

**PALM USAGE DIFFICULTIES
FOR THE
COMPUTER INSTRUCTOR CANDIDATES**

Human Computer Interaction Course

TERM PROJECT

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by

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INTRODUCTION

The information era comes with advantages and disadvantages for people. One of the disadvantages is having so much information around. So people need to organize information. The solution also comes with the new era. Electronic devices. Electronic devices are being improved everyday to ease our life.

One of these electronic devices is PDA (Personal Digital Assistant). This device helps people to organize and reorganize their daily programs. Although there are several advantages of using such devices, there are also some difficulties to use them, especially for the new users. It can be predicted that if these difficulties are overcome more people will tend to use such devices.

Usability is a fairly broad concept that basically refers to how easy it is for users to learn a system, how efficiently they can use it once they have learned it, and how pleasant it is to use (Mack & Nielsen, 1994a). Another definition of usability was mentioned by Sweeney et. al. (1991a), Usability is an emergent quality of an optimum design, which is reflected in the effective and satisfying use of IT.

Usability can be analyzed by usability tests. In case of usability tests the best results are achieved by combining empirical tests and inspections. Empirical usability measures mean that usability assessed by testing the interface with real users (Mack and Nielsen, 1994b). Mack and Nielsen also defined usability inspection methods. The researcher used the Cognitive walkthroughs method (analyzing the user's cognitive steps).

The study was conducted among the computer instructor candidates, because the researcher believes that the potential users are the advanced computer users. Also the presenters of the device for other potential users will be the computer instructors. If they have serious problems about usage of this device the potential future users may decide not to use it.

Another advantage of using such devices will be the elimination of unnecessary of computer usage. Not having knowledge or being afraid of these devices causes people to use computers as personal digital assistants. If people know that they are able to organize their days, play games, executes some programs with a more portable and cheaper machine, they may tend to use these devices.

REVIEW OF LITERATURE

The exact statement of benefits of the operating system of the device (Palm OS) is

“Palm OS makes it easy to get the things people need from a handheld. It packs the basics that everyone wants into a very small, efficient package, but also makes it easy for licensees and users to add advanced features. That's why you can find a Palm Powered handheld that's right for almost any need, from a basic handheld up to a high-powered multimedia dream machine, rugged industrial handheld, or wireless communicator.” (PalmSource, n.d.)

Palm Inc. (n.d.) states the target users of their devices as everybody in its guidelines. This is a brave statement for any corporation. But if it is possible of using by anybody, this leads may change the world, as the capabilities of the device is high. For many purposes it can be used. This paper focuses on the use of device in educational area.

The important thing is the usage of PDA's for educational purposes. Like the use of TI 92 (graphical calculator) PDAs can also be used for improving the quality of education. This can only be possible with the help of the computer instructors who are also instructional technologists. Tinker claims that the illiteracy can be overcome by the use of cheap handheld devices around the world (1999).

Staudt (2002) also have the idea of using handheld devices for educational purposes. With some peripherals variety of educational

applications can be run on these devices. By this way the students have more concrete experience especially for some of the abstract matters. For example Staudt and Tinker (1999) together studied about using these devices to teach force and accelerations to the students and got valuable results of the usability in education.

Another researcher was Curtis (2002), who works on the idea of getting handheld to the use of education. She presents the idea of using these devices both inside and outside of the class. Students conduct experiments with PDAs and peripherals such as calculating the temperature changes of a river. This is shown as a factor that increases the motivation of the students.

This paper tries to discover some usability problems of the PalmOS: the operating system of the Palm PDA device. PalmOS was taken into consideration because most of the usability problems appear in the operating system as the device is almost completely used by means of its operating system. The device only has a few hard buttons, instead it has a large screen and all activities are made by means of its touch screen. So the researcher believes that overcoming the usability problems of the operating systems will increase the potential users gradually. It is also an advantage for the company because it is simpler to upgrade the software than the hardware.

A problem as an example is the application menu. Application menu is being reached by tapping on the time area on the upper left of the screen. It is difficult to predict that the menu is reached from the time area. This function can be criticized with one of the Norman's (1998) four design principles. Good mappings design principle, which says that user can predict the result of a control button. Even it is difficult to predict that the time area is a button.

Nichols & Myers (2002) analyzed the interface of the handheld devices and proposed a solution for improve the compatibility of the interface design. They propose a dynamic interface, which can be organized by the user according to his/her wishes. By this way the user

gets the accustomed interface and have less usability problems. Another approach presented by Nichols et. al. (2003) is having PDAs as Personal Universal Controller (PDU). They think that this idea decrease the usability problems faced by the users. PDU will be used to control all the devices around the user with only one interface. With the help of PDU the user will control all devices he/she wish without any problem. This idea is also important for this study because in the near future the people may use the handheld devices as their PDU. Then it becomes more important not to have any usability problems with these devices.

