PERCEPTIONS OF STUDENTS AND TEACHERS

ABOUT THE USE OF

A KID'S PROGRAMMING LANGUAGE

IN COMPUTER COURSES

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**PERCEPTIONS OF STUDENTS AND TEACHERS
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submitted by **TAYFUN AKÇAY** in partial fulfillment of the requirements for the degree of **Master of Science in Computer Education and Instructional Technology Department, Middle East Technical University** by,

Prof. Dr. Canan Özgen   _____
Dean, Graduate School of **Natural and Applied Sciences**

Prof. Dr. M. Yaşar Özden   _____
Head of Department, **Computer Education and Instructional Technology**

Prof. Dr. M. Yaşar Özden   _____
Supervisor, **Computer Education and Instructional Technology Dept. METU**

Examining Committee Members:

Assoc.Prof. Dr. Selçuk Özdemir   _____
Computer Education and Instructional Technology Dept., Gazi University

Prof. Dr. M. Yaşar Özden   _____
Computer Education and Instructional Technology Dept., METU

Dr. Cengiz Savaş Aşkun   _____
Computer Education and Instructional Technology Dept., METU

Dr. Hasan Karaaslan   _____
Computer Education and Instructional Technology Dept., METU

Dr. Ömer Delialioğlu   _____
Computer Education and Instructional Technology Dept., METU

Date: 10.12.2009

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last Name   : Tayfun AKÇAY

Signature   :

ABSTRACT

PERCEPTIONS OF STUDENTS AND TEACHERS

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IN COMPUTER COURSES

Akçay, Tayfun

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This study examined the integration of Small Basic as a new technology in computer courses of elementary schools in Turkey and investigated the perceptions of students and teachers of elementary school about the use of Small Basic in their computer courses in terms of its effects on their perceived motivation, perceived usefulness and perceived ease of use. Also, information from teachers about advantages and disadvantages of this technology, and the suggestions of teachers about the use of this technology and the content was gathered.

A case study was conducted in the form of an action research; that is, this study used components of case study by action research. The data were collected from 4th and 5th grade students of Plevene Elementary School by using a questionnaire. Also, interviews were conducted with the teachers. Descriptive statistics, frequency distributions and descriptive analysis methods were used to analyze the results.

The findings of the study showed that Small Basic is accepted by students and all teachers as a new technology. Also, students and teachers stated that using this technology affected students' perceived motivation towards computer courses positively. Moreover, the students and the teachers perceived that Small Basic is a useful and easy to use technology. Moreover, it was stated that the students and the teachers are satisfied with advantages of the use of this new technology in their learning environment.

Keywords: Kid's programming language, Small Basic, programming language courses, e-learning portal, motivation in education, technology acceptance model.

ÖZ

BİLGİSAYAR DERSLERİNDE ÇOCUK PROGRAMLAMA DİLİ

KULLANIMI İLE İLGİLİ

ÖĞRENCİ VE ÖĞRETMENLERİN ALGILARI

Akçay, Tayfun

Yüksek Lisans, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü

Tez Yöneticisi: Prof. Dr. M. Yaşar ÖZDEN

Aralık 2009, 184 sayfa

Bu çalışmada, Small Basic'in yeni bir teknoloji olarak; Türkiye'deki ilköğretim okullarının bilgisayar derslerine entegrasyonu sorgulanmıştır. Bilgisayar derslerinde Small Basic'in kullanımı hakkındaki öğrenci ve öğretmenlerin algıları, bu teknolojinin kullanımının öğrencilerin motivasyonu üzerindeki etkisi, bu teknolojinin faydalılığı ve kullanım kolaylığı araştırılmıştır. Bununla birlikte öğretmenlerden; bu teknolojinin avantajları, dezavantajları ile ilgili bilgiler toplanmıştır. Yine öğretmenlerin bu teknolojinin kullanımı ve içerik hakkındaki önerileri kendilerinden toplanmıştır.

Bu çalışmada, eylem araştırmasının bir formu olarak durum çalışması yapılmıştır. Bu çalışma, eylem araştırması çerçevesinde durum çalışmasının tüm bileşenlerini kullanır. Veriler, Plevne İlköğretim Okulu'nun 4. ve 5. sınıf öğrencilerine uygulanan bir anket aracılığıyla toplanmıştır. Öğretmenlerle de teknoloji ile ilgili mülakatlar yapılmıştır. Sonuçların analizinde ise betimsel istatistikler, frekans dağılımları ve betimsel analiz yöntemleri kullanılmıştır.

Çalışmanın bulgularına bakıldığında, öğrenci ve öğretmenlerin, bu teknolojinin kullanımının öğrenci motivasyonlarını olumlu yönde etkilediğini düşündükleri saptanmıştır. Bununla birlikte, Small Basic uygulaması yeni bir teknoloji olarak tüm öğrenci ve öğretmenler tarafından kabul edilmiştir. Tüm katılımcıların Small Basic'in faydalı ve kolay kullanılabilir bir teknoloji olduğu kanısına vardıkları anlaşılmıştır. Ek olarak, öğrenci ve öğretmenlerin öğrenim ortamlarında bu yeni teknolojiyi kullanmanın avantajlı olduğunu düşündükleri görülmüştür.

Anahtar Kelimeler: Çocuk programlama dili, Small Basic, programlama dili dersleri, e-öğrenme portalı, eğitimde motivasyon, teknoloji kabul modeli.

To my parents and brother,

Seher, Abdullah and Tolga AKÇAY

and to my wife,

Sümeyra AKÇAY

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This study is very essential for me. Teaching kid's programming languages to children was my dream and I made it real with valuable contributions of great people.

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INTRODUCTION

> *"Computer programming is tremendous fun. Like music, it is a skill that derives from an unknown blend of innate talent and constant practice. Like drawing, it can be shaped to a variety of ends – commercial, artistic, and pure entertainment. Programmers have a well-deserved reputation for working long hours but are rarely credited with being driven by creative fevers. Programmers talk about software development on weekends, vacations, and over meals not because they lack imagination, but because their imagination reveals worlds that others cannot see. "*
>
> **Larry O'Brien and Bruce Eckel**

This study aimed to investigate the perceptions of students and teachers about the use of Small Basic in computer courses. This chapter includes background of the study, purpose of the study, significance of the study, definitions of concepts and terms and the summary of the chapter.

1.1 Background of the Study

Computer technology is playing an important role in the lives of children since computers have become increasingly available almost all elementary and secondary schools across the country. According to statistics of Ministry of National Education (MONE) in 2008, there are more than 550.000 computers in elementary and secondary schools in Turkey. Computers are used in many ways in classrooms; however, today, in many schools, "computer aided instruction means making the computer teach the child" (Papert, 1993, p.5). Because of these thoughts, in the educational community, there is a great deal of negative perceptions regarding the benefits of teaching children's computer skills. Yet, it is claimed that although they meet computers and technology in early ages, still, the child computer interaction has not been optimal (Druin, 1999). Moreover, inappropriate teaching techniques and curriculums do not contribute the computer skills of children. The successful learning model is that the way a child learns to talk, and a process without organized and deliberate teaching (Papert, 1993).

Although many different approaches have been suggested for developing students' computer skills by the usage of programming languages, computer programming has not been popular and mostly ignored in computer classrooms in Turkey. The reason of this situation is based on some thoughts: programming is difficult for most children; that is, although new generation programming languages are mathematically very elegant, they are still difficult to learn and master (Kahn, 1995), it does not promote any students' skills; there is no persuasive evidence "that writing programs will automatically improve the students' creativity or general reasoning

ability or higher order cognitive skills" (Shafto, 1986, p. 297), and it is not directly related with education curriculum.

Jean Piaget's work can be cited to support that programming languages can accelerate and develop not only the computer skills but also general reasoning and problem solving skills of children. Piaget's theoretical framework is a constructionist approach to cognitive development. He claims that cognitive development is neither a direct function of biological maturation nor a direct function of learning. Moreover, Seymour Papert (1993), as Piaget, defines children that they are the active builders of their own intellectual structures. He claims that programming languages enhance this process and accelerate cognitive developments of children. According to Papert, by the experiences gained by programming languages, children will extend their skills beyond the programming environment to other problem solving areas.

Computing science continues to advance extremely rapidly. When considering the list of many programming languages, software development tools, techniques and supporting technologies which have developed in just last decade, it is obviously seen that computer science is technological profession and a field of study which needs to be promoted not only in higher education but also in secondary, elementary education. Moreover, this rapid progress is an essential key for the continuous growing in software applications that enhance the way the people live, work, communicate and do business; therefore, it is seen that this rapid progress is not likely to slow down (Schwartz, Stagner & Morrison, 2006).

The current crisis in computer science enrollment is bringing new attentions to programming languages and their development environments and for beginner programmers, it is needed and important to provide programming languages and environments which are usable and interesting (Schwartz, Stagner & Morrison, 2006). The problem which we are now faced with is that while we have distributed computing technologies everywhere so rapidly, we have spent very little time to beginner programmers in this process (Schwartz, Stagner & Morrison, 2006). Therefore, for a beginner programmer, the learning of how to code a program has become difficult, discouraging and painful resulting in decreasing the number of programmers while increasing the computers we have.

To make beginner learners of programming languages more adaptive the advance computing technologies, to decrease that learning curve as much as is possible, and to reduce the technical difficulties that beginner programmers are faced with, educational and kid's programming languages have been developed (Schwartz, Stagner & Morrison, 2006). They are programming languages that are designed primarily as a learning instrument. They are not as much as a tool for writing real world application programs. They are low level programming languages used for just educational purposes. They offer entertaining environments to beginner learners and help them to learn more professional ones easily. Since the aim is not only to enable beginners in programming field and arise interest of them, it is also essential to encourage and prepare beginners to let them use more powerful and mainstream programming languages and technologies (Papert, 1993).

Although such kinds of technologies are created to be used and they provide a lot of advantages for their users, this does not mean computer systems make the child teach and improve their performances if they are not used (Papert, 1993). According to Technology Acceptance Model (TAM), the usefulness of these types of technologies can be investigated by the indicator factors reported in perceived usefulness and perceived ease of use constructs of TAM (Davis, 1989). Therefore, it is also needed to investigate the usefulness and ease of use of these new technologies. Also, their effects on users' motivation should be also investigated carefully before integrating them into learning processes.

Moreover, although kid's programming languages are being introduced into more and more classrooms around the world, there are no studies exploring students' and teachers' perceptions about the use of kid's programming languages. Also, there is no study and usage of kid's programming languages in Turkey.

1.2   Purpose of the Study

The purpose of this study is to analyze the integration of Small Basic as a new technology in computer courses of elementary schools in Turkey. This study aimed to investigate the perceptions of students and teachers about the use of Small Basic in computer courses. After a literature review, it was concluded that there is no study about the use of this technology and this study will probably the one of the first researches on this topic.

The main purpose of the study is to investigate the perceptions of students and teachers of elementary school about the use of Small Basic in their computer courses in terms of its effects on their perceived motivation, perceived usefulness and perceived ease of use. Also, it is aimed to gather information from teachers about advantages and disadvantages of this technology. Moreover, it is aimed to get the suggestions of teachers about the use of this technology and the content. Researches indicate that when the content of the course is more involved, it is important that the teacher have a good content knowledge base to be effective in teaching the subject (Westerman, 1989) and in active learning process, learning is not a standard process, anymore; actually, it transforms into a personalized process (Akınoğlu & Tandoğan, 2007).

This study tries to answer following research questions:

Two research questions with sub-questions were asked in this study to achieve the purpose of the study.

1. How do the students perceive the use of Small Basic in their computer courses?
    1.1. How do the students perceive Small Basic in their computer courses in terms of its effects on their perceived motivation towards the computer courses?
    1.2. How do the students perceive the usefulness of Small Basic?
    1.3. How do the students perceive the ease of use of Small Basic?

