Wide Web. If this is the distribution media you are using to receive your shareware then it makes perfect sense to register it using the Internet also. This relation is proved in the relation results section. Fifty percent of our WPI survey set both obtained their shareware and registered their shareware using the Internet. For a WPI student this makes perfect sense because the Internet is easily accessible. Payment using a check sent in the mail was the second highest for the method of payment by the individuals who chose websites as the place for getting shareware. This is a rather old

fashioned method of payment, but still a very popular one. This is also a reasonable method, because many people do not trust putting their information over the Internet even with secure channels.

Having friends as the source of media used to obtain shareware is also related to the method of payment for the registration fee. The highest method again was secure channel Internet transactions. For WPI students, passing along programs is very easy if you are hooked up to the schools network. Sharing files is easy with the use of the network neighborhood or the use of ftp sites. This also shows a usage of the Internet for distributing shareware, which naturally would be a great way to pay the registration fee as well. Again, check in the mail was the second highest method of payment.

5.2.2.2 Questions 6, 7, 8

> "6. How many unregistered shareware programs do you use?" Vs "7. How many registered shareware programs do you use?" Vs "8. How many other retail programs do you use?"

Comparing the amounts of retail software, unregistered and registered shareware an individual has is very interesting information. Looking at the graph of all three questions on the same axes, you can notice the amount of registered shareware programs only has large amounts of responses at zero and one products (see Figure 67). This is where unregistered and retail software have very low amounts, meaning fewer people have small amounts of unregistered shareware and retail software.

After around ten products, registered shareware never shows up on the graph anymore. Unregistered shareware has a few responses but after ten products most people in our survey set only have that number of retail software. The central tendencies are as

follows: five unregistered shareware programs: one registered shareware program: ten retail programs. For every six shareware programs being used by our sample set only one is registered.

5.2.2.3 Question 9 Vs Question 11

> "9. Most of the time, why do you register shareware?" Vs
> "11. What do you do most of the time when your shareware runs out?"

This relation is between the individuals who say that they purchase the full version of the software when the evaluation is over, and the reasons for registering the program. The results of this relation can be viewed in Figures 68-69. This relation showed that for the individuals that purchase full versions it is most of the time to unlock all the features of the program. This could be because they need the locked feature and there is no other program that has that feature. It could also be that the person just feels that they should have the whole program for in the future the locked feature may be needed.

The evaluation period ending was the second highest reason for registering the shareware. This would most likely be the products that have all the features but the program shuts off after a specified number of days or number of runs. Registering the program would make for unlimited usage of all the features, which is a very appealing thought.

The last reason that is going to be mentioned is the agreement to the legal statement. An astounding 48 percent of the responses said that they register shareware because they agreed to the legal statement when installing the product. This is a very large percentage of the survey responses.

The reasons that individuals don not register shareware is also interesting. The lowest response to registering shareware is to gain tech support and documentation, and agreement to the legal statement. These reasons do not impress the person enough to pay the registration fee to purchase the program. They would rather stop using the program then pay for it to receive tech support and documentation.

Having the evaluation time run out is not a big motivator for these individuals to pay the registration fee either. The smallest amount of responses to not registering shareware would be to unlock all the features. This shows that getting all the features is the most common reason to register shareware, when using the data from our sample of WPI undergraduate students.

5.2.2.4 Question 10 Vs Question 14

> "10. On average, after registering the shareware version, does the full version of the software meet your expectations?" Vs "14. On average, how would you describe the quality of shareware products?"

The results of this relation can be viewed in Figures 70-71. This is a relation between shareware quality and after registration does the product meet your expectations. For all the respondents that said yes full versions meet their expectations, 51 percent also felt that shareware had the same quality as retail software. This relation shows that out of all the responses that said they are happy with shareware also feel it has very good quality, comparing it to retail software.

The relation works exactly the same in the opposite direction. For the people that stated they were not happy with full version shareware, the majority also felt that the quality of shareware was low.

These are direct relations showing that if the quality of shareware is high then the full versions make the consumer happy, but if the quality is low then the product does not meet the expectations of the consumer.

5.2.2.5 Question 3 Vs Question 6, 7

> "3. When using shareware, what limitation do you dislike?" Vs "6. How many unregistered shareware programs do you use?" and "7. How many registered shareware programs do you use?"

This relationship attempts to establish whether there is a correlation in what limitations users dislike the most. The two sets of users considered here are users who use a large number of registered programs and users who use a large number of unregistered programs. A large number of programs for the unregistered users is defined as a number larger than the mode for the data set of Question 6, which is equal to 5. Therefore, only responses of users with more than 5 unregistered programs are considered. A large number of programs for the registered users is defined as a number larger than the mean for the data set of Question 7, which has a value of 1.68. As in the case of the unregistered users, only responses of users with more than 1 registered program are considered. By limiting the responses only to those who use significant number of shareware programs, we are screening out answers of those users who may not be very familiar with shareware and therefore give us inaccurate information.

The results of this comparison are shown in Figure 72 for the unregistered users and Figure 73 for the registered users. Both the unregistered and the registered users picked the limited number of runs as the feature that they dislike the most among all the listed features. The tendency is very strong among shareware users in general as more

than 81 percent of the unregistered users and more than 70 percent of the registered users picked it as the most disliked feature. There exists also a strong tendency among users in general as to what is the second most disliked feature. More than 67 percent of the unregistered users and more than 68 percent of the registered users found limited features to be the second most annoying limitation used in shareware programs. There is a slight discrepancy between the two types of users as to what is the third most disliked limitation. In the end, they both agree that limited evaluation time takes the third place. However, while the unregistered users actually put limited evaluation time slightly ahead of limited features limitation by a difference of .64 percent, there is a considerable drop off between the two types of limitations among registered users. As a result, limited evaluation time takes the third place among the most disliked limitations present in shareware programs.

5.2.2.6 Question 5 Vs Question 6, 7

> "5. What problems do you experience with shareware most often?" Vs "6. How many unregistered shareware programs do you use?" and "7. How many registered shareware programs do you use?"

This relationship attempts to establish whether there is a correlation in what problems users experience the most often. As in the previous relationship, the two sets of users considered here are users who use a large number of registered programs and users who use a large number of unregistered programs.

The results of this comparison are shown in Figure 74 for the unregistered users and Figure 75 for the registered users. Both the unregistered and the registered users picked insufficient set of features as the most often encountered problem with shareware

programs. Shareware users equally display this tendency as 40 percent of the unregistered users and 40 percent of the registered users picked it as the most often encountered problem.

5.2.2.7 Question 14 Vs Question 1

> "14. On average, how would you describe the quality of shareware products?" Vs "1. On average, when looking for software with certain features, what type of software do you investigate first?"

This relationship attempts to look into the link between the quality of shareware products in general as viewed by users, who when looking for software with certain features, investigate a certain type of software first. In this scenario, users were divided into three distinct categories based on their answers for Question 1: those who look for retail software first, those who look for freeware software first, and those who look for shareware software first. The results of this relationship are shown in Figure 76.

Based on the results obtained through the survey, there seems to be a fairly strong agreement between all three groups of users that shareware has lower quality than a respective retail software product. This idea is clearly displayed by users in the retail and shareware category. Almost 59 percent of users in the retail category and more than 52 percent of the users in the shareware category made that statement. However, only about 42 percent of users in the freeware category agreed to this assertion, and appear to be equally split between those who believe that shareware in general has lower quality than retail software and those who believe that shareware has the same quality as retail software. This attitude toward the quality of shareware could be fairly common among the group of users in the retail category, but it is certainly alarming considering that users

in the shareware and the freeware categories also reflect it. Therefore, regardless of what types of software users investigate first, the general attitude among them is that a retail software product found in stores has higher quality than a corresponding shareware program.

While there is a general dissatisfaction with the quality of shareware, another significant, although smaller, group of users regards shareware as having the same quality as retail software. Within this group of users, the smallest percentage belongs to the users in the retail category. This fact may reflect that these people are slightly biased towards shareware products, since they look for retail software in the first place.

Virtually all three groups of users failed to recognize shareware in general as having higher quality than retail software.

5.2.3 Inferential Analysis

The two population scores that were used to conduct the inferential analysis are the major selection and the gender. Both of these scores were acquired from the WPI Registrar's office. These are the exact statistical numbers for the undergraduate classes from WPI. The compatibility of the survey scores and the scores from the WPI statistics will give us a good measure of the fitness of the survey to the whole undergraduate class of WPI. Below are the characteristics of the two scores, that will help us determine the survey's fitness:

5.2.3.1 Major

The relative frequencies between the majors for the WPI statistics and the Students' Survey are very closely related. This would lead us to believe that the survey

responses would represent the population (WPI Undergraduates) effectively. The WPI statistical information is located in Appendix R of this document.

WPI Statistics Population:

The WPI statistics have engineering as the most common major for WPI undergraduates, followed by Science majors, Management, Humanities, and Liberal Arts.

Table 96: WPI Statistical Information, Majors

	Freq	Rel. Freq. [%]:
Management	114	0.042681
Engineering	1550	0.580307
Sciences	971	0.363534
Humanities	13	0.004867
Liberal Arts	12	0.004493
Total	**2671**	

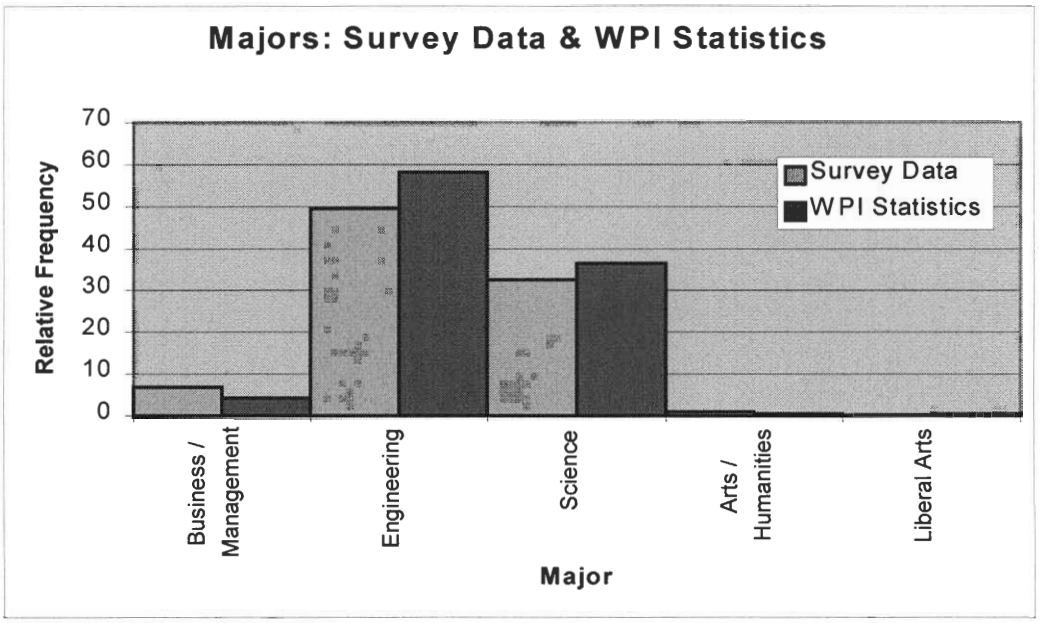
Students' Survey Sample:

The results from the Students' Survey in order of highest frequency are as follows: Engineering, Science, Management, Humanities, and Liberal Arts.