Gillmor (2003) is another researcher studying with handheld computers. He considers the usability problems of these devices. He says he struggles much about the tasks other than changing the date and time. Changing the date and time comes to the user at first when the user turns on the device. So it is another perspective that the usage of the device is difficult to use while considering the human-computer interaction. He also suggests some new designs about these devices. For example he offers enlarging the screen of the devices but the cost factor must be taken into consideration.

One more study was a project studied at Berkeley University in 1998. The aim was to analyse music playback software on PDAs (Pilot Usability Test, 1998). Three students were selected to analyse the prepared software. Three tasks were given to the users with low, medium and high difficulty. Interestingly the experienced users struggled more with the software than novice users.

Another study is about text throughput speeds associated with Pocket PC input method editors. The study constructed by Commarford (2004) at University of Central Florida. Eight individuals participated to the study. They were all experienced computer users but have no or very limited experience with text entry to the handheld devices. The study compared the usability of Graffity program on Palm and Virtual Keyboard on Windows CE. Participants performed better with Virtual Keyboard but showed no preference of a program.

METHOD

If the creators of these devices are aimed to help people to organize their daily life with these machines, they should overcome their usability problems. In order to find the usability problems, the researcher conducted a study with 7 people from the 3rd grade students at Computer Education and Instructional Technology Department (CEIT) of a private university in Ankara.

To observe usability problems, between four and five evaluators appear to be sufficient in most cases to identify 80 percent of the total usability problems we are likely to identify, in some asymptotic sense, with many more inspectors (Mack and Nielsen, 1994c). In this study researcher defined the sample as 10 people because it is possible to obtain unreliable data from some of the sample. In order to have at least five reliable evaluators the sample was defined as 10 people. The researcher could not get reliable data from three of the expected participants.

The study was designed to find the problems while the device is used for the first time. The prerequisites for the participants should never have used or tried to use the device before because the usage attempts may considerably effect their performance. The sample was selected among the computer educators. Although the Palm producers claim that the device is in the market for the use of everybody, (Palm Inc., n.d.) these types of devices are generally used by the people who are not afraid of using technology. Technology friendly people are generally among the computer users as people think that computer has the most difficult usage among the technological devices. With this perspective the researcher decided to have the sample among the students of the CEIT department that he is also used to work as an assistant at that department. The sampling was convenient sampling but the aim that the researcher conducted the study with 3rd grade was being both computer-friendly and non computer-friendly in the class with adequate computer usage background.

The pilot study was conducted with an assistant of another department in Education Faculty of the same university. She was not an expert computer user but has adequate computer knowledge in order to complete the given tasks. Although she defines herself as non-familiar with computer software, she completed the tasks without provided help, after the study she emphasized the simplicity of the tasks. There was no problem stated by her about the tasks. Even she defines the complexity of the tasks as low afterwards.

Recording the behaviors of participants may lead to more accurate results as the researchers can analyze through afterwards. The disadvantages of not recording were listed as:

- There is no permanent record of the interaction to be reviewed later, hence relevant incidents may be missed or forgotten.
- The user may find it intrusive and uncomfortable to have something hovering behind them. This may affect the subject's performance.
- Observation may yields less accurate results than automatic recording methods, as the process of recording may cause the observer to miss some actions or inaccurately record the timing of events.
- Observers may produce varying amounts of data as a result of the level of detail to which they attend within the interaction.

(Sweeney, Maguire, Shackel, 1991b).

As all of the participants were in the same class, the researcher decided to conduct the study at the same time. The computer laboratory of the department was used. As it was difficult to find a real device for each participant, the emulator program was used. Also the researcher decided to keep the records of the participants as they were participating to the study at the same time some of the data might not be gathered without recording. But video recording of users' interaction also may have some disadvantages. One is poor quality video. Video may flicker, as the record rate is not the same as screens refresh rate. With some electronic devices this problem may be overcome, but the cost increases. (Sweeney et. al. 1991c). To overcome this difficulties researcher decided to use software. The software is ViewletCam 1.0 from Qarbon Company. The 30 days free evaluation period of the software used. The software eliminated

some of the problems of researcher's observation or video camera recording. All activities on the computer screen and voice of the user were captured. There was also no flickering video. By this method;

- They did not show any negative attitudes toward the screen capture program
- The participants did not show fear or anxiety of being recorded by a camera
- As they are familiar with using computer, they did not show fear or anxiety of using a device which they have never used before
- They joined the study at the same time, and this overcame their learning of the properties of the device before the study

FINDINGS

The activities of the participants were analyzed according to the time spent for tasks. Six main tasks were defined from the activity sheet. These are listed as;

1. Running and entering a note to the Memopad program
2. Getting back to the main menu
3. Entering text using Graffiti program
4. Installing Geometry program to the device
5. Using Geometry program (calculating an area of a circle)
6. Deleting the Geometry program

Table1 shows the time spent for each task by participants. Although the computer program records 10 frames a second the spending time was rounded to the nearest integer.