2. How do the teachers of Plevne Elementary School perceive the use of the Small Basic in their computer courses?

    2.1. How do the teachers perceive Small Basic in their computer courses in terms of its effects on students' perceived motivation towards the computer courses?

    2.2. How do the teachers perceive the usefulness of Small Basic?

    2.3. How do the teachers perceive the ease of use of Small Basic?

    2.4. What are the advantages and disadvantages of the use of Small Basic in their computer courses from the teachers' point of view?

    2.5. What are the suggestions of the teachers about the use of this technology?

1.3   Significance of the Study

Computers contribute children's learning process. Also, computer programming languages creates transferable problem solving and thinking skills (Goldenson, 1996). The models based on problem-solving learning makes students active information recipients instead passive one, free self learner and problem solver (Akınoğlu & Tandoğan, 2007). Therefore, there is need for developing some computer programming courses in elementary schools. In order to provide people such skills including problem-solving in the future, effective computer programming programs may be designed both for teachers and elementary school students.

In the literature, it was hypothesized that students who learn programming languages in their early ages perform better on test of mathematical knowledge and mathematical problem solving ability (Hamada, 1986).

However, when it is looked at the elementary schools it is obviously seen that although students and teachers have computers and computer technology classrooms, they cannot gain rich benefits from using them since limited computer usage, inadequate computer hours and the computer teachers' insufficient computer programming language knowledge. Thus, teachers think that programming is not necessary to realize the educational potential of technologies and they cannot include programming topics into their lesson and cannot teach concepts of algorithms in computer literacy education.

The importance of this study is that there was no research conducted to investigate the perceptions of students and teachers of elementary schools about the use of Small Basic in their computer courses in Turkey. This study will show the perceptions of teachers' and elementary school students' about kid's programming languages. Moreover, this study will be the sample application of kid's programming languages in elementary school classrooms in Turkey for researchers and educators.

1.4   Definitions of Concepts and Terms

1.4.1   Programming Languages:

A programming language is a notation for developing program and a program is a specification of a computation or algorithm (Anthony, 1996). It is an artificial language that can be used to control the behavior of a computer and like human languages, are defined through the use of syntactic and semantic rules, to determine

structure and meaning respectively (Anthony, 1996). By using a programming language, people can command a computer to perform tasks (Bebbel, 1988). All programming languages have their own syntax and meanings which are special to them (McConnell, 1993).

1.4.2   Kid's Programming Languages:

Kid's programming languages are programming languages that are designed to be understandable and interesting for children and are used primarily as a learning instrument. They are not so much as a tool for writing real-world application programs. They are low level programming languages and they are just used for educational purposes. They offer entertaining environments to beginner learners. These programming languages also provide a base for almost all modern language such as C++, Java™, Visual Basic® and C#®, and Visual Basic® syntax (Schwartz, Stagner & Morrison, 2006). Some of the better known are Logo, Smalltalk, Basic, Phrogram™, Scratch, Popfly™, Simple and Small Basic.

1.4.3   Microsoft® Small Basic:

Microsoft® Small Basic is programming language for children. It is designed to create extremely easy, approachable and entertaining programming environment for beginners. (MSDN, 2009). Microsoft® Small Basic is a derivative and simpler version of the BASIC programming language. By including minimum amount of programming concepts, it is served an easy programming language for beginners to learn (MSDN, 2009). In this study, kid's programming language refers to Small Basic.

1.4.4   Portal:

The portal provides all online users with a single location. In portal, users can access and find all the information they need in order to perform their jobs. They can also share their resources by using this portal and access it anytime from anywhere (English, 2007).

1.4.5   Microsoft® Office SharePoint® Server:

Microsoft® Office SharePoint® Server is a complete solution for comprehensive content management, enterprise search, accelerating shared business processes and facilitating information sharing for better business purposes (Microsoft, 2009c). It helps organizations to improve their effectiveness. This collaboration and content management environment provides IT professionals and developers with the platform and tools (Microsoft, 2009c).

1.4.6   Microsoft® Learning Gateway:

Microsoft® Learning Gateway is a Web-based collaboration, communications, and content delivery framework designed for the education institutions. It enables educators to manage their administrative works, helps students to learn at their own pace, and also helps parents become more involved in their children's education (Microsoft, 2009b). It also helps to integrate many of the tools to better connect people, information, and processes. It is a learning framework and derivative of Class Server which was retired in 2007; and Microsoft® Office SharePoint® Portal Server is located at the center of it. Other Microsoft® products and third party applications are integrated to this portal to create a comprehensive and integrated solution and

also custom applications can be develop to extend the features of solution such as ITL Media Encoder (Özden, 2007).

1.4.7   Microsoft® Learning Content Development System (LCDS):

Microsoft® Learning Content Development System (LCDS) is a free tool that provide communities with content development environment to create high-quality, interactive, online courses and LCDS lets people to create e-learning courses by completing the easy-to-use LCDS templates and forms with Sharable Content Object Reference Model (SCORM) 1.2 support (Microsoft, 2009a).

1.4.8   E-Learning Portal:

E-Learning portal is a portal application, developed to deliver education-specific functionality. It integrates knowledge management, collaboration, and communications technologies (Microsoft, 2009b). It meets all e-learning objectives in one integrated environment. It allows users confidently access Web pages, conduct synchronous communications in chat sessions, join discussions in forums, share calendars and exchange e-mail messages.

1.4.9   Blended Learning:

Blended Learning is an instructional strategy combining the instructive and constructivist learning approaches (Ersoy, 2003). It is a mixed of different learning techniques, methods and resources. Then, they are used in asynchronous and synchronous learning environments. This approach combine traditional instructional methods with new advance computer aided instructional technologies and students

and teachers work together to enhance the quality of learning and teaching by using these methods and technologies (Graham, 2005). Learners and teachers can communicate and collaborate at anytime and anywhere by using the computer aided educational tools. Therefore, socially supported and constructive learning experiences are provided (Garrison & Kanuka, 2004).

1.4.10   Perception:

In this study, perception is used as a process of attaining awareness of sensory information, seeing, understanding of the tool used by teachers and students, and acquiring, interpreting and organizing the information taken by this experience.

1.4.11   Motivation:

In this study, it is an effect of tools used on learners creating intention for educational activities.

1.4.12   Students and Teachers:

In this study, students and teachers refers to the students and teachers of Plevne Elementary School.

CHAPTER 2

REVIEW OF LITERATURE

"There is nothing like looking, if you want to find something. You certainly usually find something, if you look, but it is not always quite the something you were after. "

John Ronald Reuel Tolkien

The purpose of this chapter is to present reviews of related literature in order to provide theoretical framework for this study. There are four major sections in the review of literature. The review of the literature about e-learning portal, kid's programming language, motivation in education and technology acceptance model will be presented. Also, the summary of the literature will be presented at the end.

2.1   E-Learning Portal

Nowadays, many people prefer using new technologies, especially the Internet, in their daily life for communication, information and education needs and educational technologies are becoming more and more popular among all stakeholders of learning (Inal, Karakus & Cagiltay, 2008). In educational setting, e-learning or distance education is an essential part of learning to provide better education environments and to meet the needs of learners. "One of the prominent technological developments, distance education, is eliminating border of the physical distance among learners and instructors who are far from each other" (Inal, Karakus & Cagiltay, 2008, p.63).

Nowadays, e-learning is one of the major technologies of the Internet. When considering the definition of e-learning (ENZ, 2009), it is seen that e-learning is supported by the use of learning tools and content and it involves interactivity to provide collaborative learning for learners. For example, it may include online interaction tools to enable asynchronous and synchronous learning environments between the student and their teacher or peers. These e-learning tools are usually used by Internet from any browser and technologies involving WAP phones, laptop/PC, pocket PC and PDAs and also other technologies such as videotape, video conferencing, satellite and TV broadcast, and CD-ROM (Nichols, 2008; Cavus et. al., 2006; Azetta, 2008).

Almost more than ten years, many web-based e-learning applications have emerged to be used to provide e-learning contents to distance participants; and most of them

have used a non-complex architecture and provided e-learning with a single device or browser, mainly on PCs (Azetta, 2008). Learning Management System (LMS) or Virtual Learning Environment (VLE) is a suite of e-learning tools such as Microsoft® Learning Gateway, Blackboard, WebCT, Moodle, or ITL Learning Gateway (Işık, 2009; Nichols, 2008). ITL Learning Gateway; for example, is designed to deliver tools and services. By this way, it enables schools to place students at the center of the learning experience. It also provides a secure, personalized online space for parents, teachers and students (Özden, 2007). "An LMS or VLE is the platform on which online courses or online components of courses are assembled and made available" (Nichols, 2008, p.4). LMS provides a framework for the e-learning environments. It enables the management, delivery, and tracking of learning. It is always seen that LMS is the starting point of any e-learning application. It would be better when LMS is deployed to web easily and require no additional client software. It is also important to use learning management systems in any environment. Any types of sources from different manufacturers should be supported by LMS. Also, it should be based on open standards for web deployments (Cavus et. al., 2006). Moreover, Cole states that LMS basically offers many types of tools to make a course more effective: (as cited in Uzunboylu et. al., 2006, p. 1):

- an easy way to upload and share materials,

- hold online discussions and chats,

- give quizzes and surveys,

- gather and review assignments,

- and record grades.

Microsoft® Learning Gateway is an example of a collection of e-learning tools. It is a Web-based collaboration, communications, and content delivery framework designed for the learning systems and it helps educators to manage their administrative workloads; helps students to learn at their own pace, and allow parents to become more involved in their children's education (Microsoft, 2009b). It also helps to integrate many of the tools to better connect people, information, and processes. It uses Microsoft® Office SharePoint® Portal Server at the center of the system to bring together a wide range of Microsoft® products such as Office Communication Server which provides instant messaging, audio, video conferencing and live classrooms, and also third-party products and custom applications and the examples to these applications developed in ITL labs in METU, are ITL Media Encoder, User Manager, Content Publisher and Producer and the Live Lecture (Özden, 2007). As Özden stated Live Lecture; for example as Live Meeting can be used to provide synchronous learning environment to students. It also includes Microsoft® SharePoint® Learning Kit (SLK) which is an e-learning tool. Prof. Dr. M. Yaşar Özden has also helped the localization of SLK into Turkish and he is the public license owner of it (CodePlex, 2009). This combination makes it easier for teachers to deliver both interactive and basic documents to students and provide better, collaborative and rich learning environments for them (Microsoft, 2009b).

In other words, it is an educational tool to improve teaching and making teachers involve in the learning process without removing them. Rowe states that by using a LMS, teachers do not need any skills to design web sites and they are just needed some computer literacy to write and convey their ideas using images, text or any

media on the Internet and also, they do not have to buy or install any software; just, they go to any computer, open a Web browser, and make changes in their web sites (as cited in Uzunboylu et. al., 2006). The types of tools that should be used in LMS include (Hotrum, 2005, p. 3):

- social tools to allow for self-expression (e.g., blogs, wikis, syndication protocols, etc.)

- digital repositories of personal artifacts (e-portfolios)

- tools for content interaction and collaboration (shared workspaces, collaborative tools)

- tools for connecting with instructors/ mentors/other learners (discussion forums, peer-to-peer social tools, virtual communities)

- tools for searching and ranking educational resources (search engines, semantic content filters)

- tools that engage and facilitate higher-order learning (databases, spreadsheets, simulations, expert systems, and virtual worlds)

In his study, Işık has also examined the use of e-learning and sharing portal in education activities. According to the results of his study, high number of students and teachers accepted this technology in their online learning environment. Students were also highly motivated while using this system and for that reason, students participated to these online classes by high attendance numbers (Işık, 2009).