Table 97: Student Survey Responses, Majors

CATEGORIES	FREQ.	Rel. Freq. [%]:
Business / Management	29	6.84
Engineering	210	49.53
Science	138	32.55
Arts / Humanities	4	0.94
Liberal Arts	1	0.24
QUESTION RESPONSES:	**413**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE:	**97.41**	

Figure 90: Majors- Survey and WPI Statistics, Relative Frequency Distribution



Number of categories (k) = 6

Degrees of freedom (df) = k – 1 = 5

$\Sigma(\chi 2) = \chi 2(df) = 519.1$

Critical $\chi 2 = 11.07$ (taken from a Critical Values of Chi Square table [7] assuming $\alpha = 0.05$)

Result: Our sample is outside of the acceptance region (0 … Critical $\chi 2$).

Conclusion: The One-way Chi Square (χ^2) on the Majors variable showed that our sample does not well represent the variable distribution in the population scores (WPI Statistics), and therefore our sample is biased. The relative frequency graphs look like the survey data would represent the population accurately, though this is not the case due mostly to the small differences in the results. First of all the WPI statistics have smaller frequencies than the Survey responses for Management and Humanities, while larger for

all other categories. The summation of the differences added up to make the value vary beyond the acceptable range.

5.2.3.2 Gender

For gender, the values calculated for the relative frequencies between the Students' Survey and the WPI statistics seem to be closely related. This would again lead us to believe that the results from the survey would represent the population accurately. The WPI statistical information is located in Appendix R of this document.

WPI Statistics Population:

The WPI statistics have a male to female ratio of 1: 3.57.

Table 98: WPI Statistics, Gender

Gender	Freq	Rel. Freq. [%]:
Male	2087	78.13553
Female	584	21.86447
Total	2671	

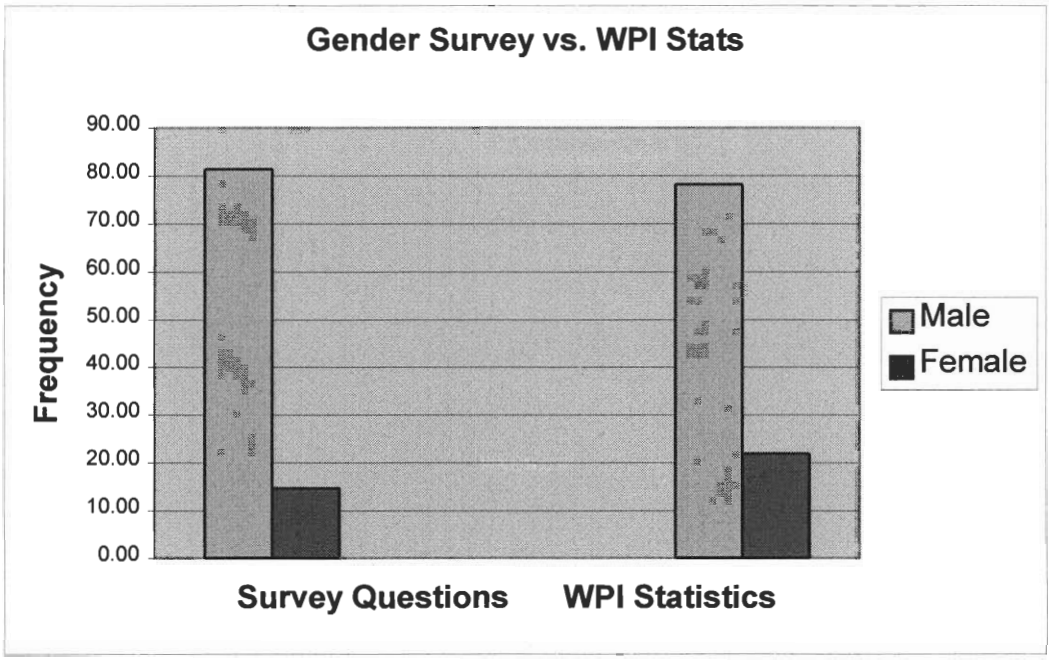
Students' Survey Sample:

The Students' Survey has a male to female ratio of 1: 5.56.

Table 99: Students' Survey Responses, Gender

CATEGORIES	FREQ.	Rel. Freq. [%]:
Male	345	81.37
Female	62	14.62
QUESTION RESPONSES:	**407**	
TOTAL RESPONSES:	**424**	
QUESTION RESPONSE RATE:	**95.99**	

Figure 91: Gender, WPI Statistics and Survey Responses



Number of categories (k) = 2

Degrees of freedom (df) = k – 1 = 1

$\Sigma(\chi 2) = \chi 2(df) = 32.83$

Critical $\chi 2 = 3.841$ (taken from a Critical Values of Chi Square table [7] assuming $\alpha = 0.05$)

Result: Our sample is outside of the acceptance region (0 … Critical $\chi 2$).

Conclusion: The One-way Chi Square (χ^2) on the Gender variable showed that our sample does not well represent the variable distribution in the population scores (WPI Statistics), and therefore our sample is biased. The bias comes mostly from a higher relative frequency of females in the WPI statistics then in the Students' Survey. The fact that not everyone who took the survey answered the question also damages the results of the inferential analysis.

6 CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the general conclusions that we have drawn out of our research, as well as a description on some of the limitations and assumptions made in our project.

Based upon the thorough investigation and analysis of the results that we have acquired from the two surveys, the WinFiles.com analysis, and the interviews, we have been able to make some relevant conclusions for this project. The conclusions will be displayed through each section of the data gathering means as stated in the Procedure section.

The goal of this project is to find out what characteristics of shareware, users like and dislike, and what drives them to register shareware. We also would like to find out what the developers feel would make a successful shareware product. We will answer these questions using the gathered data and then appropriate conclusions will be drawn from this information.

This chapter will also show the recommendations that we have made through the use of relating the conclusions from each of the four data collection methods. These recommendations will be a combination of all the data and information that we have learned throughout this project, concentrating on the results, analysis and conclusions.

6.1 DEVELOPERS' SURVEY

During the process of analysis of the survey we have learned a few interesting facts about the survey audience. One of the conclusions that we have made is that the majority of the shareware products are written by small development teams or even a single programmer. It is often a belief that multi-programmer efforts can produce more

complex software, which in effect is more likely to contain multiple-purpose features, and therefore acquire more users. However we learned, that multi-member development teams and single-member development teams have the same chances to become satisfied with the results of the shareware publication. The degree of satisfaction can be related to the net income from shareware publication as well as the number of registered and unregistered users. This also brings us to a conclusion that shareware products are on average more function-specific then retail software available in stores. Limited programmer power is a characteristic of shareware development. We also believe that a significant number of the shareware products are initially created for the developer's personal use. When the tool proves its functionality, the developer might decide to publish it as a shareware.

One of the most interesting conclusions that can be made from the Developers' Survey is that registration reminder screens and limited evaluation periods are the most often used limitation methods used today. Even more importantly, the developers using such methods reported to be happier with the results of their shareware distribution. It is our belief that shareware should not be limited by the number of available features. The user should have all the functionality he or she needs to get to know the software. It is possible that a shareware product that uses only nag screens will accumulate a much larger number of evaluating users over time, and bring more registrations to the developer. According to Bob Ellison (Syntrillium Software Corporation), "You don't want to make the nagging so harsh, so that people will simply stop using it ..." [26]. We also believe that shareware users are more likely to purchase shareware products that they have been using for long time (e.g. a year). Limiting the shareware evaluation period to 2

weeks might not give enough time for all potential users to get to know the shareware fully and get used to it. Bob Ellison says "Shareware product should be usable before it's registered..." [25]. Peter Volpa (Circuit Systems, Inc.) stated: "I believe that you have to give the end user all the features, so that they can see what the software actually does" [27].

A significant counter argument would be that if the evaluation period is too long, the product will be replaced by some other, newer competing software. Therefore existing and future competition is a significant factor to consider when choosing your limitation method. It is also important to know what kind of customers your shareware is really targeting. Bob Ellison said:

> "I think shareware companies that have been successful, have examined what are their types of users, and how they can limit them while still allowing maximum functionality. It's an absolutely crucial point" [26].

We have also learned that the shareware distribution process should not be limited to the Internet and shareware websites. One has somewhat higher chances for success when using additional means of software distribution, such as CD collections and computer magazines. Allowing your users to utilize their credit cards, as a payment method is likely to speed up the registration process. We believe that making it easier for users to process the payment is also making it more likely that users will actually register the software.

Finally, our survey showed that most of the shareware developers do not consider the increase in sales as the primary benefit of shareware distribution. The far most important benefit of shareware development was found to be the increase in publicity.

Such publicity could in return help the particular developer with job searching, if he or she decides to explore employment opportunities.

A significant number of respondents reported to be unsatisfied with the results of shareware production. Lower then expected net incomes made from shareware registrations are most likely the main reason for disappointment. There are two basically uncontrollable factors that drive the sales of shareware products: the number of people that use the shareware product, and the percentage of these people that decide to pay the registration fee. The first factor can be significantly influenced by the competition your shareware product has on the market. Ideally your shareware is the only one of its type in the market, and everybody needs it. In the worst case, there are many very similar programs present on the market, and nobody really needs them. An example of such a case would be the publication of a text editor. For the most part there really is no difference between the existing shareware text editors. They all provide the same basic functionality. The key to producing a popular and sales-wise-successful shareware product is stepping away from the common software market ideas and coming up with a radically new program.

We believe one of the biggest problems in the market of shareware today is piracy. It is very likely that if one produces a useful and widely needed shareware product, there will be somebody trying to hack into it. It is also common for pirates to publish lists of serial numbers for various software on the Internet. Such practices are likely to reduce the number of registered users of your shareware. Improving software protection techniques is therefore recommended.

Assuming that one the goals of shareware developers is an increase in publicity, distribution of the shareware product over various media makes sense. Our research shows that some of the more successful shareware developers used CD collections and computer magazines as a means of publication in addition to the Internet.

There are a few visible biases present in our survey results. First and the most important is that our research concentrated on Microsoft Windows shareware. Although there are shareware products present for other platforms, such as Macintosh, we believe the majority of the shareware products are written for Windows 95, Windows 98 and Windows NT. We have drawn our survey audience mostly from shareware publications present at WinFiles.com, which we believe is a good representation of the shareware market for Windows platforms. The results acquired from the inspection of WinFiles.com were used as the population characteristics in the inferential statistics of the Developers' Survey.

Because we contacted the respondents of our survey through email, and because we acquired the email addresses from WinFiles.com, we have introduced shareware distribution bias. The developers who responded to our survey already had their products published on a shareware website (WinFiles.com). The survey question asking about the distribution media used was therefore strongly biased.

Questions 7 and 12 of the survey were asking if the developer is satisfied with the distribution of the shareware product, and if the shareware distribution is worth the results. The results acquired from these two questions are biased in some way as well. We can assume that there are a number of developers, who produced a shareware product, but due to poor distribution and product usage had to back out of the shareware

market. We were not able to reach these developers. Therefore, the results on questions 7 and 12 represent a lower bound on the number of dissatisfied developers. The spectrum of our survey is shifted toward the more satisfied part of the developer population.