Table 1: Time Spent for Tasks

User/Task	Task1	Task2	Task3	Task4	Task5	Task6
User1	16	8	136	64	12	48
User2	18	7	160	55	14	41
User3	32	10	283	80	25	60
User4	23	14	200	114	18	84
User5	38	16	334	134	30	88
User6	34	14	295	146	26	108
User7	41	18	362	118	32	100

Figure 1 gives the values placed in Table 1 in a graphical way.

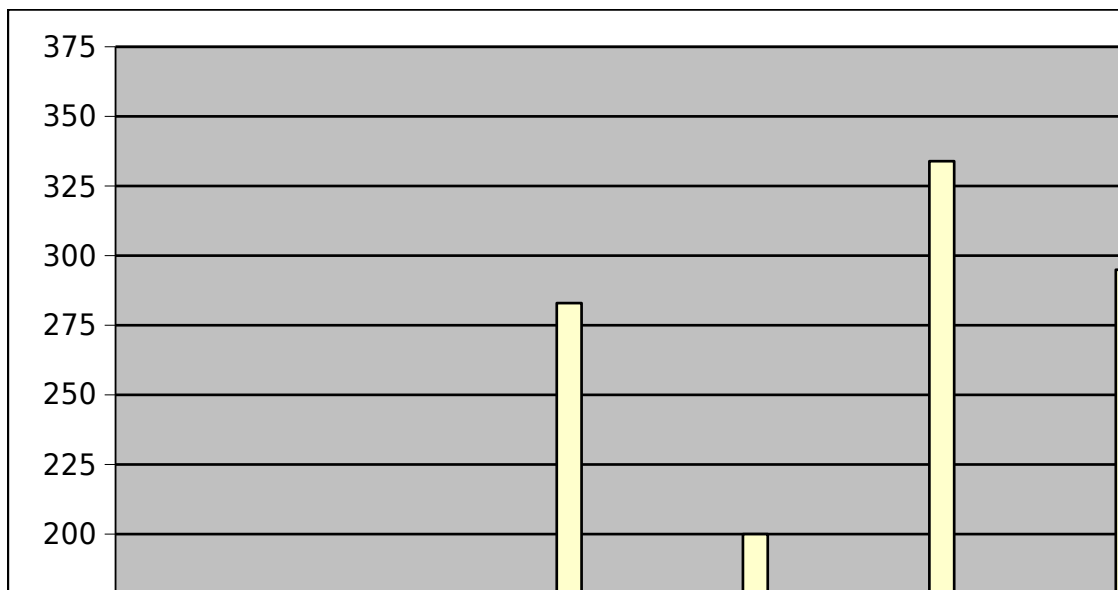


Figure 1: Time spent for tasks

The average time spent for tasks can be seen in Table 2 for each task.

Table 2: Average Time Spent for Tasks

Tasks	Average time (seconds)
Running and entering a note to the Memopad program	28,9
Getting back to the main menu	12,4
Entering text using Graffiti program	252,9
Installing Geometry program to the device	101,6
Using Geometry program (calculating an area of a circle)	22,4
Deleting the Geometry program	75,6

Also the students provided some thoughts about the usage of the PalmOS in the activity sheet given. Provided opinions by the users are listed below:

- Whatever I do the operating system does not crash. This is the best characteristic of the device for me. The desktop part is very simple in the program even if a person knows nothing about desktop system. There is nothing to confuse. It is another advantage to be able to use some peripherals for extra activities.
- The advantages of the device are being small, easy to carry, practical and easy to use and its shape. My opinion as a disadvantage is limited memory capacity.
- Using the pen of the device is difficult especially during the writing. Because you should not remove the pen from the screen while writing a character otherwise it can read the character other than you want
- Generally it is easy to use the system. But the character recognition is different. So it is a little bit difficult. The applications are also easy to use.
- In a moment only one application is running. This is the different part from windows system. But running another application is very simple. The difficult part of the system is that you have to input the characters in the way that the system request. So it is a little bit difficult to input text to the system.
- The system does not resemble the other operating system that I know. It is different and a little difficult. It is hard to understand what each button stands for. Menus and properties are also hard to understand and difficult to use. The easy part is

running the applications. But directions are another part of the system that is difficult and confusing.