Content is also important to convey information to learners via e-learning environments. Generally, learning objects are used in e-learning systems. They are

digital resources that can be used many times and any time in different e-learning systems (Nichols, 2008). It is important to use, exchange, manage, track and re-use these learning objects, content and data to enable them to all learning management systems (Rogers & Liddle et. al., 2007). By this purpose, US Department of Defense initiated the Advanced Distributed Learning (ADL) to develop technology enhanced learning (2009). The result of their works was a reference model for sharable content which is called the Sharable Content Object Reference Model (SCORM) (Rogers & Liddle et. al., 2007). SCORM is a series of standards and specifications for e-learning systems. It provides communications between client side content and a server system by providing set of definitions. SCORM also provides definitions for contents about how to package them into a transferable ZIP file. The standard uses XML files and definitions of contents are stored in these files. It is based on the standards set by IMS Global, Ariadne, IEEE and AICC (ADL, 2009). Although everyone is not required to be SCORM conformant, Masie offers some examples to people who would gain benefits from using aspects of SCORM (as cited in Rogers & Liddle et. al., 2007, p. 22):

- If you wish to track learner progress and mastery, and use rules to determine the learner's path through content, you will want to use SCORM "Run Time Environment" and "Sequencing."
- If you do not need to track the learner but do want to export your content to other SCORM learning management environments, you will want to use Content Packaging in the "Content Aggregation Model" part of SCORM as an interchange format.

- If you want your content to be searchable and usable in particular contexts, you will probably want to use the metadata part of the "Content Aggregation Model" for tagging your content.

Consequently, "in e-learning environments, the instructor would truly be a 'guide on the side' creating a context for learning, identifying suggested content, assisting in the development of personal learning intentions, and guiding students through a constructive engagement with the tools available. Learners would be free to explore, exchange and express themselves within this holistic learning environment or network, relying in part at least on peers to help them accomplish tasks and to learn" (Hotrum, 2005, p. 3).

2.2 Kid's Programming Language

A programming language is a notation for developing software and it is an artificial language that can be used to control the computer (Anthony, 1996). All computers use applications created by these programming languages to perform some tasks. Kid's programming languages are also programming languages; however, they are designed to be understandable and interesting for children. They are used as a learning tool and writing real-world application programs by using these tools are very difficult.

"Teachers and parents often value the time that elementary school children spend playing math drill games and using word processors because they believe that children should learn to use computers. Can we make the more creative aspects of

computer usage available to young children as well?" (Rader, Brand & Lewis, 1997, p. 351)

New, innovative and easy to learn kid's programming environments is arising. There are many studies in the literature focusing on kid's programming languages and their benefits on learning through programming. Moreover, these showed that many kid's programming languages support children's learning and their skills such as problem solving. Literature reviews indicates that computer programming languages enhance problem solving skills contributing mathematical and science knowledge. Programming languages encourage students to evaluate their mathematical concepts, and also to gather problem solving strategies (Appalanayudu & Ismail, 2005).

Problem solving forms part of thinking. It is an intellectual function and mental process, and it is defined as higher order cognitive process. Problem solving is widely used to include studies and techniques related to a wide range of higher level cognitive skills including Bloom's levels of analysis, synthesis, and evaluation (1956).

Moreover, problem solving involves an unknown situation or case that requires a resolution as it is found in programming languages. Buswell (1959) stated that for the learner, a problem deals with a new situation. Being a problem-solver requires some skills to resolve the situation. In problem solving process, learner applies their existing knowledge, skills, and concepts to a case situation in order to provide a solution (Adiguzel & Akpinar, 2004). "It was observed that problem solving usually

started as a situation in which actions had to be taken in spite of insufficient knowledge" (De Hoyos, Gray & Simpson, 2004, p. 255). However, if children are to make sense of generalized statements and classify problems to create more efficient and robust methods while solving them, then a different approach to introduce problem solving might be considered (Dougherty & Slovin, 2004).

In programming, problem solving generally involves the interpretation of the problem, creation a method to solve it, following programming procedures to achieve the result and finally, analyzing the result to see if it is an acceptable solution to the problem faced with (Polya, 2004).

George Polya's book (2004) "How to Solve It" describes methods and steps of problem solving. It suggests the following steps when solving a problem:

- First, you have to understand the problem.
- After understanding, then make a plan.
- Carry out the plan.
- Look back on your work. How could it be better?

If this technique fails or they cannot solve the problem effectively, Polya (2004) advises that "If you cannot solve a problem, then there is an easier problem you can solve: find it" or: "If you cannot solve the proposed problem try to solve first some related problem. Could you imagine a more accessible related problem?"

Kid's programming languages are low level ones and used for educational purposes. Almost all kid's programming languages provide a learning path. While they are offering more entertaining environments to beginner learners, they also help them to learn more professional programming languages easily. These educational programming languages provide a base for almost all modern language with some features of advanced languages have such as C++, Java™, Visual Basic® and C#®, and Visual Basic® syntax (Schwartz, Stagner & Morrison, 2006). Some well-known kid's programming languages are Logo, Smalltalk, Basic, Phrogram™, Scratch, Popfly™, Simple and Small Basic.

LOGO and turtle graphics which is one of the kid's programming languages and have been popularized for teaching programming to young children in elementary and secondary schools (Papert, 1993).

ToonTalk™ is another one. The main idea behind ToonTalk™ is to shift computational concepts by concrete familiar objects and therefore, young children learn the behavior of objects in ToonTalk™ quickly (Kahn, 2001).

Cleogo is other programming language which is similar to Logo. It combines the pedagogical values of peer-learning and of collaborative problem solving and it creates flexible and appropriate user-interfaces for programming, especially for children (Cockburn & Bryant, 1998).

By using the Bongo programming language, children can gain access to an environment on the Web which is designed by using constructivist approaches. It lets children easily design and implement video games and share these with others on the WWW (Begel, 1997).

Phrogram™ (formerly Kid's programming language) is another kid's programming language. Most important goal of it is to decrease that learning curve as much as is possible, and to remove the technical difficulties that beginner programmers are face with (Schwartz, Stagner & Morrison, 2006). Schwartz (2006) explains that why children and youngsters learn to program with Phrogram™:

> "Beginning programming with Phrogram™ is the easiest way to learn real programming − and many of you who want to program fun things will find that Phrogram™ does everything you need it to do, better than any other language or environment does. But if you want to graduate to other kinds of programming, like "enterprise development", you'll find that Phrogram™ has prepared you well to move on to languages like Java™ or C#® or VB. Phrogram™ is carefully designed to be as much as possible like those languages, and their programming environment. Except, of course, Phrogram™ is much easier, and much more fun!" (Schwartz, 2006, p. 5)

Microsoft® Small Basic is the latest kid's programming language to help children to learn programming concepts. It is designed to create extremely easy and approachable programming environment for beginners (MSDN, 2009). Fun is also important in Small Basic. Turtle; for example, offers an entertaining programming

experience to children. While entertaining, children can easily learn the concepts of programming.

Small Basic is a restricted version of Visual Basic® programming language. It is designed as a first programming language for future programmers. After learning programming by using Small Basic, children can easily use Visual Basic® to become more powerful in programming field. By Small Basic, it is aimed to bring down the barrier to learn programming languages and serve this programming language as a stepping stone to more professional computer programming environments (MSDN, 2009).

Microsoft® Small Basic is a derivative of the BASIC programming language; however, it is simpler than BASIC. It was introduced by Microsoft® in November 2008. By providing minimum amount of programming concepts, Microsoft® helps beginners with this easy programming language. The language has just 15 keywords, and the environment is user friendly with a clear interface (MSDN, 2009). Object specific libraries allow children to create programs in their interest areas; for example, children put the photo of the day from Flickr into their programs. By using these libraries, children can create entertaining and interactive software running on the net or on the desktop (MSDN, 2009). The system use development environment as it is found in the Microsoft® Visual Studio IDE. In this IDE, auto-completion and context sensitive help is provided. It was developed by Microsoft® DevLabs and released in November 2008 (MSDN, 2009). It is intended that audience for Small

Basic is anyone wants to learn programming. They may be children or beginner adults.

In order to help children understand and learn a new concept, and develop their cognitive skills, kid's programming languages have being developed more than 30 years. Moreover, not only students learn how to program but also several outcomes from the learning of programming have been suggested by the literature:

As Papert (1993) stated that, programming provides beginner programmers with a very fertile ground in order to make them discover and master powerful ideas and develop their thinking skills. Moreover, the discipline of programming reinforces the logical thinking the students learn in their math courses (Morgan & Sanders, 2002). By learning how to program, students can also learn problem solving strategies and experience in some courses such as mathematics; especially, geometry (Kushan, 1994).

2.3   Motivation in Education

Self directed learning is a fact of life; especially for children and plays a crucial role in student learning. Most researchers agree that students are curious, they love adventures, they go to things that interest them, they marvel at new discoveries and they ask many questions with great interest. Although motivation is an essential condition of learning, many of them lose their earlier enthusiasm and their learning processes are motivated by external directives such as grades or even well-done with stars.

Ames stated that motivation in education is deal with students' motivation to learn and "If we place a value on developing a motivation to learn in students, we are concerned with whether students initiate learning activities and maintain an involvement in learning as well as a commitment to the process of learning" (as cited in Ray, 1992, p. 4). Also, students' learning processes and behaviors can be affected by motivation (Ormrod, 2003)

It is reported in National Institute of Education (NIE) that Deci and Ryan identify three main types of behavioral motivation: intrinsic, extrinsic and amotivated. Each directs an individual's behavior at different times. (1981).

Intrinsic: NIE reports that the way young children learn through exploration and questioning is generally characteristic of intrinsic motivation (1981). The self directed learning of little children is paradigmatic of intrinsically motivated behavior. It is active, involving and open-minded. It includes surprise and wonder. It leads children toward mastery of their environments and provides them with the tools to be more self-determining (Deci & Ryan, 1981). Such learning helps children to master about their environments and they act with self-determination. For these children, the reward for an activity is the activity itself (NIE, 1981). When intrinsically motivated, the reward for the activity seems to be part and parcel with the activity itself. There is no reward separate from the spontaneous feelings and thoughts that accompany the activity. Curiosity, exploration and play are examples of this type of activity (Deci & Ryan, 1981).

Extrinsic: The learning behaviors of older children who are often more externally directed frequently reflects extrinsic motivation. This kind of learning is less likely to be marked by curiosity and interest and because of this, learning can be less than perfect or expected. The attention of these children is generally focused more on the outcome of an activity rather that the activity itself (NIE, 1981). When extrinsically motivated, people are working toward some external reward. It might be money, good grades, status, parental or teacher approval, or the avoidance of an unpleasant event (Deci & Ryan, 1981).

Amotivated: The learning of amotivated children is generally slow and painful. The children tend to be passive and they act as if they are helpless. They behave that outcomes are dictated by chance or fate and not by their own efforts. These children find it difficult to learn, they do not achieve and frequently come to feel they are worthless (NIE, 1981). Amotivated children tend to be non-responsive (Deci & Ryan, 1981).

Deci and Ryan later took their attentions to self-determination theory as other researchers and started to study people who take specific actions to succeed in a goal and situations whose people are motivated. Self-determination theory is a general theory of human motivation and it is concerned with the choices of people without any external influence (Deci & Ryan, 2002).

According to Deci and Ryan, "self-determination theory emphasizes the importance of satisfying one's needs for autonomy (deciding for oneself what to do and how to do it), competence (developing and exercising for success) and relatedness (affiliating with others)" (as cited in Brophy & Ames, 2005, p. 10). Deci and Ryan later proposed three main intrinsic needs used in self-determination. According to Deci and Ryan, they are universal, natural and psychological and these needs include the need for competence, need for autonomy (or self-determination) and the need for relatedness (Deci & Ryan, 2002).