Another potential problem that we have spotted is that a few developers who produced more than one shareware product were confused on how to answer some of the survey questions. Although we explicitly asked to pick only one shareware product in such cases, the instructional part of the survey seemed not to be understood in some cases.

Finally, our survey analysis does not account for the fact that a significant part of the developers who took the survey might have just started their shareware publishing careers. It is our belief that if a shareware producer is successful, he or she will with time expand its development team size. Since our survey respondents reported to have an average team size of 1.6 (with mode and median at 1), it is again our prediction that our survey audience belonged to a slightly less experienced spectrum of the shareware developer population.

The inferential analysis part of the project did not prove the survey to be 95 percent representative of the population of shareware developers publishing at WinFiles.com. The reason why we were not able to find out exactly how representative our survey is was that we did not have much information about the shareware developer population in general. The only informative data in our possession were statistics on shareware prices and shareware evaluation periods of all the shareware products published at WinFiles.com. Because the survey means fell out of the confidence levels for these two variables, we cannot be certain on any conclusion made with respect to

questions 2 and 10 of the survey. These two questions asked for the shareware evaluation period and the estimated shareware registration fee. We did not have a basis for analyzing the population fitness of other results acquired in this survey.

6.2 STUDENTS' SURVEY

As stated before, the general user data collection was a failure therefore the Worcester Polytechnic Institute undergraduate class became the target audience for the survey. We had a 17.1 percent response rate from the survey, which we feel is a large percentage and a good amount to draw some accurate conclusions. The survey is not a good measure of what the general shareware user population would be because the sample set was undergraduate college students at a highly technical school. This is a very concentrated grouping and can not be considered general. This is the main limitation to the conclusions that can be drawn from the data collected. Although the data collected is high quality and of value, it cannot justify what the general population of shareware users would have answered if they had responded to our survey.

The conclusions for the Students' Survey are broken down into specific categories that will be addressed in the recommendations section later in the project report. These categories will contain our conclusions based on the materials presented in the analysis section. All conclusions in this section pertain only to what our 425-person response set gave for answers to the online survey.

6.2.1 Shareware Limitations

The results and the analysis of those results show that having registration reminders or "nag screens" and random reminders that open up during the program is a good way to get the message across to the user that the program needs to be registered.

We can conclude from the results of our survey that the users would like shareware that did not have locked out features, limited evaluation times or limited numbers of program runs.

A rough conclusion can be drawn from this information. The surveyed students would rather get to use the program, not necessarily evaluate it, and never have to pay the registration fee. If nag screens are the only limitation that is on the shareware, other than lack of technical support or documentation, then there is no physical means to make the user pay the registration fee. We believe that having a nag screen pop up every once in a while, would not drive someone, who does not want to pay the money, to purchase the full version.

6.2.2 Why Shareware is Registered

According to the survey takers, shareware is most often registered to unlock the limited features of the program. This is also one of the most disliked limitations as shown by the survey. This draws some very interesting conclusions in itself. The limitation that is one of the most disliked is also the most common reason given for registering the shareware. One could argue that the most disliked limitations would be a reason to remove the program from their machine, however this can also be a reason to keep it and register it. This shows that a majority of survey takers register the program, when the limitation is disliked such as locked-out features.

This also shows that the limitations that are intended to make the user less annoyed while evaluating the software do not convince him or her to register it. Simple nag screens that pop up, while allowing full usage of the program can be annoying but may be dealt with and overlooked just to gain full access to the program. If nag screens

annoy the user that much and they like, want, or need the program they will pay the registration fee just to remove the annoying limitation that has been placed on the product.

6.2.3 Quality of Shareware

The quality of shareware is a big issue with regards to purchasing the full version of the program. During the evaluation period the user must get a feel for what the program is like; this would include the user interface, the stability of the program and whether or not it has a sufficient set of features for the particular application. "Insufficient features" does not refer to locked out features; it refers to a program designed for a specific application and whether or not it has the features the user wants or needs.

According to the survey takers, the quality of shareware is lower than that of retail software. This is not a good reputation for shareware. As stated by Bob Ellison:

> "The perception of shareware is really low... There is still a general perception that shareware equates to poor software ... That public perception is extremely damaging." [26].

If it is known to be of a lower quality then fewer people will look to shareware for purchasing, software to perform specific tasks. 47 percent of the responses stated that shareware had a lower quality then retail software while only 40 percent said that it had the same quality. A consumer may purchase a program from a well-known and established company rather than a shareware producer, even if they are of equal quality, just to get the better name.

The response for shareware being of such low quality would be due to the following factors. A large portion of the responses stated that they had problems un-

installing the shareware. This would be a cause for depicting shareware as being lower quality, for retail software most often comes with an installation/un-installation process. A majority of the respondents stated that their shareware programs crash frequently. This is a definite cause to say that shareware is low quality. If the program crashes all the time, there could be a problem in the source code. An extremely large fraction of students said that when getting shareware very often the program does not have a sufficient set of features. If a shareware company makes a product for a certain application and the program has fewer features then a retail program, then the consumer may choose to purchase the retail software. The programs need to have as many relevant features as possible and tools for the given application that it was designed for. A large percentage of the survey respondents said that their shareware had a confusing interface, which could be construed as low quality.

Quality of the program is a driving factor behind the registration of shareware products. We can conclude from our survey results and analysis that the survey audience believe that shareware is a lower quality software than that which can be purchased through the retail channels. Insufficient features, crashes, installation problems and confusing interfaces would all be factors in depicting shareware as lower quality.

6.2.4 Internet Access

The accessibility of the Internet is a big factor in the results that we have obtained from the students. The survey was an online survey so the individual filling out the survey had Internet access to take the survey.

Where the people get the shareware is also related to the Internet. The most common answer for where shareware was distribution websites. This is due to the fact

that the people at WPI have accessibility to the Internet. Getting shareware from friends, which had the second highest response for where the students get their shareware, would be due to the local network and sharing of files, or through the use of FTP (file transfer protocol) sites. These FTP sites whether from friends or shareware distributors are directly accessed through the use of the Internet.

The method of payment also depends on the Internet accessibility. Using a secured Internet transfer is the most common way to register the shareware among survey takers. Some shareware companies incorporate distribution and online registration into their company website. The conclusion here is that both the method of payment and distribution media most often used are directly related to the students' usage and accessibility of the Internet. For users who get their shareware from computer magazines, a more appropriate method of payment could be sending a check in the mail. These are both non-internet methods of payment and distribution.

6.2.5 Registration Fee

The majority of the students said that 10-20 dollars is the approximate range of an acceptable registration fee. The central tendency for the registration fee is $10.00. This is a reasonable fee for a general Windows 95 shareware program, depending on the particular application. According to Bob Ellison, "The perception is that [shareware] shouldn't be expensive..." [26]. This value is a low number dollar-wise. This relates to our survey sample, which consists of college students in the range of 17-26 years of age, with the majority below 20 years. Their responses can be justified by their financial status. As a very general stereotype, college students are not as likely to have lots of extra money to spend on computer programs; thus they would opt for a low registration

fee. $10.00 is a very small amount of money thus we can assume they would be able to pay for this.

6.2.6 Number of Registered Programs

The students that participated in our survey reported a large range of values for the number of shareware programs that they used. As shown in the analysis section, the majority of users had 1 registered shareware program and 5 unregistered shareware programs. From the other answers in the survey we can conclude that the quality, registration fee, and limitations are what drives the people to register their shareware.

The fact that the average amount of registered shareware programs used by the survey group was 1 is an alarming amount. This can be due to three distinct reasons. 1) The people who took the survey feel that the quality of shareware is too low to pay the 10-20 dollars to register the program. 2) The features of the unregistered program are sufficient for the users needs. 3) The limitations incorporated in the shareware did not push the user into registering the program.

6.2.7 Evaluation Restriction

The evaluation restriction can be categorized into three discrete types, evaluation time, number of runs, and unlimited usage. Unlimited usage got the most responses for the evaluation period length. Drawing conclusions from this can be done in two ways. Stereotype the survey group as people who do not want to pay the registration fee yet use the program unlimited, or as people who need a longer evaluation time but still bind to the legal agreement to register the program.

The majority of students stated that the evaluation restriction should be limitation of number of runs. The value most often stated was 50 runs for a program. If this is a

general shareware program that does not load up at computer startup, 50 runs of the program should be a sufficient amount of runs to evaluate the program. The results also state that the most disliked restriction is a small number of runs. We can conclude that unlimited runtime is the most preferred, but a large value of 50 runs would also make the user satisfied for the evaluation period.

Evaluation time had the least amount of responses as a viable restriction. The central tendency is 4 weeks for the time period. We can conclude that a long evaluation period is better for satisfying the shareware user. The unlimited time period would be ideal for our sample set but is most likely non-realistic, without incorporating another limitation, such as a reminder screen.

Both of these values prove that for evaluating shareware, a user needs a large amount of time to see if the program is what he or she is looking for. This period can be either a large number of runs or a large number of weeks.

6.2.8 Conclusion Results

These conclusions are all based on what the students who participated in this survey had to say in response to our survey. These conclusions should not be misread as conclusions of a general population, but these are still valuable conclusions. This study was based on a singled out sample, nevertheless the conclusions can be used to make recommendations as to what the people who took the survey would like to have put into their shareware programs.

6.3 WINFILES.COM

The data gathered from WinFiles.com provides useful information regarding several factors involved in publishing a successful shareware product. Since the site

represents one of the largest shareware collections on the Internet, the results obtained from WinFiles.com represent the characteristics of all shareware programs that are available on that site. It is important to distinguish that fact, as the following conclusions are based on all the shareware programs and not just the most successful ones.

One of the most important decisions that a shareware publisher will have to make while releasing a shareware product is to choose what limitations and restrictions to put into the evaluation version. Expiration period refers to a period of time after which a shareware product expires. It is one of the most commonly used limitations by shareware programmers. The three statistical methods of describing a set of data, the mean, the mode, and the median, almost all uniformly agree upon the period of 30 days as the most characteristic of the shareware programs present on the WinFiles.com site. We conclude therefore, that the evaluation period of an average Windows shareware product in today's market is 30 days.

Installation options specify whether a shareware product has an installation program, a un-installation program, or other means of installation. Since almost three-quarters of the programs available from WinFiles.com offer both installation and un-installation means, it is in the best interest of the shareware publisher to provide these two options in order to stay competitive with the existing market.

Finally, the last factor that we consider based on the data obtained from WinFiles.com is the price of a shareware product. The shareware product prices found on the WinFiles.com website show a great variation, ranging anywhere from $.50 to $1995. However, a great majority of the shareware programs are priced below $30.

Based on mean, mode, and median, the registration fee of $20 has been selected as the value representative of the majority of the shareware programs on the WinFiles.com site.

6.4 FINAL RECOMMENDATIONS

The following are some of the major points that we would like to communicate to shareware developers reading this project report. These are made up from the conclusions drawn from each of the three data gathering means, with the interview data supporting them.

1. Come up with fresh ideas for your shareware. This is most likely to provide you with publicity.

6. A small development team size does not mean a smaller chance for success.

7. Use registration reminder screens as the start and the end of the program. These are the least disliked limitation as stated by the users. They are an easy, effective way to remind people of the legal agreement during the installation of the program.