- It is very simple to switch from one application to the other.

DISCUSSIONS

None of the participant has used a handheld device before. Besides all of the participants define himself/herself as good at computer usage. With the opinions of the students and 252,9 seconds for Task 3: “Entering text using Graffiti program”, it can be concluded that the expert computer users find it difficult to use the Graffiti program for text input. They struggle especially for wrong character recognition. The students do not want to spend effort to learn the writing style of the device. They want the device to recognize their own writing style.

The second most time consuming task is installing the Geometry application to the device. In fact 3 of the participants are given help to find where to install an application. This is not taken into consideration much because in the real device the applications are installed with synchronizing the device with computer. As it is not completely identical with real device situation the researcher do not make recommendations according to this result.

75,6 seconds is the time that takes the most time thirdly for the task deleting an installed application. This can be one of the most criticizing points of the usability of the device because the application menu is hidden and not easy to find. Maybe the developers think that after first one or two usage the user learns the place but it cannot be an excuse. The first opinion is very important for the people especially who are afraid of using technological devices. This hidden menu may lead to negative motivation especially for these people.

With the help of PDU the user will control all devices he/she wish without any problem. (Nichols et. al., 2003) This idea is also important for this study because in the near future the people may use the handheld devices as their PDU. Then it becomes more important not to have any usability problems with these devices.

Limitations of this study can be summarized as:

- Participants are somehow affected by each other. The time for each task is very close to each other because it was difficult to avoid interaction among the participants.
- The sample was small for generalization of the results for a large population but the researcher believes that it was enough to analyze the usability problems for target population.
- The computer laboratory of the department could be used for only one hour, as there was another class. It would be better if there were more time. In fact, the students did not complain about the time limitation.
- Detailed statistical analysis did not conducted. The statistical difference might be analyzed.

APPENDIX A

El Bilgisayarları Kullanım Problemleri Çalışması

Çalışma hakkında:

Bu çalışma Levent Emmungil tarafından PalmOS işletim sistemi içeren el bilgisayarlarının kullanım sorunlarını ortaya çıkarmak için yapılmaktadır.

Çalışma sırasında öncelikle bilgisayardaki Palm Emülatörünü (PalmOS işletim sistemini bilgisayar ortamında kullanmanızı sağlayan yazılım) kullanmanız beklenmektedir. Bu sırada yapmanız gereken işlemler sırasıyla;

1. Palm cihazını açmak
2. Ana menüye girmek
3. MemoPad programını açmak
4. Programa bir not girmek
5. Ana menüye dönmek
6. Ana menüdeki Welcome ikonuna tıklamak
7. Yönlendirmeleri izlemek
8. Graffiti programını kullanarak yazı yazmak
9. Geometry programını cihaza kurmak *
10. Geometry programını açmak
11. Geometry programını silmek
12. Cihazı kapatmak

Bu sırada ekrandaki görüntüler ve sesiniz ayrıntılı inceleme için bilgisayara kaydedilecektir. Programı kullanırken aynı zamanda düşüncelerinizi mikrofona söylemeniz gerekmektedir. Bu sayede kullanım problemleri daha rahat tanımlanacaktır.

Bu çalışmanın hiçbir aşamasında isminiz kullanılmayacak, verdiğiniz bilgiler sadece araştırma amacı ile kullanılacaktır.

Çalışma sırasında değerlendirilen siz değil cihazın kullanım özellikleridir. Sıkıntı duyduğunuz anda araştırmacıdan yardım isteyebilirsiniz.

Lütfen çalışma bittikten sonra diğer sayfadaki soruları cevaplayınız.

Çalışmamıza katıldığınız için teşekkür ederiz.

Levent Emmungil

Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Araştırma
Görevlisi

* Emülatörde gerek cihazdan farklı olarak fareye sađ tıklama yaparak program kurma menüsüne girildiđi ancak gerek cihazda sađ tıklama özelliđinin olmadığı belirtilir.

1. Bilgisayar alanında kendinizi nasıl tanımlarsınız? (zayıf, orta, ileri)

2. Daha önce bir el bilgisayarı kullandınız mı?

3. Daha önce bir el bilgisayarı emülatörü kullandınız mı?

4. Cihazın kullanımını ile ilgili düşünceleriniz nelerdir? (Size kolay veya zor gelen özellikleri)

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