1. **Need for Competence:** It is related to the need to experience oneself as capable. It also refers the need to competent in controlling the environment. It acknowledges students' feelings when it is necessary in order to require them to do something which they do not want to do (by allowing them know that they are aware of their feelings and by taking time to state why the requirement is necessary) (Deci & Ryan, 2002).

2. **Need for Autonomy (or Self-Determination):** It is related to the need to actively participate in determining own behavior and it provides students with meaningful rationales which will enable them to determine the purpose and personal importance of the situation; and also includes the need to experience one's actions without any external influence (Deci & Ryan, 2002).

3. **Need for Relatedness:** It is related to others. It cares others' needs. It manages the situation by using a style that emphasizes choice rather than

control and also includes the need in order to experience satisfaction in participation and involvement with the social environments (Deci & Ryan, 2002)

Moreover, effective teachers help students to create their goals, beliefs and attitudes and these contributions enable to quality involvement in learning processes; therefore, not only motivation is important because it contributes to achievement, but also it is important itself as an outcome (Ray, 1992).

Teachers play an important role in student motivation. Effective teachers need to be motivated in order to motivate their students (Ray, 1992).

Grossnickle and Thiel give a list of teacher traits that enhance effectiveness and motivation (as cited in Ray, 1992, p. 14):

1. Cooperative, democratic attitudes

2. Kindliness and consideration for the individual

3. Patience

4. Wide interests

5. Personal appearance and pleasing manner

6. Fairness and impartiality

7. Sense of humor

8. Good disposition and consistent behavior

9. Interest in pupils' problems

10. Flexibility

11. Use of recognition and praise

12. Unusual proficiency in teaching a particular subject.

Students' motivation may be enhanced if students love their teacher and feel that the teacher is a person who is caring, warm and fair (Ray, 1992).

There are many theories about motivation and many methods to apply these theories. The truth is that according to these theories, motivation is an essential condition of learning because people are always under the direction of some need or motive to learn something.

Bruner describes the relationship between motivation and learning in the following way (1966):

> "The will to learn is an intrinsic motive, one that finds both its source and its reward in its own exercise. The will to learn becomes a 'problem' only under specialized circumstances like those of a school, where a curriculum is set, students are confined, and a path fixed. The problems exist not so much in learning itself, but in the fact that what the school imposes often fails to enlist the natural energies that sustain spontaneous learning" (Bruner, 1966, p. 127).

2.4 Technology Acceptance Model

Developments in computing and information technologies are affecting the meeting and communication ways of human beings. By these developments, people are able to talk, meet and work together outside; that is, their communication ways are different from they do in traditional meeting and office spaces. Researchers also state that information technologies are also affecting the teaching and learning ways of people (as cited in Rezaei et. al., 2008). In educational institutions, it is important that how to use communication and information technologies for educational purposes. The term e-learning has been created by these purposes and it refers to any learning that occurs in technology enabled environments; that is, it is learning that is enabled by the application of digital technologies; for example, it becomes any learning that occurs on Internet (Abbad, Morris & de Nahlik, 2009). E-learning is the suitable combination of information and communication technologies to develop student-oriented, active, open, and life-long teaching-learning processes and it is also a new approach in education (as cited in Rezaei et. al., 2008).

In order to understand the users' behaviors toward information technologies, many models have been suggested: the theory of reasoned action, the technology acceptance model, the theory of planned behavior, the motivational model, self-efficacy theory and the big five (Saade, Nebebe & Tan, 2007).

In this research technology acceptance model (TAM) proposed by Davis (1989) is used.

The TAM is an derivative of the theory of reasoned action (TRA) which was introduced by Fishbein and Ajzen was specifically designed for defining user acceptance of information systems (as cited in Abbad et.al., 2009). Davis's TAM focuses on two factors: perceived usefulness and perceived ease of use (1989). According to Davis, these two factors are especially important for users (1989):

"First, people tend to use or not use an application to the extent they believe it will help them perform their job better. We refer to this first variable as perceived usefulness. Second, even if potential users believe that a given application is useful; they may, at the same time, believe that the systems is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application. That is, in addition to usefulness, usage is theorized to be influenced by perceived ease of use" (Davis, 1989, p. 320).

"The TAM posits that two factors, perceived usefulness and perceived ease of use, are of primary relevance in influencing IT acceptance behaviors. Following Davis, the posited relationship between perceived usefulness and perceived ease of use is that perceived usefulness mediates the effect of perceived ease of use on attitudes and intended use. In other words, while perceived usefulness has direct impacts on attitudes and intended use, perceived ease of use also influences attitude and use indirectly through perceived usefulness" (Abbad, Morris & de Nahlik, 2009, p. 2).

According to Davis (1989), this model contains the usefulness and ease of use of a technology, and also attitudes toward the use of technology.

The essential TAM proposes that these three variables work together to impact the actual use of technology in a given setting.

Specifically, in the following figure, Davis states that perceived usefulness and ease of use factors work together to impact one's attitude towards the technology, which, this, finally, affect the actual use of the technology (as cited in Sivo & Pan, 2005)
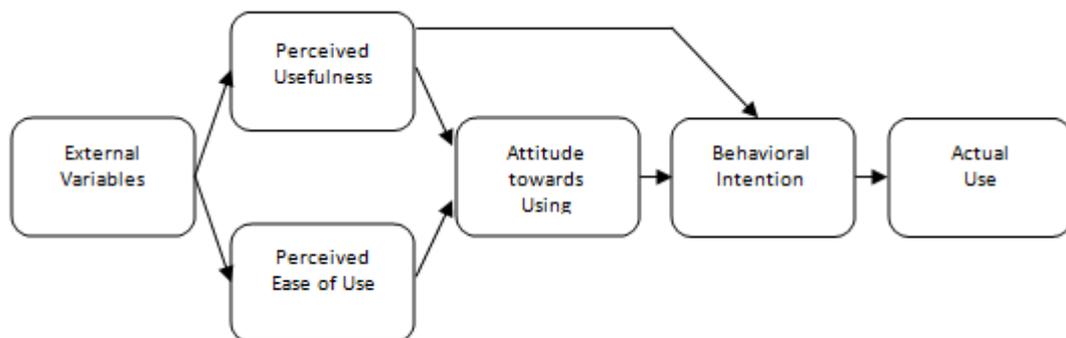
Figure 2.1   Technology Acceptance Model (TAM) (as cited in Malhotra & Galletta, 1999)

TAM is widely used by researchers in their studies to explain user acceptance of information technologies. These studies infuse TAM with a richer theoretical basis for understanding factors that might affect user adoption of a new technology

(Wright & Granger, 2001). Researchers also state that TAM offers an essential theoretical contribution in order to understand information systems' usage and acceptance (as cited in Malhotra & Galletta, 1999).

2.5   Summary

New technologies shape traditional education processes; especially, learning. These latest technologies are widely used in most educational institutions and these innovations are expanding the range of possible solutions that can improve teaching and learning (Graham, 2005). Information and communication technologies offer a possibility to apply new learning and teaching practices. By this way, participants are also familiar with the technology and easily manage their works. They are provided with the most features of e-learning such as independence from time and place, communication with teacher and peers from anywhere and anytime by being in a virtual instructional environment.

To provide better learning environments, nowadays, many people prefer using the Internet in their daily life for their communication, information and education needs (Inal, Karakus & Cagiltay, 2008). In educational setting, e-learning is an essential part of learning to provide better education environments and to meet the needs of learners. It involves interactivity to provide collaborative learning for learners. Learning is provided asynchronously and synchronously. For example, it may include online interaction tools to enable these types of learning environments

between the student and their teacher or peers. Almost more than ten years, many web-based e-learning applications have emerged (Azetta, 2008). Microsoft® Learning Gateway is an example of a collection of e-learning tools. It is an e-learning framework designed for the education institutions and helps educators, students and parents to become more involved in learning process (Microsoft, 2009b). It helps to integrate many of the tools to better connect people, information, and processes. In e-learning environments, by using Microsoft® Learning Gateway, the instructor is able to create a context for learning environments, identify offered content, assist in the determination and development of personal learning needs and intentions, and guide students in a constructivist learning environment with the tools available (Microsoft, 2009b). Learners are free to exchange, explore and express themselves within this constructivist learning environment and also, collaborate with peers to assist them to complete their tasks and to learn (Microsoft, 2009b).

Kid's programming languages can be learnt this type of blended learning environment both in classroom or e-learning setting. Kid's programming languages are also programming languages; however, they are designed to be understandable and interesting for children. They are used primarily as a learning instrument. It is mostly impossible to real-world application programs by using these languages. There are many studies in the literature focusing on kid's programming languages and their benefits on learning through programming. Researchers agree that much kid's programming languages support children's learning and their skills. These programming languages provide a starting point for more professional ones and each has been designed for students to be easy to understand and entertaining. Each

provides students with learning environments which are very similar to full professional environments. These programming languages also provide a base for almost all modern languages such as C++, Java™, Visual Basic®, and C#®. Microsoft® Small Basic is the latest kid's programming language to help children to learn programming concepts. It is designed to make programming extremely easy, approachable and fun for beginners. It is aimed to bring "fun" back to programming (MSDN, 2009).

Self directed learning is a fact of life; especially for children and plays a crucial role in student learning; especially new topics such as one of the kid's programming language; Small Basic. Most researchers agree that students are curious, they love adventures, they go to things that interest them, they marvel at new discoveries and they ask many questions with great interest. Although motivation is an essential condition of learning, many of them lose their earlier enthusiasm and their learning processes are motivated by external directives such as grades or even well-done with stars. There are many theories about motivation and many methods to apply these theories. The truth is that according to these theories, motivation is an essential condition of learning because people are always under the direction of some need or motive to learn something.

In order to use these new technologies in learning processes, learners need to be understood well. Developments in computing and information technologies are affecting the meeting and communication ways of people. They are now able to talk, meet and work together in any place. Their communication ways are different from

they do in past (as cited in Rezaei et. al., 2008). Many theoretical models have been developed to understand the users' behaviors toward information technologies such as the theory of reasoned action, the technology acceptance model, the theory of planned behavior, the motivational model, self-efficacy theory and the big five (Saade, Nebebe & Tan, 2007). The technology acceptance model (TAM); for example, proposed by Davis (1989), can be applied to different information technologies which are very new to users. According to Davis, TAM focuses on two factors: perceived usefulness and perceived ease of use; and TAM provides an important base to understand the usage and acceptance of new information technologies (1989).

CHAPTER 3

METHODOLOGY

"A great lathe operator commands several times the
wage of an average lathe operator, but a great
writer of software code is worth 10,000 times the
price of an average software writer. "
Bill Gates

In this chapter, the methodology used in this study will be provided in detail. First, overall research design of the study, participants and the context of the study will be presented. Then, instruments, data collection and data analysis procedures will be described in detail. Finally, assumptions of the researcher and the limitations of the study will be presented.

3.1   Overall Research Design

The purpose of this study is to investigate the perceptions of students and teachers of Plevne Elementary School about the use of Small Basic in computer courses. Having this purpose in mind, a case study was conducted in the form of an action research; that is, this study uses components of case study by action research (Erginel, 2006). Therefore, this research focuses on a single case - Small Basic application in computer courses that was experienced by students and teachers of Plevne Elementary School.

Case studies work with a single or a unique instance in a real situation (Cohen, Manion & Morrison, 2000). A case is a specific, unique, and integrated system which is bounded to contextual factors. A case study is defined as "a research strategy which focuses on understanding the dynamics present within single settings" (Eisenhardt, 1989, p. 534). It is also described: "the process of learning about the case and the product of our learning" (Stake, 1994, p. 237). Patton (as cited in Erginel, 2006) is also stated that the rich and detailed data that is obtained in case studies enable the researcher to understand the phenomenon in question in great depth. Case studies also provide some useful clues in order to understand specific situations and experiences which may be generalized in future researches (Tursak, 2007). It is regarded as a complex design strategy, and it investigates the phenomenon in its real life context (Robson, 2002).