8. Do not limit the functionality or the number of available features in the unregistered version of your shareware. This is a borderline evaluation, for it is the number one disliked limitation but it is also the number one reason stated for actually registering the shareware, as seen by our Students' Survey. Taking the number of registered users and dividing it by the total number of people that ever used your shareware can estimate the registration rate. By including a strict evaluation period limitation, or by locking out certain features, you are more likely to obtain a higher registration rate. However, this does not actually ensure higher income.

9. Provide free technical support as well as other cost-free related services to your customers and potential customers. Some users care very much about having the tech support available while evaluating the shareware.
10. Provide well-written documentation and easy to access software help. Users do take the documentation into consideration, (not a large percentage nevertheless these people need to be taken into account).
11. Use CD collections and computer magazines as additional means of distribution. The Internet is still the number one method for distribution, but you need to broaden your distribution area.
12. Do not expect much income from your shareware sales. Increase in publicity is the most likely benefit to come. One out of five developers, who took our survey, was not satisfied with the results of the shareware production. The average number of shareware programs registered by WPI students who took the survey is 1, while the number of unregistered is 5.
13. Include more advanced anti-piracy security features in your shareware. Serial number protections are often ineffective.
14. Unstable and confusing interfaces turn people away from purchasing the product. When creating a new shareware product to perform some specific tasks, make sure that you incorporate every possible feature into the program. Lack of sufficient features is a cause for low quality programs.
15. Keep the registration fee attractive. Ten to twenty dollars is a typical price for a full version shareware product.

16. Keep in mind the range of ages that your target audience will be made up of and their social context. Younger people in general will not have a lot of money to pay the registration fees. Also, we believe it is more likely an older adult will pay the registration fee because they are obligated by the legal agreement. People with a high income will most likely pay the fee while people with little income may not.
17. The evaluation period must be long enough for the user to actually evaluate the product. Keep in mind it may take several runs or several weeks for the user to explore the whole program. The evaluation period must relate to this whether it is a limited time period or a limited number of runs. The evaluation period should not go below 50 runs or 4 weeks.
18. Internet accessibility is the key to putting out shareware. The Internet is the fastest growing media source and the easiest to promote shareware on. One can set up a distribution site where the product can be retrieved and also pay the registration fee with a secured channel. The Internet is one of the best methods to get the publicity needed to compete in the software market.

APPENDIX A: DEVELOPERS' SURVEY

ABOUT THE PROJECT:

The project's focus is an analysis of the shareware market from both developers' and users' point of views. The main goal of the project is to find out what parameters of shareware make it successful. Success in shareware production means short-term and long-term financial benefits to the developer. Through statistical analysis we will develop a practical model for a prosperous shareware product. In our model, we will associate vendor success to shareware user satisfaction.

For more information on this project, please read the Project Proposal (MS Word97 document, 150 Kb).

SURVEY NOTES:

1. This survey is fully CONFIDENTIAL (we do not record ANY identities). However, if you do not feel comfortable answering any of the questions below, select "N/A" for your answer.
2. The survey is focused on shareware, so if you produce only freeware, public domain, open software, etc., please do not take this survey.
3. If you develop more then one shareware program, please concentrate your answers around your most popular or most recent shareware.
4. If you are not sure about some of the numbers below, give us your best estimate.
5. This survey should take no longer than 5 min to fill out.

ADDITIONAL NOTES:

Interpret the "shareware version" as the state of your software before user registration. Interpret the "full version" as the state of your shareware after it has been registered.

1. What limitations do you usually include in your shareware? (check all that apply)

   Limited features
   Limited evaluation time
   Limited number of runs
   Reminders at the start or the end of the program
   Randomly generated reminders
   No support

No documentation
N/A

2. What usage limitations do you put on your shareware?

   Evaluation time in weeks:
   Limit to number of runs:
   Unlimited
   N/A

3. What do you offer with the shareware version of your software? (check all that apply)

   Documentation
   Free support
   Subscription to news letters or mailing lists
   N/A

4. What do you offer with your registered version of the software? (check all that apply)

   Documentation
   Free support
   Subscription to news letters or mailing lists
   N/A

5. What type of media do you use to distribute your shareware? (check all that apply)

   Shareware websites
   Computer magazines
   CD collections
   BBSs
   User groups
   Rack vendors
   Other:
   N/A

6. What do you find are the benefits of producing the shareware version of your software? (check all that apply)

   Increase in full version sales
   Technical feedback from the shareware users
   Increase in publicity
   N/A

7. Did distribution of the shareware meet your expectations?

Yes
No
N/A
Can you tell us why?

8. How many programmers were involved in the production of the shareware?

   Enter number:
   N/A

9. Which of the methods do you provide to pay the registration fee? (check all that apply)

   Secured Internet transfer (https://) using credit card
   Unsecured Internet transfer (http://) using credit card
   Phone call using credit card
   Check in mail
   N/A

10. Approximately, what is your shareware registration fee?

    Enter amount: $
    N/A

11. Give us your best estimate on the number of users of the full version of your software?

    Enter number:
    N/A

12. Using your own data, is the cost of putting out the shareware worth the results?

    Yes
    No
    N/A
    If no, can you tell us why?

If you would like to be provided with an electronic copy of the final Project Report, please give us your email address:

Email (optional):

Comments (optional):

APPENDIX B: STUDENTS' SURVEY

ABOUT THE PROJECT:

The project's focus is an analysis of the shareware market from both developers' and users' points of view. The main goal of the project is to find out what parameters of shareware make it successful. Success in shareware production means short-term and long-term financial benefits to the developer. Through statistical analysis we will develop a practical model for a profitable shareware product. In our model, we will associate vendor success with shareware user satisfaction.
For more information on this project, please read the Project Proposal (MS Word97 document, 150 Kb).

WHAT IS SHAREWARE?

"Shareware is a marketing method, not a type of software or even strictly just a distribution method. When software is marketed through normal retail channels, you are forced to pay for the product before you have even seen it. The Shareware marketing method lets you try a program before you buy it. Since you have tried the program, you know whether it will meet your needs before you pay for it. A Shareware program is just like a program you find in major stores, catalogs, and other places where software is purchased; except you get to use it, on your own computer, before paying for it." (http://www.asp-shareware.org)

TERMS GLOSSARY:

- *"registration"* - process of purchasing rights to use shareware product. After the registration is complete, a shareware product becomes fully functional and all the usage restrictions go away.
- *"shareware version"* - state of a shareware product before registration.
- *"full version of a shareware product"* - state of a shareware product after registration.
- *"shareware limitations"* - usage restrictions put on the shareware software by the developer. Such limitations might include: limited evaluation period, registration reminders, limited features, etc.
- *"freeware"* - software that is free to use. Freeware products might still be copyrighted.
- *"retail software"* - type of software that you need to pay for before using or trying it. An example of such software is any shelf software sold in software retail stores.

SURVEY NOTES:

1. This survey is fully CONFIDENTIAL (we do not record ANY identities). However, if you do not feel comfortable answering any of the questions below, select "N/A" for your answer.

2. This survey is targeted at shareware users. If you never used shareware do not take this survey.

3. If you are not sure about some of the numbers below, give us your best estimate.

4. This survey should take no longer than 10 min to fill out.

5. In case you get a server error page on the submission, click on the "Reload" button. The server might be busy processing other submissions at the moment.

    1. On average, when looking for software with certain features, what type of software do you investigate first?
    (check one)

        Freeware
        Shareware
        Retail software
        N/A

    2. Where do you get your shareware from?
    (check all that apply)

        Shareware websites
        Computer magazines
        CD collections
        Friends
        BBSs
        User groups
        Shareware racks in retail stores
        Other:
        N/A

    3. When using shareware, what limitation do you dislike?
    (5 = really hate it, ... 1 = doesn't bother me)

        Limited features
        Limited evaluation time
        Limited number of runs
        Reminders at the start or the end of the program

Randomly generated reminders
Lack of technical support
Absence of documentation
N/A

4. How long do you think an average shareware evaluation restriction should be?

   Evaluation time in weeks:
   Limit to number of runs:
   Unlimited
   N/A

5. What problems do you experience with shareware most often? (3 = Often, 2 = Sometimes, 1 = Hardly ever or never)

   Virus infections
   Installation problems
   Uninstallation problems
   Program crashes
   Insufficient set of features
   Confusing or unattractive program interface
   Lack of technical support
   Absence of documentation
   N/A

6. How many unregistered shareware programs do you use?

   Enter number:
   N/A

7. How many registered shareware programs do you use?

   Enter number:
   N/A

8. How many other retail programs do you use?

   Enter number:
   N/A

9. Most of the time, why do you register shareware? (3 = Often, 2 = Sometimes, 1 = Hardly ever or never)

   Evaluation period ran out
   I need the locked features
   To gain technical support services
   To acquire documentation
   I agreed to the legal statement when installing the shareware
   N/A

10. On average, after registering the shareware version, does the full version of the software meet your expectations?

    Yes
    No
    N/A
    Can you tell us why?

11. What do you do most of the time when your shareware runs out? (check all that apply)

    Simply stop using the software
    Try to reinstall it
    Purchase the full version
    Look for other similar shareware
    Look for other retail software
    N/A

12. What do you think is a reasonable average shareware registration fee?

    Enter amount: $
    N/A

13. Which of the methods do you feel most comfortable using, to pay the registration fees?
    (check one)

    Secured Internet transfer (https://) using credit card
    Phone call using credit card
    Fax credit card information
    Check in mail
    N/A

14. On average, how would you describe the quality of shareware products?
    (check one)

    Shareware has a higher quality then retail software
    Shareware has the same quality as retail software
    Shareware has a lower quality then retail software
    N/A

15. What gender are you?

    Male
    Female
    N/A

16. What age are you?
(check one)

Under 17 years of age
17 years of age
18 years of age
19 years of age
20 years of age
21 years of age
22 years of age
23 years of age
24 years of age
25 years of age
Over 26 years of age
N/A

17. How would you categorize your major
(check one)

Business / Management
Engineering
Science
Arts / Humanities
Liberal Arts
Other:
N/A

APPENDIX C: USERS' SURVEY

ABOUT THE PROJECT:

The project's focus is an analysis of the shareware market from both developers' and users' points of view. The main goal of the project is to find out what parameters of shareware make it successful. Success in shareware production means short-term and long-term financial benefits to the developer. Through statistical analysis we will develop a practical model for a profitable shareware product. In our model, we will associate vendor success with shareware user satisfaction.

For more information on this project, please read the Project Proposal (MS Word97 document, 150 Kb).

WHAT IS SHAREWARE?

"Shareware is a marketing method, not a type of software or even strictly just a distribution method. When software is marketed through normal retail channels, you are forced to pay for the product before you have even seen it. The Shareware marketing method lets you try a program before you buy it. Since you have tried the program, you know whether it will meet your needs before you pay for it. A Shareware program is just like a program you find in major stores, catalogs, and other places where software is purchased; except you get to use it, on your own computer, before paying for it." (http://www.asp-shareware.org)

TERMS GLOSSARY:

- *"registration"* - process of purchasing rights to use shareware product. After the registration is complete, a shareware product becomes fully functional and all the usage restrictions go away.
- *"shareware version"* - state of a shareware product before registration.
- *"full version of a shareware product"* - state of a shareware product after registration.
- *"shareware limitations"* - usage restrictions put on the shareware software by the developer. Such limitations might include: limited evaluation period, registration reminders, limited features, etc.
- *"freeware"* - software that is free to use. Freeware products might still be copyrighted.
- *"retail software"* - type of software that you need to pay for before using or trying it. An example of such software is any shelf software sold in software retail stores.