Action research is a practical approach to professional examination in any social condition (Waters-Adams, 2006). The term "action research" was first employed by

Lewin (1948) referring to it "as a way of learning about organizations through trying to change them" (as cited in Erginel, 2006) and indeed, action research did not emerge in education (Lewin, 1948). However, later, it was applied to education to be used in the development of teaching and learning; and the examples in this component related to education are so particular relevance to teachers or lecturers engaged in their daily contact with children or students (Waters-Adams, 2006). The context for professional examination may change; however, the principles and processes in action research remain same with respect to the nature of the practice (Waters-Adams, 2006). Within this context, Bogdan and Biklen state that the researcher utilizes qualitative methods and processes in order to reflect on his/her experiences in the research process (as cited in Erginel, 2006). The work of Lawrence Stenhouse (1975) was the particular usage of action research in education. In that study, it was supported that curriculum development and research should belong to the teacher (Stenhouse, 1975). He also stated that teachers need to study curriculum and their works by themselves by the lights of action research (Stenhouse, 1975). Action research in education is based on the works of teachers which they experience (Waters-Adams, 2006).

Carr and Kemmis (1986) described action research as it is about the development of practice, the understanding of practice, the situation in which the practice takes in place.

Kemmis and McTaggart (1988) also defined action research as a cycle of research and action involved in four phases:

1. Planning phase: researchers, educators, staff, colleagues, and community members collaboratively observe their situation and start to ask what should be.

2. Acting phase: then, they implement a plan which was developed.

3. Observing phase: in this phase, participants are observed and data is collected.

4. Reflecting phase: reflections are declared and plan is developed with respect to their experiences gaining from their planning, acting, and observing stages.

These four particular points become a part of a cycle and the processes of each phase may be revised. Therefore, in this ongoing process of action research, changes may occur.

In this study, analysis part was also added to this cycle of processes of action research to define research questions, to examine context, to research sample projects to be used as a guide and help the processes occurred in planning stage. By this new form, it may be the sample cycle for all other researchers who use action research in their works.

3.1.1   Stages of Action Research

The purpose of this study is to investigate the perceptions of students and teachers of Plevne Elementary School about the use of Small Basic in computer courses. Having this purpose in mind, first of all, the stages of research was defined by the help of

literature reviews about action researches in education field. Especially, the study of Erginel (2006) helped a lot to build these stages. It is the published example of action research and assisted the researcher to figure out this research type in action. Then, overall research design was completed with respect to these stages.

First, in analysis part, teaching and learning practice and context were examined at the beginning of the fall semester of school. To define research questions, one specific area of interest was focused. Then, researching of sample projects to be used as a guide was started. As a participant of the study and as a participatory researcher, analysis related to problem situation was conducted in this stage. As a researcher, observations were made and contributions to the examinations of teaching and learning practice were made. Context and curriculum about computer courses were also reviewed. All these works were completed at the beginning of the fall semester of school. After defining problems in learning programming languages, researcher focused on one specific area of interest to define the research questions by the help of supervisor. After these questions were defined, researcher started to research sample projects in literature to be used as a guide to this study.

Second, in planning stage, researcher formed a detailed plan of action and decided on the time frame. Then, the resources to be used in the study were selected with respect to problems identifies and based on the needs for learning programming languages. Actually, this was the most important part of research design. Since the computer literacy level of both students and teachers were very low, this planning stage helped great to overcome this issue. In this stage, as a researcher, it was helped to prepare a

detailed plan of action and also, while deciding on the time frame used in the study. In resource selection process, the researcher offered many resources to other participants and these resources were selected with respect to needs of participants. Since the computer literacy levels of participants were very low, the contents about basic computer topics were prepared by the researcher. This was the first revision conducted by the researcher on the plan. After first implementation, it was seen that computer literacy levels of participants were not enough to conduct this study. Therefore, trainings about the learning environment and basic computer topics were prepared and conducted. Moreover, the other contents related to research problem were prepared and given to participants of the study. Phrogram™ was selected as a kid's programming language in this stage and contents about Phrogram™ were prepared. Also, the learning environment was provided in this stage to conduct these programming courses. As a researcher, by the suggestions of teachers, all hardware and software needs were met such as laptops, projection devices, servers, content development tools, e-learning environments etc... In the application of this part of stage, it was seen that Phrogram™ was the complex programming language for the study by the suggestions of participants. It was difficult to learn and teach. Since the researcher first taught the topics to teachers before students, it was figured out before conducting these lessons to students. Researcher immediately revised the plan and started to research the other resources to be used as kid's programming language. In that time, there were some delays on the time frame; however, by the defining of new kid's programming language, computer courses to students started at the right time. Small Basic was defined as new kid's programming language and course materials were immediately prepared.

After planning, plan implemented. In this section, researcher revised planning stage two times as mentioned in planning stage and then implemented the final plan. The one of the reason of this is the low computer literacy level of participants and the other reason is the more complex kid's programming language (Phrogram™) which was selected for this study before. In implementation, the researcher first taught the topics related to kid's programming language and then, teachers conducted their lessons with students. It was also taught how to use learning content development software and e-learning portal. While teaching these tools, the researcher had also helps from his colleagues. In implementation of the computer courses, the first and last computer courses were given by the researcher. Also, in the remaining lessons, the researcher helped to teachers while teaching their topics as an assistant teacher. Also, in the first parts of lab sessions, the researcher helped the teachers.

Then, in observing stage, two data collection techniques were used: Questionnaire with students and interview with teachers. Although the researcher acted in these stages as a participatory researcher and attended the classes as an assistant role, he did not involve in data collection parts of the study since he did not directly take in place in teaching activities and did not spend much time all the lessons participants attended. To avoid threats against trustworthiness of the study and not to provide incorrect information about educational activities conducted both in class and out class, researcher was not engaged in data collection part of the study as a participant.

And finally, the perceptions of the students and the teachers about the use of Small Basic were declared in Reflecting Stage.

All stages of this action research are listed in Figure 3.1.

In order to obtain students' and teachers' perceptions about Small Basic, both quantitative and qualitative methods were used. Also, in order to obtain information about advantages and disadvantage of Small Basic and suggestions of teachers about this technology, qualitative methods were used.

Analysis
- Examine your teaching and learning practice and context
- Focus on one specific area of interest to define your research question.
- Use the sample projects as a guide.

Plan
- Come up with a detailed plan of action
- Decide on the time frame
- Select the resources you will need
- Devise strategies to carry out your plan

Act
- Implement your plan
- Note any deviation from your plans (with reasons)

Observe
- Use different observation techniques (e.g. research journal, student feedback, video, recording, questionnaires, peer observation)
- Collect and analyse the data

Reflect
- Reflect critically on what has happened: challenges encountered, points to learn from, celebrate and affirm positives.
- Share your findings and reflection
- Think about how you can make further improvements

Figure 3.1   Stages of an Action Research

3.2   Research Questions

The main purpose of the study is to investigate the perceptions of students and teachers of Plevne Elementary School about the use of Small Basic in their computer courses.

Two research questions with sub-questions were asked in this study to achieve the purpose of the study.

1. How do the students perceive the use of Small Basic in their computer courses?

   1.1. How do the students perceive Small Basic in their computer courses in terms of its effects on their perceived motivation towards the computer courses?

   1.2. How do the students perceive the usefulness of Small Basic?

   1.3. How do the students perceive the ease of use of Small Basic?

2. How do the teachers of Plevne Elementary School perceive the use of the Small Basic in their computer courses?

   2.1. How do the teachers perceive Small Basic in their computer courses in terms of its effects on students' perceived motivation towards the computer courses?

   2.2. How do the teachers perceive the usefulness of Small Basic?

   2.3. How do the teachers perceive the ease of use of Small Basic?

   2.4. What are the advantages and disadvantages of the use of Small Basic in their computer courses from the teachers' point of view?

   2.5. What are the suggestions of the teachers about the use of this technology?

3.3   Participants

To meet the purpose of this study, participants were selected from public school of Ministry of National Education (MONE). Research was conducted in Plevne Elementary School located in Sincan, Ankara, Turkey whose students were not proficiency at computer courses. This was the one of two reasons why this school was selected to carry out this research. This situation is also valid almost all

elementary schools in Turkey. By this way, research can easily be generalized to all Turkey.

Moreover, Microsoft® Unlimited Potential (UP) sponsored the project and contributed the project with USD 100.000. UP's mission is to enable social and economic opportunity for everyone. To better serve this people, UP combines advanced technologies and strong partnerships with governments, international organizations, nongovernmental organizations (NGOs), educational institutions, and technology and service partners (Microsoft, 2009d). This was another reason why this school was selected in Sincan which low income families live in. Through UP, there were set up two classrooms with projection devices, electronic equipments, notebook carrying cabinets, netbooks and notebooks; and also one server room was set up. Furthermore, all school was equipped with wireless networks. 35 netbooks were given to one classroom. Another 35 notebooks were given to other classroom and two more and much qualified notebooks were given to teachers.

Seventy six students and two elementary school teachers involved in the research for six weeks to meet the purpose of this study. The participants of the study took this research in during 2008-2009 semesters. The students were 4th and 5th grade Plevne Elementary School students. There were two classrooms and seventy six students involved in the activities. However, just sixty eight of them responded to Students' Perceptions about Kid's Programming Language Questionnaire (SPKPL-Q). This is because four of them does not read and write well and the other four of them were

absent at evaluation lesson. As it is showed in Table 3.1, Twenty eight (41.2%) of them were male and forty (58.8%) of them were female.

Table 3.1   Participants: Students

GENERAL				TOTAL	
Male		**Female**			
N	**%**	**N**	**%**	**N**	**%**
28	41.2	40	58.8	68	100.0

Interviews were conducted with the teachers of these classrooms in order get their perceptions about the tool. As it is seen in table 3.2, the teachers are working in Plevne Elementary School at least four years. Also, they have been giving computer courses approximately for one year. However, they have not used any e-learning portal and programming language in their computer courses before this study. One of them is male and the other teacher is female.

Table 3.2   Characteristics of Teachers of Plevne Elementary School

Questions	Teacher 1	Teacher 2
How long have you been working as a teacher in Plevne Elementary School?	for 4 years	for 5 years
How long have you been giving computer course?	for 1 year	for 0.5 years
Have you ever used any e-learning portal before?	No	No
Have you ever used any programming language in your courses before?	No	No

3.4   Context

The study was conducted in actual field settings. In this section, learning environment will be described in detail.

3.4.1   Information about Educational Activities

In order to investigate the perceptions of students and teachers, a computer course was redesigned with respect to curriculum provided by MONE (2006). The content and the structure of this course was revised and redeveloped considering the basic principles of a kid's programming language education, and new components were integrated into it. Blended; both face to face and online learning environment were used to provide better education about Small Basic. The following section provides detailed information on how the course was developed and implemented.

3.4.1.1 Small Basic Sessions of Students

The programming sessions took place in the classrooms of school and lasted approximately two hour including one break time. The study lasted 6 weeks. Sessions were conducted once a week and students in their leisure times were free to use computers in their classrooms. Small Basic, e-learning environment, notebooks, pencils, worksheets and presentation files were provided. Moreover, web site in e-learning portal was designed for students to provide better learning environments. In order to develop students' programming skills, sessions were divided into three phases.

1st Phase - Instruction

In this short phase, teachers gave the basic concepts of Small Basic on that day's topics and introduced sections of programming tools. In this phase, students were also free to ask questions.

2nd Phase – Practices

In this phase, students made some exercises on learning topic using programming language and worked on practices provided by their teachers. Students were also able to ask questions about topic and tool.

3rd Phase – Sharing Experiences and Practicing on Problematic Issue

In this third phase, students engaged in some problematic issues provided by their teachers by using kid's programming languages. These issues were taken from real

time conditions. Students shared their ideas with pupils and tried to find better solutions to the problem case. In this phase, teachers did not provide any solution to the students and they were out in learning process. Students developed their own ways to solve the problems.

After sessions, students were able to reach lesson documents and sent their assignments via their web site in e-learning portal. They were also able to discuss course topics on this site with their friends and teachers.

3.4.1.2 Small Basic Sessions of Teachers

The programming sessions for teachers took place in the school and lasted approximately one hour, and conducted once a week. Also, teaching materials were provided via e-learning portal. Teachers were free to ask questions whenever they wanted to the researcher about kid's programming language. By this reason, there were no exact times for learning sessions except scheduled ones. Small Basic, educational materials and presentation files were provided. Teachers used web site in portal environment designed for children. In this web site, they found sections which were special to them and restricted for just their usage. In order to provide better learning materials to the students including teachers' perceptions, teachers were taught in detail on Small Basic. They were instructed on both programming languages and tool. Problematic cases were also provided such as English vocabulary.

After course sessions, teachers gave their assignments and discuss with their students about course topics via e-learning portal.

3.4.2 Information about Microsoft® SharePoint® Server and Learning Gateway

Microsoft® Office SharePoint® Server is a comprehensive solution and help organizations to improve their effectiveness. In this portal, comprehensive content management and enterprise search are provided for better business purposes and it also helps to accelerate shared business processes and facilitate information sharing (Microsoft, 2009c). Moreover, this collaboration and content management environment provides IT professionals and developers with the platform and tools and by these platform and tools, their needs for server administration, application extensibility, and interoperability are met (Microsoft, 2009c).

The Microsoft® Learning Gateway (MLG) is a rich collaborative e-learning environment for all education stakeholders. It is a powerful and extensible suite which is designed to help schools meet their priorities using a scalable framework. Since it is a flexible and extensible solution, it can be built on existing systems of schools and work securely by meeting schools' current needs (Microsoft, 2009b). Learning Gateway is built on Microsoft® SharePoint® Portal Server and integrates knowledge management, collaboration and communication technologies (Microsoft, 2009b).

Blended Learning Environment was provided for the study. Addition to Face-to-Face Lectures, participants used e- learning environment as another tool. SharePoint® Portal Server and Learning Gateway contains all known modules used in online learning and sharing environments such as discussion boards, announcements, surveys calendars etc.

In Plevne Elementary School, by using SharePoint® Portal Server and Learning Gateway capabilities, teachers were able to manage their course documents, store students' works, reports, lesson plans, and course materials in an electronic filing cabinet, manage user account information, use tasks and calendar web parts, open discussion boards, collaborate with students by using discussion boards, handle announcements, manage course syllabus, deal with assignments, collect and grade assignments, and give feedbacks to students.

Students were also able to view course documents, their tasks, course calendars, announcements and course syllabus. They were also able to discuss on open topics, view, complete and submit their assignments online, and see their feedbacks provided by their teachers. They also collaborate with others by sharing photographs, videos, and project work. Moreover, each student's files, assessments, and homework were stored in their own workspace and e-portfolio. By this way, the risk of loss was reduced and this also removed the need for students to transport files on disk, memory stick, or CD.

3.4.3   Information about Small Basic

Microsoft® Small Basic is programming language for children. It is designed to create easy, approachable and entertaining programming environment for beginners (MSDN, 2009). By Small Basic, it is aimed to bring down the barrier to learn programming languages and serve this programming language as a stepping stone to more professional computer programming environments (MSDN, 2009). Microsoft® Small Basic is a derivative of the BASIC programming language; however, it is simpler than BASIC. It was introduced by Microsoft® in November 2008. By including minimum amount of programming concepts, Microsoft® provides an easy programming language for beginners to learn. The language has only 15 keywords, and the environment is beginner friendly with a clear interface (MSDN, 2009). It was developed by Microsoft® DevLabs and released in November 2008 (MSDN, 2009). It is intended that audience for Small Basic is anyone wants to learn programming concepts. They may be children, beginner adults or even parents who want to educate their children in programming.

Small Basic was the main tool to teach programming concepts to students. It has a very simple and user-friendly interface. In just one day, students had an ability to manage all sections of the software. Students wrote codes by using this tool. While writing their codes, they used all features of this tool such as intellisense and quick tips. By using this tool, students also wrote codes in their free study times as playing a game rather than surfing in Internet. By the help of this study, tool was also localized into Turkish. All help files and user interface are now in Turkish.

Brief information about Microsoft® Small Basic is provided in Appendix E.

3.4.4   Information about Learning Content Development System (LCDS)

Microsoft® Learning Content Development System (LCDS) is a free tool that provide communities with content development environment to create high-quality and interactive online courses (Microsoft, 2009a). The LCDS lets people to create e-learning courses by completing the easy-to-use LCDS templates and forms. By this templates and forms, people can generate and publish interactive activities, highly customized content, quizzes, assessments, animations, games, demos, and other multimedia (Microsoft, 2009a). By using LCDS, the learning communities can easily develop and deliver their Web contents which support Sharable Content Object Reference Model (SCORM) 1.2. Therefore, these contents can be hosted in any learning management system.

Teachers prepared learning objects and learning materials not only computer courses to teach Small Basic but also other courses by using this tool. It has a very simple and user-friendly interface. By using this tool, teachers easily created their own e-learning materials.

By using LCDS, teachers could setup their course structures by selecting a template for each topic. They published their course materials such as pictures, images, videos and audio. They also added course related links and files by using LCDS. Before publishing their contents, they had a chance to experience their contents from the

students' point of view at any time by previewing feature of it. Then, they published their courses and distributed them to students via learning management system.

3.5   Instruments

Two instruments were used to gather data from participants in this study.

In order to obtain students' perceptions about the Small Basic, "Students' Perceptions about Kid's Programming Language Questionnaire (SPKPL-Q)" was used.

Another instrument used in the study, to obtain teachers' perceptions about the Small Basic is that "Teachers' Perception about Kid's Programming Language Interview Guide (TPKPL-IG)".

Research questions and corresponding instrument were given in the following table.

Table 3.3   Research Questions and Data Collection Tools

Research Questions	Data Collection Tools
Question 1: How do the students perceive the use of Small Basic in their computer courses?	Students' Perception about Kid's Programming Language Questionnaire (SPKPL-Q)
Question 1.1: How do the students perceive Small Basic in their computer courses in terms of its effects on their perceived motivation towards the computer courses?	
Question 1.2: How do the students perceive the usefulness of Small Basic?	
Question 1.3 How do the students perceive the ease of use of Small Basic?	
Question 2: How do the teachers of Plevne Elementary School perceive the use of Small Basic in their computer courses?	Teachers' Perception about Kid's Programming Language Interview Guide (TPKPL-IG)
Question 2.1. How do the teachers perceive Small Basic in their computer courses in terms of its effects on students' perceived motivation towards the computer courses?	
Question 2.2: How do the teachers perceive the usefulness of Small Basic?	
Question 2.3: How do the teachers perceive the ease of use of Small Basic?	
Question 2.4 What are the advantages and disadvantages of the use of Small Basic in their computer courses from the teachers' point of view?	
Question 2.5: What are the suggestions of the teachers about the use of this technology?	

3.5.1 Students' Perceptions about Kid's Programming Language Questionnaire (SPKPL-Q)

This questionnaire was adapted from the study of Tursak (2007). The study of the Tursak presented the key factors to obtain the students' perceptions about Remote Access Technology. Tursak listed 3 sub-scales. They were "perceived motivation, perceived usefulness and perceived ease of use". He found the overall reliability statistic for perception constructs as 0.946, which was an acceptable value in educational studies.

This questionnaire was used to obtain the students' perceptions about Small Basic (Appendix A and B). It was adapted and developed in English; however, since the English level of the students is very low, Turkish version of the questionnaire was used to make them understand the all questions clearly.

3.5.1.1 Questionnaire Development Process

After adaption, the questionnaire was examined by several test and subject area experts to assure the questionnaire's accuracy, clarity and validity. One test and 7 subject area experts examined the questionnaire.

First feedback was about some English technical words. Some questions contained some technical English words relevant to many users; however, irrelevant to children. Therefore, these words replaced with appropriate ones by the help of experts and technical dictionaries. Another feedback was about the question containing "user-friendly" term. Since expert thought that this might create confusion

in children's mind, it was removed from questionnaire. The other feedback about some questions containing two directions. One of the examples of these types of question is "User interfaces and messages of 'Small Basic' were clear and understandable". These questions were divided into two parts as in sentence "Messages of 'Small Basic' were clear and understandable". One of the expert found that "Programming Language Software" was irrelevant and this term was replaced with "Programming Language". Another problem was on that question: "Have you ever taken any web-supported or online course until now?" Experts stated that "online course" was enough to convey the message. Therefore, it was replaced with new one. They also revised the guidance sentences stated before section questions to make them clearer. They also revised the last section time intervals not to make them confusing on children's minds.

All of these feedbacks, some questions were revised and changed. After all revisions, English to Turkish translation was checked and the questionnaire was finalized.

3.5.1.2 Questionnaire Subscales

The questionnaire consists of 5 sections and there are 6 sub scales. These sub scales are: self reported computer competency level, self reported e-learning background, self reported usage, perceived effects on students' perceived motivation towards computer courses, perceived usefulness and perceived ease of use. Subscales, sections and their number of questions are listed in Table 3.4. First 3 sub scales contain questions about participants' background information which are self reported

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computer competency level, self reported e-learning background and self reported usage. Other 3 sub scales are aimed to get students' perceptions about Small Basic.

Table 3.4   Sub Scales, Sections and Number of Questions of SPKPL-Q

Sub Scales	Sections	Number of Questions
Self Reported Computer Competency Level	Section 1	9
Self Reported E-Learning Background	Section 2	4
Self Reported Usage	Section 5	2
Perceived Effects on Students' Perceived Motivation Towards Computer Courses	Section 3	9
Perceived Usefulness	Section 3	9
Perceived Ease of Use	Section 4	9
Total		**42**

3.5.1.3 Validity

In order to ensure the validity of the questionnaire and interview guide, its subscales and questions were revised and adapted from other questionnaire and interview guide used in previous researches (Turşak, 2007). Also, to increase the validity, it was developed by the help of experts. During the development period of the instruments, they directed the structure and the content by their feedbacks.

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3.5.1.4 Reliability

After adaption and revise of questionnaire by the help of expert feedbacks to increase the reliability of the study, the questionnaire was conducted paper-based. After data collection and analysis, the reliability coefficient alpha value was calculated as 0.927. As Hatcher (1994) stated that the recommended "minimum" level of .70 and the accepted "desirable" level of .80 for social science research. This value is high enough for reliability and widely accepted in social sciences. Number of questions and Cronbach's Alpha values for perception constructs are listed in the Table 3.5.

Table 3.5   SPKPL-Q Reliability Statistics for Perception Constructs

	Number of Items	Cronbach's Alpha
Perceived Effects on Students' Perceived Motivation Towards the Computer Courses	9	0.859
Perceived Usefulness	9	0.865
Perceived Ease of Use	9	0.806
Overall for Perception Constructs	**27**	**0.927**

3.5.2 Teachers' Perceptions about Kid's Programming Language Interview Guide (TPKPL-IG)

This interview guide, its subscales and questions was revised and adapted from the study of Tursak (2007). During the adaption and development of the instrument, expert feedbacks and directions were gathered and interview guide was revised by those feedbacks.

This interview guide was used to obtain the teachers' perceptions about Small Basic (Appendix C and D). It was adapted and developed in English; however, since the English level of the teachers is very low, Turkish version of the interview guide was used to make them understand the all questions clearly.