SURVEY NOTES:

1. This survey is fully CONFIDENTIAL (we do not record ANY identities). However, if you do not feel comfortable answering any of the questions below, select "N/A" for your answer.
2. This survey is targeted at shareware users. If you never used shareware do not take this survey.
3. If you are not sure about some of the numbers below, give us your best estimate.
4. This survey should take no longer than 10 min to fill out.
5. In case you get a server error page on the submission, click on the "Reload" button. The server might be busy processing other submissions at the moment.

    1. Where do you use shareware the most?
    (check one)

        Home
        Work / Business
        School:
        Other:
        N/A

    2. On average, when looking for software with certain features, what type of software do you investigate first?
    (check one)

        Freeware
        Shareware
        Retail software
        N/A

    3. Where do you get your shareware from?
    (check all that apply)

        Shareware websites
        Computer magazines
        CD collections
        Friends
        BBSs
        User groups
        Shareware racks in retail stores
        Other:
        N/A

    4. When using shareware, what limitation do you dislike?
    (5 = really hate it, ... 1 = doesn't bother me)

Limited features
Limited evaluation time
Limited number of runs
Reminders at the start or the end of the program
Randomly generated reminders
Lack of technical support
Absence of documentation
N/A

5. How long do you think an average shareware evaluation restriction should be?

   Evaluation time in weeks:
   Limit to number of runs:
   Unlimited
   N/A

6. What problems do you experience with shareware most often? (3 = Often, 2 = Sometimes, 1 = Hardly ever or never)

   Virus infections
   Installation problems
   Uninstallation problems
   Program crashes
   Insufficient set of features
   Confusing or unattractive program interface
   Lack of technical support
   Absence of documentation
   N/A

7. How many unregistered shareware programs do you use?

   Enter number:
   N/A

8. How many registered shareware programs do you use?

   Enter number:
   N/A

9. How many other retail programs do you use?

   Enter number:
   N/A

10. Most of the time, why do you register shareware? (3 = Often, 2 = Sometimes, 1 = Hardly ever or never)

    Evaluation period ran out
    I need the locked features

To gain technical support services
To acquire documentation
I agreed to the legal statement when installing the shareware
N/A

11. On average, after registering the shareware version, does the full version of the software meet your expectations?

    Yes
    No
    N/A
    Can you tell us why?

12. What do you do most of the time when your shareware runs out? (check all that apply)

    Simply stop using the software
    Try to reinstall it
    Purchase the full version
    Look for other similar shareware
    Look for other retail software
    N/A

13. What do you think is a reasonable average shareware registration fee?

    Enter amount: $
    N/A

14. Which of the methods do you feel most comfortable using, to pay the registration fees?
    (check one)

    Secured Internet transfer (https://) using credit card
    Phone call using credit card
    Check in mail
    N/A

15. On average, how would you describe the quality of shareware products?
    (check one)

    Shareware has a higher quality then retail software
    Shareware has the same quality as retail software
    Shareware has a lower quality then retail software
    N/A

16. What gender are you?

Male
Female
N/A

17. What age are you?
(check one)

Under 15 years of age
15 - 18 years of age
18 - 21 years of age
21 - 25 years of age
25 - 35 years of age
35 - 45 years of age
45 - 55 years of age
Over 55 years of age
N/A

18. What's your household income?
(check one)

Below $10,000
$10,000 - $20,000
$20,000 - $30,000
$30,000 - $40,000
$40,000 - $50,000
$50,000 - $60,000
$60,000 - $70,000
$70,000 - $80,000
$80,000 - $90,000
$90,000 - $100,000
Over $100,000
N/A

APPENDIX D: INTERVIEW QUESTIONS

1. How long have you been in the shareware industry?

2. How has you company expanded with the success of your product?

3. What type of media do you use to distribute your shareware, and why?

4. There are some limitations usually included in shareware programs. How do you choose which ones to use and why?

5. What extra features or services do you offer to your users after registration?

6. How do you decide what will be a registration fee for a shareware product?

7. At what point of the development process do you decide on the limitation included in the final product?

8. Which method of the registration fee payment has made the largest impact on the sales of your software?

9. Give us your best estimate on the number of users of the full version of your software?

10. How often do you get feedback from users and do you find it helpful?

11. Do people take advantage of your technical support?

12. Has you company adapted any software engineering models?

13. How many software developers are employed at your company and what is the average project team size?

14. What do you find are the benefits of producing the shareware version of your software?

15. If you could start the development process from the beginning again, would you do anything differently?

16. Where do you think the future of the shareware market is heading?

17. Is there any information that you feel would be useful to us?

APPENDIX E: LETTERS TO DEVELOPERS

FIRST LETTER TO DEVELOPERS

The following is the first cover letter sent to the shareware developers, requesting their participation in the Developers' Survey:

Dear Shareware Developer,

Survey URL: http://www.wpi.edu/~peterg/IQP/dev_survey.html

We are conducting a non-profit educational research on the shareware market. As a developer, you have been chosen to participate in our on-line survey. If you currently are not a shareware developer, please disregard this message. Your survey response will be left totally anonymous. However, you may request, to have your name placed in an appendix provided with the final project report as a matter of advertisement. Project results will be submitted and presented to Worcester Polytechnic Institute. We are also planning on publishing our results on all of the major shareware websites.

The research is part of our WPI Interdisciplinary Qualifying Project requirement, which is designed to investigate implications and interactions between the technology and the society. Our research consists of a detailed analysis of shareware usage in software marketing and sales. Your responses will be extremely important to the success of this project. We are conducting another survey targeted at software users, to determine their tendencies, biases, likes and dislikes on the subject of shareware. If you are interested in the results of our project, please fill out the survey and the final report will be made available to you in electronic form.

The survey is about 14 questions and will take no longer then 10 minutes to complete. The data collected from the survey is extremely important to the success of this project. Your contribution will be highly appreciated. Thank you for your time and cooperation. If you do not wish to help us, please reply to this email with the subject line "REMOVE".

Sincerely,

Kenneth Belliveau
Sebastian Jastrzebski
Peter Golaszewski
Worcester Polytechnic Institute, Worcester, MA

SECOND LETTER TO DEVELOPERS

The Following is the second cover letter sent to the developers, reminding them to fill out the Developers' Survey:

Dear Shareware Developer:

This is a follow up on the previous message we have sent to you. If you have responded to our previous email, please ignore this message. Unless you ask for more information, this is the last message you will get from us. We have acquired your e-mail address by your advertisement on WinFiles.com.

We are three undergraduate students at Worcester Polytechnic Institute. We are conducting a Junior Interdisciplinary Project on the shareware market, advised by the WPI faculty members Prof. Selkow and Prof. Hofri. It is a non-profit educational research. We would appreciate if you would take the time to fill out an online survey. Your survey response will be left totally anonymous. The project results will be presented to the department of Computer Science, Worcester Polytechnic Institute.

Our research consists of a detailed analysis of the role of shareware in software marketing, sales and purchasing. Your responses will be extremely important to the success of this project. If you are interested in the results of our project, the final report will be made available to you in an electronic form. The survey is 12 questions long
and will take no longer than 5 minutes to complete. Your contribution will be highly appreciated. Thank you for your time and cooperation.

Survey URL: http://www.wpi.edu/~peterg/IQP/dev_survey.html

Sincerely,

Kenneth Belliveau
Sebastian Jastrzebski
Peter Golaszewski
Worcester Polytechnic Institute, Worcester, MA

APPENDIX F: LETTERS TO WPI STUDENTS

FIRST LETTER TO WPI STUDENTS

The following is the cover letter sent to Worcester Polytechnic Institute students, requesting their participation in the Students' Survey:

Dear WPI Student,

We are three WPI Juniors working on our Interactive Qualifying Project. Our topic is a detailed analysis of the Shareware software market, including both views from student users as well as the software developers. Shareware is a version of software that has certain limitations. Once the registration fee is paid, full access of the program is restored. This is used by
software companies as a marketing tool. We would like to find out how a college student uses and evaluates Shareware. As a technical student attending WPI, we would like to ask you to participate in our online survey. If you currently do not use Shareware, please disregard this message.

The survey will take no more than 5 minutes to fill out. Your answers will be kept totally anonymous. Your help is very important to the success of this project. If you would like to help us out and take the survey please go to this site:

http://www.wpi.edu/~peterg/IQP/std_survey.html

Thank you very much for your time and help.

Sincerely,

Kenneth Belliveau
Sebastian Jastrzebski
Peter Golaszewski

Project Advisors
Micha Hofri
Stanley Selkow

SECOND LETTER TO WPI STUDENTS

Dear WPI Student,

We have emailed you last week, asking you to partake in our online survey on the Shareware Software market. We have gotten a lot of quality responses to this request. This message is being sent to everyone on the survey list again because the survey is totally anonymous. We apologize for the people who received our first email and have already taken the survey. We are very grateful to everyone that has filled out the survey or has decided that this survey does not pertain to them. Your help is what is going to make this project be successful. Everyone here at WPI must do an Interactive Qualifying Project to graduate. We are asking that anyone who did not take our survey, to please visit our website and take the 5-10 minutes and fill out our online form. This is the last email you will receive from us on this subject, so if you have the time, we are asking that you please fill out the survey.

The survey URL is http://www.wpi.edu/~peterg/IQP/std_survey.html

Thank you very much for your time and patience.
Again, we apologize and thank everyone who has already taken the survey.

Sincerely,

Kenneth Belliveau
Sebastian Jastrzebski
Peter Golaszewski

APPENDIX G: LETTER TO USERS

The following is the cover letter sent to the shareware users, requesting their participation in the Users' Survey:

Dear Shareware User,

We are conducting a non-profit educational research on the shareware market. You have been chosen to participate in our on-line survey. Your survey response will be left totally anonymous. In a few days you will receive another email from us, providing the survey location. If you currently are not a shareware user please disregard this message.

The project results will be submitted and presented to Worcester Polytechnic Institute. We are also planning on publishing our results on all of the major shareware websites. This research is part of our WPI Interdisciplinary Qualifying Project requirement, which is designed to investigate implications and interactions between the technology and the society. Our research consists of a detailed analysis of users' tendencies, biases, likes and dislikes on the subject of shareware. The responses gathered are extremely important to the success of this project. We are conducting another survey targeted at shareware developers, to research usage of shareware as marketing and sales tools. If you do not wish to help us, please reply to this email with the subject line "REMOVE". Thank you.

Sincerely,

Kenneth Belliveau
Sebastian Jastrzebski
Peter Golaszewski

Worcester Polytechnic Institute, Worcester, MA

APPENDIX H: LETTER TO SHAREWARE SITES

The following is the letter sent to administrators of all major shareware distribution websites, requesting that a link to our Users' Survey be included in their pages:

To Whom It May Concern:

We are three undergraduate students at Worcester Polytechnic Institute. We are conducting a Junior Interdisciplinary Project on the shareware market, advised by the WPI faculty members Prof. Hofri and Prof. Selkow. It is non-profit educational research. Our research consists of a detailed analysis of shareware usage in software marketing and sales.

We have two surveys, on which we will base our analysis: Developers' Survey and Users' Survey. Over 1200 shareware developers have already taken our survey. Over 800 of them have requested that we send them an electronic copy of our Final Report.
Since you are in charge of a well-known shareware-related website, we would like to ask you to help us reach the users audience. We would really appreciate if you could put a link to our survey page on your website. In return, we will put a link to your site in the Acknowledgments section of our Final Report. We will also send you our final research results. If you are willing to contribute to our project, please let us know. Following is the URL to our Users' Survey:

http://www.wpi.edu/~peterg/IQP/usr_survey.html

If you would like to find out more about our project, please read the project proposal located at: http://www.wpi.edu/~sebby/IQP/Proposal/Proposal.doc

Thank you for your time and consideration.

Sincerely,

Peter Golaszewski
Kenneth Belliveau
Sebastian Jastrzebski

Worcester Polytechnic Institute, Worcester, MA

APPENDIX I: LETTER TO COLLEGES

The following is the cover letter sent to the Colleges of the Worcester Consortium students (excluding WPI students), requesting their participation in the Students' Survey:

Shareware Market Research Survey

We are three students from Worcester Polytechnic Institute working on a non-profit educational research on the shareware market. Over the past two decades the software market has been enriched by the existence of shareware products. Shareware is defined as a promotional tool and is used to advertise fully featured software products. We are asking you all to participate in our on-line survey. We are surveying all of the schools in the Worcester Consortium to find out how students use and evaluate Shareware. If you choose to help us, your survey response will be left totally anonymous. If you currently are not a shareware user please disregard this message.

The project results will be submitted and presented to Worcester Polytechnic Institute. This research is part of our WPI Interdisciplinary Qualifying Project requirement, which is designed to investigate implications and interactions between technology and the society. Our research consists of a detailed analysis of users' tendencies, biases, likes and dislikes on the subject of shareware. The responses gathered are extremely important to the success of this project. We are conducting another survey targeted at shareware developers, to research usage of shareware as marketing and sales tools. Thank you for your time.

If you would like to participate in our survey, which will take no more than 5 minutes, please go to this site:

http://www.wpi.edu/~peterg/IQP/std_survey.html

For more information, the complete project proposal is available online at:

http://www.wpi.edu/~sebby/IQP/Proposal/Proposal.doc

Sincerely,

Kenneth Belliveau

Sebastian Jastrzebski

Peter Golaszewski

Project Advisors:

Stanley Selkow (sms@wpi.edu)

Micha Hofri (hofri@wpi.edu)

APPENDIX J: LETTER TO COLLEGE ADMINISTRATORS

The following is the letter sent to network administrators of the colleges in the Colleges of the Worcester Consortium requesting access to the student body mailing lists:

Good Afternoon,

We are three WPI students working on our Junior Interdisciplinary Project. Our topic is a detailed analysis of the Shareware Market. We would like to survey your student body. We are surveying all the schools in the Worcester Consortium, to find out how students use and evaluate Shareware. We have an online survey that will take no more than 5 minutes to fill out. If this is Possible, we would like the enclosed message sent to your students. If there are other policies that we need to address, please let us know. The survey is running on WPI's server, so just the cover letter with the url will need to be sent. Thank you very much for your time. If you could respond with the status of our request, it would be greatly appreciated.

Sincerely,

Kenneth Belliveau
Sebastian Jastrzebski
Peter Golaszewski

APPENDIX K: LETTER TO COMPANIES

The following is the letter sent to the companies of successful shareware products requesting their participation in telephone interviews:

Dear [SHAREWARE COMPANY NAME],

We are looking for the phone number, or email address of the main project manager of the [SHAREWARE PRODUCT] software. We are conducting a college research project on successful shareware products. Our research is advised by the Computer Science Department of Worcester Polytechnic Institute, Worcester, MA.

If you are not able to give us contact information to the project management, we would appreciate if you could give us the phone number to your Marketing Department.

If you would like to find out more about our project, please read the Project Proposal located at: http://www.wpi.edu/~sebby/IQP/Proposal/Proposal.doc
Thank you for your time.

Sincerely,

Kenneth Belliveau
Sebastian Jastrzebski
Peter Golaszewski

Worcester Polytechnic Institute, Worcester, MA

APPENDIX L: SHAREWARE SITES EMAILED

The following shareware distribution websites were asked to put a link to on their pages to our Users' Survey:

filetransit.com
jumbo.com
download.com
cnet.com
filepile.com
zd.com
alberts.com
binaries.org
bmtmicro.com
breezin.net
download.net
clicked.com
demonet.com
filemine.com
ix.netcom.com
filedudes.com
filedudes.com
filez.com
softwareshak.com
javashareware.com
mysharewarepage.com
quickfiles.com
rocketdownload.com
sharepaper.com
clinet.fi
sharewaremall.com
toocoolweb.com
magpage.com
doubleclick.net
softseek.com
tucows.com
tucows.com
winsite.com
winsite.com
softwarevault.com
softwarevault.com
attitude.net
winfiles.com

APPENDIX M: NNTP C CLIENT SOURCE CODE

The following C program was used to the download list of emails from a NNTP server:

```
/* NNTP Fetcher v.1.0        */
/* Date  : 2/11/99           */

#include <stdio.h>
#include <unistd.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/socket.h>
#include <netinet/in.h>1
#include <arpa/inet.h>
#include <netdb.h>
#include <ctype.h>
#include <errno.h>
#include <string.h>

#define BUFSIZE 10000

void BadServer (char *s) {
                char buf[BUFSIZE];
                strcpy (buf, "*** CANNOT CONNECT TO: ");
                strcat (buf, s);
                strcat (buf, "\n");
                write(fileno(stdout),buf,strlen(buf));
}

void BadConnection (char *s) {
                char buf[BUFSIZE];
                strcpy (buf, "*** LOST CONNECTION TO: ");
                strcat (buf, s);
                strcat (buf, "\n");
                write(fileno(stdout),buf,strlen(buf));
}

void BadGroup (char *s) {
                char buf[BUFSIZE];
                strcpy (buf, "*** BAD NEWSGROUP: ");
                strcat (buf, s);
                strcat (buf, "\n");
                write(fileno(stdout),buf,strlen(buf));
}

int main(int argc, char *argv[]) {
```

```
    /* Define variables */
    struct sockaddr_in sin;
struct hostent *ph;
struct servent *ps;
int s, len, a,b,p,done;
long address;
char buf[BUFSIZE];
char email[BUFSIZE];
char line[BUFSIZE];
char em[BUFSIZE];
char *host  = argv[1];
char *group = argv[2];
    int debug = 0;

    /* Check syntax */
    if (argc < 3) {
            strcpy (buf, "SYNTAX: bulk nntp_server news_group [debug]\n");
            write(fileno(stdout),buf,strlen(buf));
            return (0);
    }

    /* Check if called to debug */
    if (argc == 4) { if (!strcmp(argv[3],"debug")) debug = 1; }


             strcpy (buf, "*** READING: ");
             strcat (buf, host);
             strcat (buf, " : ");
             strcat (buf, group);
             strcat (buf, "\n");
             write(fileno(stdout),buf,strlen(buf));

    /* Prepare for connection */
    if (isdigit(host[0])) {
            if ((address = inet_addr(host)) == -1) {
                    BadServer(host);
                    return (0);
            }
            sin.sin_addr.s_addr = address;
            sin.sin_family = AF_INET;
    } else if ((ph = gethostbyname(host)) == NULL) {
            BadServer(host);
            return (0);
    } else {
            sin.sin_family = ph->h_addrtype;
            bcopy (ph->h_addr, (char *) &sin.sin_addr, ph->h_length);
    }
```

```
        /* Set the port - 119 */
        sin.sin_port = 30464;

        /* Attempt connection */
        if ((s = socket (AF_INET, SOCK_STREAM, 0)) < 0) { BadServer(host); return (0); }
        if (connect (s, (struct sockaddr *) &sin, sizeof(sin)) < 0) { BadServer(host);
return (0); }

        /* Fluch server info */
        if ((len = read(s,buf,BUFSIZE)) < 0) { BadConnection(host); return (0);     }
        if (debug) write(fileno(stdout),buf,len);
        if (buf[0] != '2') { BadServer(host); return (0); }

        /* Set the group to current */
        strcpy (buf, "GROUP ");
        strcat (buf, group);
        strcat (buf, "\n");
        if (write(s,buf,strlen(buf)) < 0) {   BadConnection(host); return (0); }
        if ((len = read(s,buf,BUFSIZE)) < 0) { BadConnection(host); return (0);     }

        if (debug) write(fileno(stdout),buf,len);

        /* Check if the group exists */
        if (buf[0] == '4') { BadGroup(group); return (0); }

        /* Loop through articles */
        do {
                strcpy (buf, "NEXT\n");
                if (write(s,buf,strlen(buf)) < 0) { BadConnection(host); return (0); }

                if ((len = read(s,buf,BUFSIZE)) < 0) { BadConnection(host); return (0); }

                if (debug) write(fileno(stdout),buf,len);

                /* Check if we got an article */
                if (buf[0] == '2') {
                        /* get the article head */
                        strcpy (buf, "HEAD\n");
                        if (write(s,buf,strlen(buf)) < 0) { BadConnection(host); return
(0); }
                        for (p=0;p<BUFSIZE;p++) buf[p]=0;
                        p = 0;
                        done = 0;
                        while (!done)
                        {
                          a = recv(s, (void *) &buf[p], 1, MSG_WAITALL);
                          if (a > 0) p++;
```

```
                    if (p>10) {
                        if (
                            (buf[p-5]==13) &&
                            (buf[p-4]==10) &&
                            (buf[p-3]==46) &&
                            (buf[p-2]==13) &&
                            (buf[p-1]==10)
                          ) done = 1;
                    }
                }
                buf[p]='\0';
                line[0]=10;
                line[1]='\0';
                done = 0;
                strcpy (email, strtok(buf,line));
                n = 0;
                while (email!=NULL && !done) {
                        n++;
                        if (n==5) done=1;
                        if (strlen(email)>10) {
                                email[5] = '\0';
                                if (strcmp (email,"From:") == 0)
                                {
                                   strcpy (em, &email[6]);
                                   strcat (em, "\n");
                                   write(fileno(stdout),em,strlen(em));
                                   done = 1;
                                }
                        }
                        if (!done) { strcpy (email, strtok(NULL,line)); }
                }
                buf[0] = '2';
            }

        } while (buf[0] == '2');
}

/* End of the source */
```