After development of interview guide, conceptual framework for interview data analysis was created (Yıldırım & Şimşek, 2006). The conceptual framework used in this study for descriptive analysis of interview data can be seen in following table.

Table 3.6   Conceptual Framework for Interview Data Analysis

1. Effects of the use of Small Basic on Students' Perceived Motivation towards Computer Courses
    a. Interest / Enjoyment
    b. Perceived Competence
    c. Willingness
    d. Participation

2. Perceived Usefulness
    a. Work More Quickly
    b. Job Performance
    c. Increase Productivity
    d. Make Job Easier
    e. Useful

3. Perceived Ease of Use
    a. Easy to Learn
    b. Easy to Use
    c. Easy to Become Skillful
    d. Clear and Understandable

4. Advantages and Disadvantages

5. Suggestions

3.6   Data Collection Procedures

Two instruments were used to collect data from participants.

First, questionnaire (SPKPL-Q) was used to gather data from students by quantitative methods. SPKPL-Q was delivered to students at the end of the action stage period and conducted paper-based. The response data were recorded into Excel file by using data coding procedures (Appendix B) of questionnaire. Then, data was imported into SPSS sheets from Excel to measure statistical values and to analyze. Frequencies, percentages, means and standard deviations were calculated. Different graphical charts such as histograms, bar charts and pie charts were prepared to visualize the data. As it is mentioned in reliability section, the reliability of all measurement sub scales was clearly above the recommended "minimum" level of .70 and the accepted "desirable" level of .80 for social science research (Hatcher, 1994). Also, while delivering the questionnaires, it was said to the students that the data was important and this data would contribute to the future of computer courses. Out of seventy six students, sixty eight of them responded to the questions.

Second, interview (TPKPL-IG) was used to gather data from students by qualitative methods. TPKPL-IG was delivered and conducted to teachers at the end of the action stage period. All speeches were recorded by using two sound recorders with the permission of teachers. Also, some important points were recorded into notebooks by the researcher. Then, these records were scripted carefully and to catch important point matched with notes. Finally, to analyze the qualitative data, all notes translated into English since all teachers used Turkish in interviews. Then, all data was analyzed carefully. Descriptive analysis method was used to analyze the interview data and this interview data were analyzed by using descriptive analysis approach described by Yıldırım and Şimşek (2006). According to this approach, a conceptual

framework was created. The data obtained was summarized and interpreted by using this predefined framework. This framework can be examined in result section of this study. While interviewing the teachers, it was said that the data was important and this data would contribute to the future of computer courses.

3.7 Data Analysis Procedures

The analysis of the data was composed of two major sections: quantitative and qualitative data analysis. This is because both quantitative and qualitative data collection tools were used in the study.

First research question, "How do the students perceive the use of Small Basic in their computer courses?" and sub questions were analyzed by using quantitative data analysis. Participants of this analysis were 4th and 5th grade elementary school students. SPKPL-Q was used as an instrument and descriptive statistics were used as data analysis techniques. Sections of data analysis procedures are listed in following table.

Table 3.7   Quantitative Data Analysis Procedures

Method of Analysis	Sections	Description of the Process
Quantitative	Coding	By the help of Data Coding Guide (see Appendix B), data from the SPKPL-Q were coded.
	Descriptive Statistics	Descriptive analysis of mean, frequency, percentage, and standard deviations for each question were calculated by using SPSS 16.0 software program.
	Display	Using SPSS, Excel and Word tabling features, charts and tables were created from the data.
	Conclusion Drawing	Interpretations were made by using tables and charts. Then, conclusions were drawn.

Second research question, "How do the teachers of Plevne Elementary School perceive the use of Small Basic in their computer courses?" and sub questions were analyzed by using qualitative data analysis. Participants of this analysis were class teachers of elementary school. TPKPL-IG was used as an instrument. A conceptual framework was developed and data was organized by using this conceptual framework. Stages of data analysis procedures are listed in following table.

Table 3.8   Qualitative Data Analysis Procedures

Method of Analysis	Sections	Description of the Process
Qualitative	Coding	Interview audio records and hand-written notes were scripted carefully and transferred into Microsoft® Word for subsequent analysis.
	Ordering and Displaying	A conceptual framework was developed and used with respect to main research questions and their sub-questions. Then, interview scripts were organized by using this conceptual framework.
	Conclusion Drawing	Interpretations about data were made. Conclusions were drawn. Then, they were included in the thesis.
	Verifying	Conclusions were verified by reviewing with reference to the original data.

3.8   Assumptions

In this study, the following assumptions were made:

- The participants would respond the questionnaires and interview accurately,
- The measures in the study were reliable and valid to make accurate assumptions,
- The data through all study were correctly recorded and analyzed,
- Participants interested about the study,

- Teachers interacted with students and enhanced extracurricular computer programming activities,

- Computers in classrooms were always opened to the students in the study.

- The data gathering and analysis techniques used were sufficient to provide reliable research,

- Reliability and validity of all the measurements used in this study were accurate enough to make accurate assumptions.

3.9   Limitations

The following limitations resided in the study:

- The reliability of this study is dependent on the validity of the instruments used, and the honesty of the participants' responses to the instruments,

- The study was conducted with volunteer participants,

- The results and conclusions are limited to the case investigated.

3.10   Delimitations

The delimitations of the study were the followings:

- The study was limited to sixty eight students and two elementary school teachers of Plevne Elementary School involved in the research in during 2008-2009 semesters,

- This study is limited to quality of educational activities prepared and conducted by teachers of Plevne Elementary School.

CHAPTER 4

RESULTS

"Science is the only true guide in life. "
Mustafa Kemal Atatürk

In this chapter, the results of quantitative and qualitative analysis related with students' and teachers' perceptions about the use of Small Basic that is used in computer courses are presented. The results are presented with reference to the research questions. This chapter includes the following sections: Characteristics of the participants, results of the questionnaire responses and results of interviews with the teachers.

4.1   Characteristics of Participants

4.1.1   Characteristics of the Students

As seen in the Table 4.1, there were 28 (41.2%) male and 40 (58.8%) female students participated to the study.

Table 4.1   Characteristics of the Students

	GENDER				TOTAL	
	Male		Female			
	N	%	N	%	N	%
Students participated in the study	28	41.2	40	58.8	68	100.0

4.1.1.1   Students' Computer Competency Level

According to students' self reported data about their computer competencies as shown in Table 4.2, 41.5% of students stated them self as expert in several software included in the questionnaire such as web browsers, e-mails, search engines etc... The percentage of students reported their competency level for this software as intermediate was 35.62% and that of students reporting their competency level as beginner was 7.18%.

For the competency on programming language software, 41.2% of the students reported their competencies as intermediate. According to participants' answers, the

number of intermediate students was 28, the number of expert students was 20 (29.4%) and the number of beginner students was 12 (17.6%). These numbers show that participants are mostly familiar with the programming language software.

Table 4.2   Statistics of the Students' Self-Reported Computer Competencies

	Not Used		Beginner		Intermediate		Expert	
	N	%	N	%	N	%	N	%
Web browsers	8	11.8	4	5.9	34	50.0	22	32.4
Search Engines	2	2.9	4	5.9	20	29.4	42	61.8
E-Mail	18	26.5	0	0	12	17.6	38	55.9
Online Forums & Blogs	8	11.8	10	14.7	38	55.9	12	17.6
Online Chat Applications	18	26.5	2	2.9	20	29.4	28	41.2
Microsoft® Word Applications	0	0	2	2.9	30	44.1	36	52.9
Microsoft® Excel Applications	14	20.6	10	14.7	14	20.6	30	44.1
Microsoft® PowerPoint Applications	20	29.4	0	0	22	32.4	26	38.2
Programming Language Software	8	11.8	12	17.6	28	41.2	20	29.4

4.1.1.2 Self Reported E-Learning Background

According to the results of SPKPL-Q which are shown in Table 4.3, 97.1% of the participants used Internet in their courses, 17.6% of them have taken at least one online or web-supported course before this study. The percentage of participants taken at least one web-supported programming language course before study was 17.6%. Also, the percentage of the participants who used any programming language software in their computer courses before this study was 58.8%.

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Table 4.3   Statistics of the Students' Self-Reported Experiences

	Yes		No	
	N	**%**	**N**	**%**
Have you ever taken any web-supported or online course until now?	12	17.6	56	82.4
Have you ever taken any web-supported programming language courses before this semester?	12	17.6	56	82.4
Have you ever used the internet for your course studies until now?	66	97.1	2	2.9
Have you have ever used any programming language software in your computer courses until now?	40	58.8	28	41.2
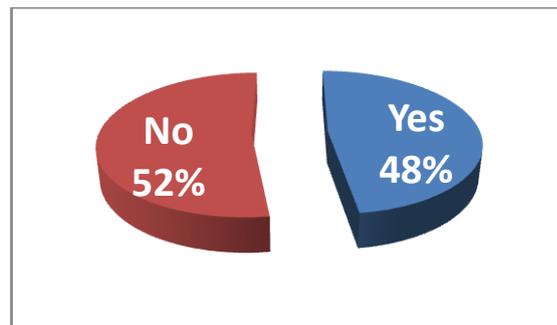
Figure 4.1   Distributions of E-Learning / Programming Language Competencies

4.1.1.3 Students' Self Reported Usage

As it is seen in Table 4.4, 44.1% of the students reported their usage as 1-3 times in a week. The percentages of participants reporting their usage as 3-5 times in a week was 23.5%. Also, 29.4% of students used the system everyday or more than one in a in a day.

Table 4.4   "How frequently did you use "Small Basic" in your computer courses?"

	N	%
Never	2	2.9
1-3 times in a week	30	44.1
3-5 times in a week	16	23.5
Everyday	12	17.6
More than one in a day	8	11.8
Total	**68**	**100.0**

According to the results of the question "How frequently did you use "Small Basic" in your out-of-class computer courses?", as it is seen in Table 4.5, 67.4% of students used the system at least once in a week.

Table 4.5   "How frequently did you use "Small Basic" in your out-of-class computer courses?"

	N	%
Never	22	32.4
1-3 times in a week	26	38.2
3-5 times in a week	12	17.6
Everyday	8	11.8
More than one in a day	0	0
Total	**68**	**100.0**

4.1.2 Characteristics of the Teachers

As it is seen in Table 4.6, the teachers are working in Plevne Elementary School at least 4 years. Also, they have been giving computer courses approximately for one year. However, they have not used any e-learning portal and programming language in their computer courses before this study.

Table 4.6   Characteristics of Teachers of Plevne Elementary School

Questions	Teacher 1	Teacher 2
How long have you been working as a teacher in Plevne Elementary School?	for 4 years	for 5 years
How long have you been giving computer course?	for 1 year	for 0.5 years
Have you ever used any e-learning portal before?	No	No
Have you ever used any programming language in your courses before?	No	No

4.2 Students' Perceptions about Small Basic (SPKPL-Q)

SPKPL-Q was conducted to obtain students' perceptions about using "Small Basic". Their perceptions were investigated in terms of three aspects: *Effects of the use of this technology in students' perceived motivation towards their computer courses, perceived usefulness and perceived ease of use.* Descriptive statistics of questions for students' perceptions about Small Basic questionnaire is provided in appendix F.

Table 4.7   Abbreviations Used for Student Perception Questions

Abbreviations	Description
SD	Strongly Disagree
D	Disagree
N	Neutral
A	Agree
SA	Strongly Agree

The scale of the questionnaire was Likert-Type and its scales and abbreviations used in this results section was listed in Table 4.7.