APPENDIX N: EMAILING PERL SCRIPT

The following Perl script was used to send Email messages to multiple addresses:

```
print "\n Emailer  - written for WPI C99 IQP #1024\n";
$total = 0;
$grouping = 300;
open (F, "EmailsList.tmp");
$count =0;
$emailslist = "";
while (<F>) {
   $email = $_;
   $email =~ s/ //g;
   $email =~ s/\n//g;
   if ($email ne "") {
        $count = $count + 1;
        if ($count == 1) { $emailslist = $email; }
           else { $emailslist = "$emailslist,$email";}
        if ($grouping == $count) {
              print "\n Sending mail to: $emailslist ";

################################################
format M =


.
$mailprog="sendmail -ba";
open (M,"| $mailprog $emailslist ");
print M "From: Sebastian Jastrzebski <sebby\@wpi.edu>\n";
print M "Reply-To: sebby\@wpi.edu\n";
print M  "Subject: Shareware Marketing Research\n";
print M  "\n";
print M  <<MAILEND;

[Message text]

MAILEND
close (M);
################################################

              $total = $total + $grouping;
              $count = 0;
              $emailslist = "";
              print "\n  (Emails sent so far: $total) ";
              sleep 600;
       }
```

```
   }
}
if ($count != 0) {
        print "\n Sending mail to: $emailslist ";

################################################
format M =



.
$mailprog="sendmail -ba";
open (M,"| $mailprog $emailslist ");
print M "From: Sebastian Jastrzebski <sebby\@wpi.edu>\n";
print M "Reply-To: sebby\@wpi.edu\n";
print M  "Subject: Shareware Marketing Research\n";
print M  "\n";
print M  <<MAILEND;

[Message text]

MAILEND
close (M);
################################################

        $total = $total + $count - 1;
        print "\n  (Emails sent so far: $total) ";
}
close (F);
print "\n\n DONE \n\n";
```

APPENDIX O: CGI PERL SCRIPTS

The following CGI Perl scripts were used to record the survey responses:

Users' Survey:

```
#!/usr/local/bin/perl
print "Content-type: text/html\n\n";

$s = $ENV{'QUERY_STRING'};

open (FILE, ">>usr_survey.dat");
print FILE "$s\n";
        close FILE;

open (FILE, "thanx.html");
while (<FILE>) { print "$_ \n"; }
close FILE;
```

Developers' Survey:

```
#!/usr/local/bin/perl
print "Content-type: text/html\n\n";

$s = $ENV{'QUERY_STRING'};

open (FILE, ">>dev_survey.dat");
print FILE "$s\n";
close FILE;

open (FILE, "thanx.html");
while (<FILE>) { print "$_ \n"; }
close FILE;
```

Students' Survey:

```
#!/usr/local/bin/perl
print "Content-type: text/html\n\n";

$s = $ENV{'QUERY_STRING'};

open (FILE, ">>std_survey.dat");
print FILE "$s\n";
close FILE;

open (FILE, "thanx.html");
while (<FILE>) { print "$_ \n"; }
close FILE;
```

APPENDIX P: SURVEY PREFORMATTING SCRIPT

The following Perl script was used to pre-format our survey responses data file:

```
print "\nIQP results formatter v1.0";
print "\n\n Skipping lines: none \n";
open (FILE1, "dev.txt");
open (FILE2, ">pre.txt");
print FILE2
"q1|q2|q2a|q2b|q3|q4|q5|q5a|q6|q6a|q7|q7a|q8|q8a|q9|q10|q10a|q11|q11a|q12|q12a|Email|Comm
ents\n";
$lc = 0;
while (<FILE1>) {
   $lc = $lc + 1;
   if (
        ($lc ne -1)
      )
   {
        $line = $_;
        @args = split (/&/,$line);
        @formated = ();
        foreach $arg (@args) {
               @qst = split (/=/,$arg);
               $question = @qst[0];
                $question =~ s/%(..)/pack("C",hex($1))/ge;
                $question =~ s/\+//g;
                $question =~ s/\n//g;
               $answer   = @qst[1];
                $answer   =~ s/%0D%0A/ /ig;
                $answer   =~ s/%(..)/pack("C",hex($1))/ge;
                $answer   =~ s/\|/ /g;
                $answer   =~ s/\n/ /g;
                $answer   =~ s/,/ /g;
                $answer   =~ s/\+/ /g;
                $answer   =~ s/N\/A//g;
               $n = -1;


                if ($question eq  "q1")   { $n = 0; }
                if ($question eq  "q2")   { $n = 1; }
                if ($question eq  "q2a")  { $n = 2; }
                if ($question eq  "q2b")  { $n = 3; }
                if ($question eq  "q3")   { $n = 4; }
                if ($question eq  "q4")   { $n = 5; }
                if ($question eq  "q5")   { $n = 6; }
                if ($question eq  "q5a")  { $n = 7; }
```

```
                if ($question eq  "q6")   { $n = 8; }
                if ($question eq  "q6a")   { $n = 9; }
                if ($question eq  "q7")   { $n = 10; }
                if ($question eq  "q7a")  { $n = 11; }
                if ($question eq  "q8")   { $n = 12; }
                if ($question eq  "q8a")  { $n = 13; }
                if ($question eq  "q9")   { $n = 14; }
                if ($question eq  "q10")  { $n = 15; }
                if ($question eq  "q10a") { $n = 16; }
                if ($question eq  "q11")  { $n = 17; }
                if ($question eq  "q11a") { $n = 18; }
                if ($question eq  "q12")  { $n = 19; }
                if ($question eq  "q12a") { $n = 20; }
                if ($question eq  "Email") { $n = 21; }
                if ($question eq  "comments") { $n = 22; }

                if ($n eq -1) {
                        print "\n$line";
                        print "\nERROR: \"$question\" on line $lc\n";
                        exit (0);
                }

                @formated[$n] = @formated[$n] .  $answer .  ",";
        }
        $outline = "";
        foreach $foo (@formated) {
                $outline = $outline .  $foo .  "\|";
        }
        $outline =~ s/,\|/\|/g;
        $outline =~ s/:,//g;
        $outline =~ s/:\|/\|/g;
        print FILE2 $outline .  "\n";
    }
}
close (FILE1);
close (FILE2);
```

APPENDIX Q: SHAREWARE FAQ

What is shareware?

Shareware is a marketing and distribution method. A shareware program is usually a stripped down version of the fully featured commercial software, and its purpose is to let you evaluate the software features before you decide to buy it. If you are satisfied with the preview, you can contact the shareware producer and purchase the full version of the software.

What kinds of shareware programs are available?

Shareware software is aimed at the horizontal markets. Shareware producers usually develop their software for large numbers of users. Small games and utility programs are among the most popular. You might not find shareware for more specific purposes, such as calculating space rocket trajectories. The fewer people would need to use a particular kind of software, the smaller the chances are that there is a shareware version of it.

Where can I get shareware?

Today, the most popular shareware distribution media is Internet. You can download shareware off of many World Wide Web sites, such as: http://www.shareware.com.

There are also other ways to acquire shareware:

· Computer magazines

· CD collections

· BBSs

· User groups

· Rack vendors

I paid for the shareware CD or floppy at the store. Why do I have to pay again, to make the shareware fully functional?

What you paid for is most likely the distributor fee. Shareware distributors make copies of shareware programs and put them on CDs and floppies for sale. Distributing shareware with such media costs money. When you pay for a shareware CD or floppy, you simply pay the distributor for all his or her trouble. If you decide that you want the full version of the shareware, you will need to pay the producer.

Who writes shareware?

Anybody who knows how to program can write shareware. There is a significant number of individual developers, but there are also large companies that produce shareware.

My shareware program tells me that the evaluation period ran out. What should I do?

The purpose of shareware is strictly to allow you to evaluate the software. If you like it, and would like to keep using it, you should register with the company that produced it. After you make the required payment, they will either provide you with the full version of the software, or will give you a key, to unlock the shareware and make it fully functional. You will find details on registration procedure in the documentation that comes with the shareware.

If you do not wish to buy the full version of the software after the evaluation period runs out, you must stop using the shareware and un-install it. Trying to reinstall the shareware or to crack the unlock key is ILLEGAL.

What will I gain by registering the shareware?

This depends on the shareware itself. When you register the shareware, it becomes fully functional commercial software. All usage limitations that were put on the shareware will disappear. You will get more functionality or flexibility. You might in addition gain access to technical support services, newsletters or mailing lists. To find out exactly what your shareware offers in its full version, read the documentation that comes with it, or contact the shareware producer directly.

What are the downsides of using shareware over commercial software you can buy at software retailers?

There are several possible downsides to shareware. Since shareware is often developed by individuals and simply uploaded to shareware websites, it is possible that it comes with a virus. Although most of the big shareware websites check the shareware for such problems, there are others that do not. If you got your shareware from a friend, chances for a virus increase. Commercial retail software always goes through extensive testing and debugging procedures. Shareware written by individual programmers is more likely to give you trouble such as:

· Problems with installations and un-installations

· Lack of professional documentation

· No reliable technical support

· Unexpected behavior

Can I legally pass shareware among friends?

It depends. Each shareware should come with some sort of license agreement, which states the conditions under which it can be distributed. Some shareware asks you

to agree to such conditions before you install the program. If you are not sure what are the legal conditions that come with the shareware, read the shareware documentation, or contact the producer directly.

FULL-TIME UNDERGRADUATE ENROLLMENT FROM 1975 TO 1998

	F75	F76	F77	F78	F79	F80	F81	F82	F83	F84	F85	F86	F87	F88	F89	F90	F91	F92	F93	F94	F95	F96	F97	F98
ENGINEERING																								
BIOMEDICAL	34	60				24	24	55	53	40	34	37	36	35	24	30	38	49				51	88	115
CIVIL	418	384	325	278	244	243	204	191	172	170	181	186	170	212	269	285	294	302	304	360	321	283	223	188
CHEMICAL	174	218	242	268	266	260	282	275	231	186	161	147	133	124	139	145	181	223	244	244	259	248	217	185
ELECTRICAL	417	447	481	552	542	603	671	723	822	868	859	818	743	638	597	528	515	454	460	462	443	429	425	444
ENVIRONMENTAL			10	20	22	20	17	6	3	1		2	5	4	8	15	27	36	38	18	12	11	5	4
INDUSTRIAL																						27	43	40
MECHANICAL	405	466	485	551	605	596	645	689	679	648	705	761	810	850	913	914	892	846	802	736	628	595	567	544
MANUFACTURING													23	45	61	57	49	47	35	35	34	25	13	11
UNDECLARED/ED														49	51	79	77	81	111	59	46	27	28	19
SCIENCES																								
BIOLOGY/BIOTECH	48	53	118	82	51	38	33	40	55	67	73	80	97	112	103	109	125	168	212	255	260	289	300	296
BIOCHEMISTRY															2	7	14	17	25	38	50	56	68	73
CHEMISTRY	83	79	64	72	61	43	37	43	35	35	39	38	39	34	34	35	33	42	50	50	51	46	33	35
COMPUTER SCIENCE	186	181	205	214	249	241	256	273	241	208	198	208	178	169	165	183	193	204	219	242	279	333	394	466
ES	19	17	42			1																		
MATH	106	113	84	64	47	45	37	45	51	55	52	57	62	79	76	84	84	77	82	69	66	67	52	47
PHYSICS	104	100	84	84	63	60	48	57	48	55	51	44	56	61	70	82	81	72	63	67	56	61	50	52
PM	6														7									
UNDECLARED/SC														2	2	1	2	3	5	1	1	3	0	2
OTHER																								
ECON/SOC SCI TECH	20	17	7	3	2	3		1	2	2	1	1	3	5	2	4	2	2	6	9	7	4	6	5
HUMANITIES&ARTS		3		2						1	1		2	3	2	2	5	5	4	6	6	8	9	13
INTERDISC	9	12	13	9	20	11	11	3		2	2	4	4	5	9	5	10	15	14	9	5	8	7	6
MANAGEMENT	73	66	105	124	150	156	145	132	168	141	167	155	146	123	147	116	106	109	98	85	69	62	87	114
ND/ZZ/UNDECLARED	60	52	105	71	56	37	63	39	58	60	51	110	98	47	36	26	27	33	29	17	13	11	23	12
TOTAL	2162	2268	2370	2394	2378	2381	2473	2572	2618	2539	2575	2648	2605	2597	2717	2707	2755	2785	2801	2762	2606	2644	2638	2671
ENGINEERING	1448	1575	1543	1669	1679	1746	1843	1939	1960	1913	1940	1951	1920	1957	2062	2053	2073	2038	1994	1914	1743	1696	1609	1550
	67%	69%	65%	70%	71%	73%	75%	75%	75%	75%	75%	74%	74%	75%	76%	76%	75%	73%	71%	69%	67%	64%	61%	58%
SCIENCES	552	543	597	516	471	428	411	458	430	420	413	427	432	457	459	501	532	583	656	722	763	855	897	971
	26%	24%	25%	22%	20%	18%	17%	18%	16%	17%	16%	16%	17%	18%	17%	19%	19%	21%	23%	26%	29%	32%	34%	36%
OTHER	102	98	125	138	172	170	156	136	170	146	171	160	155	136	160	127	123	131	122	109	87	82	109	138
	5%	4%	5%	6%	7%	7%	6%	5%	6%	6%	7%	6%	6%	5%	6%	5%	4%	5%	4%	4%	3%	3%	4%	5%
UNDECLARED	60	52	105	71	56	37	63	39	58	60	51	110	98	47	36	26	27	33	29	17	13	11	23	12
	3%	2%	4%	3%	2%	2%	3%	2%	2%	2%	2%	4%	4%	2%	1%	1%	1%	1%	1%	1%	0%	0%	1%	0%

NOTE: Figures are taken from the Official Fall Enrollment Report and include full-time undergraduates including students on Co-Op.

CLASS OF:	02	01	00	99	98	TR	CO-OP	UNDERGRAD TOTALS	AREAS OF STUDY*	F/T GRAD (GS)	P/T GRAD (ED/GE/AC)	GRADUATE TOTALS
ENGINEERING												
BIOMEDICAL	31	34	33	8	4	4	1	**115**	14	35	8	**43**
CIVIL	43	44	52	37	11	3	2	**192**	22	25	30	**55**
CHEMICAL	41	41	38	51	7	2	5	**185**	15	23	1	**24**
ELECTRICAL	121	122	82	73	17	10	19	**444**	88	48	47	**95**
FIRE PROTECTION										28	37	**65**
INDUSTRIAL	4	10	10	10	2	2	2	**40**	3			
MECHANICAL	135	110	144	105	25	8	17	**544**	50	58	19	**77**
MANUFACTURING	2	1	5	3	0	0	0	**11**	8	8	9	**17**
MATERIALS										17	10	**27**
UNDECLARED (ENGR)	15	4	0	0	0	2	0	**21**	17			
SCIENCES												
BIOLOGY/BIOTECH	74	83	72	48	7	10	2	**296**	13	25	2	**27**
BIOCHEMISTRY	13	18	16	17	3	3	0	**70**	11	3	0	**3**
CHEMISTRY	9	9	10	4	3	0	0	**35**	7	18	1	**19**
COMPUTER SCIENCE	168	134	71	57	13	12	11	**466**	69	70	70	**140**
MATH	9	10	10	16	1	1	0	**47**	31	17	11	**28**
PHYSICS	21	12	11	7	0	0	1	**52**	22	5	1	**6**
UNDECLARED (SC)	2	0	0	0	0	0	0	**2**	1			
OTHER												
ECON/SOC SCI TECH	2	1	2	0	0	0	0	**5**	10			
HUMANITIES	0	4	3	2	1	0	1	**11**	31			
INTERDISC	2	0	4	1	1	0	0	**8**	12	0	1	**1**
MANAGEMENT	15	29	36	23	6	2	3	**114**	29	21	129	**150**
UNDECLARED	7	3	2	0	0	1	0	**13**	8			
TOTAL	714	669	601	462	101	60	64	2671	461	401	376	777

* Upon entry, many students indicate additional Areas of Study. Each year, between 10 and 20 students graduate with two majors.

NOTES: Undergraduate data include full-time undergraduates and students on Co-Op.
Graduate data include GS (full-time) and ED/AC/GE (part-time) students.

GENDER & ETHNICITY BY FIRST MAJOR
FULL-TIME UNDERGRADUATE STUDENTS

	WHITE	%	BLACK	%	HISP	%	ASIAN	%	NATIVE AMER	%	NON-RES ALIEN	%	UNK	%	FEMALE	%	MALE	%	DEPT TOTALS
ENGINEERING																			
BIOMEDICAL	100	87%	1	1%	3	3%	6	5%	1	1%	4	3%	0	0%	60	52%	55	48%	115
CIVIL (INCL EV)	168	88%	4	2%	5	3%	3	2%	2	1%	10	5%	0	0%	48	25%	144	75%	192
CHEMICAL	158	85%	1	1%	3	2%	13	7%	0	0%	8	4%	2	1%	58	31%	127	69%	185
ELECTRICAL	334	75%	13	3%	14	3%	46	10%	4	1%	33	7%	0	0%	36	8%	408	92%	444
INDUSTRIAL	18	45%	2	5%	2	5%	1	3%	0	0%	17	43%	0	0%	7	18%	33	83%	40
MECHANICAL	471	87%	9	2%	16	3%	24	4%	0	0%	24	4%	0	0%	72	13%	472	87%	544
MANUFACTURING	8	73%	0	0%	1	9%	0	0%	0	0%	2	18%	0	0%	2	18%	9	82%	11
UNDECLARED/ED	20	95%	0	0%	0	0%	0	0%	0	0%	1	5%	0	0%	1	5%	20	95%	21
SCIENCES																			
BIOLOGY/BIOTECH	255	86%	6	2%	6	2%	17	6%	1	0%	11	4%	0	0%	169	57%	127	43%	296
BIOCHEMISTRY	63	90%	1	1%	2	3%	3	4%	0	0%	1	1%	0	0%	34	49%	36	51%	70
CHEMISTRY	34	97%	1	3%	0	0%	0	0%	0	0%	0	0%	0	0%	14	40%	21	60%	35
COMPUTER SCIENCE	397	85%	5	1%	7	2%	34	7%	1	0%	22	5%	1	0%	28	6%	438	94%	466
MATH	39	83%	1	2%	2	4%	1	2%	0	0%	3	6%	0	0%	15	32%	32	68%	47
PHYSICS	49	94%	1	2%	0	0%	2	4%	0	0%	1	2%	0	0%	1	2%	51	98%	52
UNDECLARED/SC	2	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0%	1	0%	2
OTHER																			
ECON/SOC, TECH, POL	2	40%	1	20%	0	0%	1	20%	0	0%	1	20%	0	0%	2	40%	3	60%	5
HUMANITIES	11	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	3	27%	8	73%	11
INTERDISC	5	63%	0	0%	0	0%	0	0%	0	0%	2	25%	1	13%	4	50%	4	50%	8
MANAGEMENT	83	73%	3	3%	4	4%	6	5%	1	1%	16	14%	1	1%	27	24%	87	76%	114
UNDECLARED	9	69%	0	0%	1	8%	1	8%	0	0%	1	8%	0	0%	2	15%	11	85%	13
TOTAL	2226	83%	49	2%	66	2%	158	6%	10	0%	157	6%	5	0%	584	22%	2087	78%	2671

GLOSSARY

Chi Square procedure – nonparametric inferential analysis procedure for testing whether the frequencies of category membership in the sample represent the predicted frequencies in the population. [7].

Confidence interval for a single population mean - Range of values of mean , any one of which is likely to be represented by the sample mean [7].

Continuous Scale - A scale that allows for fractional amounts of the variable being measured [7].

Correlation coefficient - A number that describes the type and strength of relation between two scores [7].

Correlational study - Procedures of finding correlation between two or more scores in the sample set [7].

Descriptive analysis - Procedures for organizing and summarizing sample data, to describe and communicate its characteristics [7].

Discrete Scale - A scale that allows for measurement only in integer amounts [7].

Freeware - software "which can be 'freely' used without payment to the author, but for which the author retains the copyright to the software" [6].

Frequency - Number of times particular score appears in the sample set [7].

Histogram - A graph similar to a bar graph but with adjacent bars touching, used to plot the range frequency distributions [7].

Inferential analysis - Procedures for determining how well the sample data and its characteristics represent the general population [7].

Linear regression - Procedure for finding best-fit line that describes linear relationship between two scores [7].

Mean (average) - The score located at the mathematical center of a distribution [7].

Central tendency - A score that summarizes the location of a distribution on a variable by indicating where the center of the distribution tends to be located. Either mean, mode or median are most of the time chosen to as the central tendency measure [7].

Median (Mdn.) - The score located at the 50^{th} percentile [7].

Mode (modal score) - The most frequently occurring score in a sample [7].

Nominal scale - A scale in which each score is used simply for identification [7].

Normal curve model - The most common model of score distribution. Describes a normal distribution of a population of scores [7].

Open software – In general, a program that has an agreement for free distribution, includes the source code, allows the distribution of both the compiled version and the source code and protects integrity of the author's source code. For more information on the open software, please visit http://www.opensource.org, or read "The Open Source definition" section of this report.

Ordinal scale (rank scale) - A scale in which scored indicate only rank order or a relative amount [7].

Parametric statistics - Inferential procedures that require certain assumptions about the parameters of the raw scores in the population, such as existence of the normal distribution. [7].

Percentile - The percentage of all scores in the sample that are at of below a particular score [7].

Population - The infinitely large group of all possible scores that would be obtained if the behavior of every individual of interest in a particular situation could be measured [7].

Positively skewed distribution - Frequency polygon with low frequency, extreme high scores but without corresponding low frequency, extreme low ones [7].

Rank scale - See Ordinal Scale.

Relationship - A correlation between two variables whereby a change in one variable is accompanied by change in the other [7].

Relative frequency - The portion of time a score occurs in a distribution, which is equal to the proportion of the total number of scores that the score's sample frequency represents [7].

Representative sample - A sample whose characteristics accurately reflect those of the population. [7].

Retail software – software that can be found on shelves of stores. Offered in wrapped boxes, giving users little chance to see how it performs.

Sample - A relatively small subset of a population intended to represent the population [7].

Scattreplot - A graph of the individual data points from a set of two scores [7].

Score - Value of a variable [7].

Semi-interquartile range - The average distance between the median and the scores at the 25^{th} and 75^{th} percentiles (the quartiles). Used to describe skewed distributions [7].

Shareware – software marketing and distribution method. A shareware program is usually a stripped down version of the fully featured commercial software, and its purpose is to let you evaluate the software features before you decide to buy it. If you are satisfied with the preview, you can contact the shareware producer and purchase the full version of the software.

Standard deviation - The statistics that communicates the average of the deviations of scores from the mean in a set of data. [7].

Variable - Anything that, when measured can produce two or more values [7].

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