Table 4.8   Descriptive Statistics of Perception Constructs

	SD	D	N	A	SA	Mean	Std. Dev.
	%	%	%	%	%		
Perceived Effects on Motivation	3.7	3.3	13.5	19.4	60.2	4.29	0.735
Perceived Usefulness	4.9	4.7	6.6	25.5	58.4	4.28	0.779
Perceived Ease of Use	2.4	9.1	9.2	22.7	56.6	4.22	0.781
Overall	**3.7**	**5.7**	**9.8**	**22.5**	**58.4**	**4.26**	**0.674**

Note: Total number of participants (N) = 68

As it is shown in the Table 4.8, 79.6% of students stated positive perception whereas only 7.0% of them stated negative perception for "Perceived Effects on Motivation". Similarly, 83.9% of students stated positive perception for "Perceived Usefulness" and only 9.6% of them stated negative perception. Moreover, 79.3% of students reported positive perception about "Perceived Ease of Use" while just 11.5% of them reporting negative perception.

As a result, the mean of the questionnaire data is 4.26 with standard deviation equals to 0.674. Overall, 80.9% of students that is much more than a half of them reported positive perception whereas only 9.4% of them reporting negative perception about the use of "Small Basic".

4.2.1 Students' Perception about the Effects of the Use of Small Basic on their Motivation towards the Computer Courses

Students' perceptions about the effects of the use of "Small Basic" on their motivation towards the computer courses were investigated by the use of 9 questions grouped in 4 indicator factors. Indicator factors were "Interest / Enjoyment, Perceived Competence, Willingness and Participation".

Table 4.9   Descriptive Statistics for Sub-Factors of Perceived Motivation

	SD	D	N	A	SA	Mean	Std. Dev.
	%	%	%	%	%		
Interest / Enjoyment	6.8	2.9	11.7	12.8	65.7	4.27	0.965
Perceived Competence	0	5.9	14.7	23.5	55.9	4.29	0.931
Willingness	1.9	2.9	15.7	20.6	58.8	4.31	0.696
Participation	5.9	1.5	11.8	20.6	60.3	4.28	0.899
Overall	**3.7**	**3.3**	**13.5**	**19.4**	**60.2**	**4.29**	**0.735**

Note: Total number of participants (N) = 68

As it is presented in the Table 4.09, for "Interest / Enjoyment" questions, 78.5% of students reported positive perception whereas only 9.7% of them stated negative. Moreover, 79.4% of students stated positive perception about "Perceived Competence" questions and just 5.9% of them stated negative perceptions. Furthermore, 79.4% of students stated positive perception for "Willingness" questions while just 4.8% of them reported negative perception. Finally, 80.9% of students stated positive perception about "Participation" factor while only 7.4% of them reported negative perception.

As a result, overall mean is 4.29 with standard deviation equals to 0.735. Overall, 79.6% of students that is much more than a half of all students reported positive perception while just 7.0% of them reporting negative perception about the use of "Small Basic" on their motivation towards the computer courses.
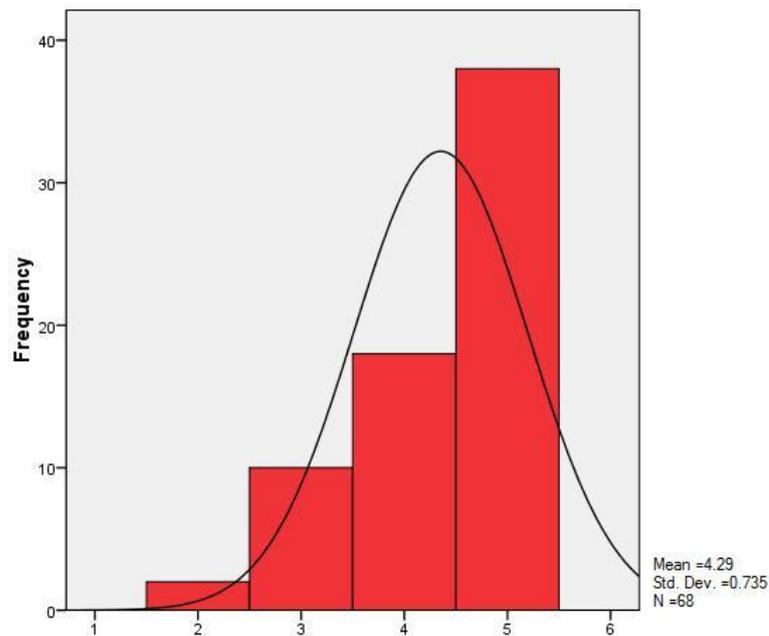
Figure 4.2 Mean Score Distribution of Students' Perceptions about the Effects of the use of Small Basic on their Motivation towards Computer Courses

As it is presented in Figure 4.2, most of the scores were located between 4.0 and 5.0. This shows that the average perceptions of the students were between "Agree" and "Strongly Agree". Also, it is clearly seen that high number of students scored 5; that is "Strongly Agree".

4.2.1.1 "Interest / Enjoyment" Factor of Perceived Motivation

Three questions were used to investigate this indicator. Question S3.04 (question 4 in section 3 of the questionnaire) were about to investigate the perceptions of the students about the effects of the use of Small Basic on their interests towards

computer courses. As it is presented in Table 4.10, 82.4% of the students reported positively whereas just 8.8% of them stated negative response for this question. In order to obtain the perceptions of the students about the effects of the use of this technology on their enjoyment in computer courses, questions S3.06 and S3.18 were used. These questions were pair questions. 76.5% of students stated positive perceptions to these questions while only 5.13% of them stating negative perception. The overall positive perception ratio for this factor is 78.5% and overall negative perception is just 9.7%. Overall, mean is equal to 4.27 and standard deviation equals to 0.965.

Table 4.10   Descriptive Statistics for "Interest / Enjoyment" Factor of Perceived Motivation

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.04 ... increased my interest on our computer courses.	2	2.9	4	5.9	6	8.8	14	20.6	42	61.8	4.32	1.057
S3.06 ... made our computer courses enjoyable.	2	2.9	2	2.9	6	8.8	8	11.8	50	73.5	4.50	0.985
S3.18 ... made our computer courses boring.	10	14.7	0	0	12	17.6	4	5.9	42	61.8	4.00	1.466
Overall	**4.7**	**6.8**	**2.0**	**2.9**	**8.0**	**11.7**	**8.7**	**12.8**	**44.7**	**65.7**	**4.27**	**0.965**

Note: Question S3.18 is a reversely coded question.

4.2.1.2 "Perceived Competence" Factor of Perceived Motivation

Only one question, S3.16 was asked to students in order to examine this indicator. As it is showed in Table 4.11, 79.4% of the students stated positive answer while just 5.9% of them stating negatively to this question. The mean score for Perceived Competence factor is equal to 4.29 with standard deviation 0.931.

Table 4.11   Descriptive Statistics for "Perceived Competence" Factor of Perceived Motivation

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.15 ... increased my satisfaction about our computer courses.	0	0	4	5.9	10	14.7	16	23.5	38	55.9	4.29	0.931
Overall	**0**	**0**	**4**	**5.9**	**10**	**14.7**	**16**	**23.5**	**38**	**55.9**	**4.29**	**0.931**

4.2.1.3 "Willingness" Factor of Perceived Motivation

To investigate this factor, three questions were asked. Question S3.07 and Question S3.17 were pair questions and aimed to obtain students' perceptions about the effects of Small Basic on their willingness. As it is presented in Table 4.12, the percentage of positive answers of these questions was 80.9% while negative ones were just 5.85%. Question S3.10 was asked to obtain students' perceptions about the effects of this technology on their Perceived Motivations towards computer courses. 76.5% of participants stated positive perceptions for that question while only 2.9% of them

stated negative perceptions. Also, 20.6% of them reported neutral. Overall, the total

ratio of positive answers of Willingness Factor is 79.4% and negative ones are 4.8%.

The overall mean score is equal to 4.31 with standard deviation, 0.696.

Table 4.12 Descriptive Statistics for "Willingness" Factor of Perceived Motivation

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.07 ... decreased my willingness to work on our computer courses.	2	2.9	2	2.9	10	14.7	16	23.5	38	55.9	4.26	1.017
S3.10 ... increased my motivation towards our computer courses.	2	2.9	0	0	14	20.6	18	26.5	34	50.0	4.21	0.971
S3.17 ... increased willingness to work on our computer courses.	0	0	4	5.9	8	11.8	8	11.8	48	70.6	4.47	0.922
Overall	**1.3**	**1.9**	**2.0**	**2.9**	**10.7**	**15.7**	**14.0**	**20.6**	**40.0**	**58.8**	**4.31**	**0.696**

Note: Question S3.07 is a reversely coded question.

4.2.1.4 "Participation" Factor of Perceived Motivation

In order to examine this factor, two questions were asked. Question S3.03 was about

the effects of Small Basic on their participation to their computer courses. As it is

presented in Table 4.13, 76.4% of the students answered to this question positively while only 5.8% of them stated negative responses. To investigate the effects of the use of this tool on their study time in their computer courses, question 3.11 was asked. The percentage of positive answers was 85.3% while negative answers were just 8.8%. Overall, 80.9% of participants answered positively to these questions of Participation Factor and just 7.4% of them answered negatively. The overall mean score for this factor was 4.28 with standard deviation equals to 0.899.

Table 4.13 Descriptive Statistics for "Participation" Factor of Perceived Motivation

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.03 ... increased my participation to our computer courses.	2	2.9	2	2.9	12	17.6	12	17.6	40	58.8	4.26	1.045
S3.11 ... increased my study time on our computer courses.	6	8.8	0	0	4	5.9	16	23.5	42	61.8	4.29	1.185
Overall	**4.0**	**5.9**	**1.0**	**1.5**	**8.0**	**11.8**	**14.0**	**20.6**	**41.0**	**60.3**	**4.28**	**0.899**

4.2.2 Students' Perceptions about Usefulness

Students' perceptions about the usefulness of "Small Basic" were investigated by the use of 9 questions grouped in 6 indicator factors reported in Perceived Usefulness

construct of Technology Acceptance Model (Davis, 1989). Indicator factors were "Work More Quickly, Job Performance, Increase Productivity, Effectiveness, Makes Job Easier and Useful", and descriptive statistics for those factors obtained from the results of SPKPL-Q reported in the table 4.14.

Table 4.14   Descriptive Statistics for Sub-Factors of Perceived Usefulness

	SD	D	N	A	SA	Mean	Std. Dev.
	%	%	%	%	%		
Work More Quickly	8.9	4.4	5.9	20.6	60.3	4.19	1.022
Job Performance	5.9	8.8	10.3	23.6	51.5	4.06	0.998
Increase Productivity	5.9	0	8.8	35.3	50	4.24	1.038
Effectiveness	2.9	5.9	2.9	23.5	64.7	4.41	1.011
Makes Job Easier	5.9	2.9	8.8	26.5	55.9	4.24	1.121
Useful	0	5.9	2.9	23.6	67.7	4.53	0.753
Overall	**4.9**	**4.7**	**6.6**	**25.5**	**58.4**	**4.28**	**0.779**

Note: Total number of participants (N) = 68

As it is shown in the Table 4.14, for "Useful" variables of perceived usefulness factor of Small Basic, students reported most positive responses with the percentage of 91.3%. For "Work More Quickly" questions, 80.9% of students reported positive perception whereas 13.3% of them stated negative. Moreover, 75.1% of students stated positive perception about "Job Performance" questions and 14.7% of them stated negative perceptions. Furthermore, 85.3% of students reported positive

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perception for "Increase Productivity" questions while just 5.9% of them reported negative perception. Also, for "Effectiveness" indicator, the percentage of positive responses was 88.2% and the percentage of negative ones were just 8.8%. Finally, 82.4% of students stated positive perception about "Makes Job Easier" factor while only 8.8% of them reported negative perception.

As a result, overall mean is 4.28 with standard deviation equals to 0.779. Overall, 83.9% of students; that is much more than a half of all students reported positive perception while just 9.6% of them reporting negative perception about "Perceived Usefulness" of Small Basic.
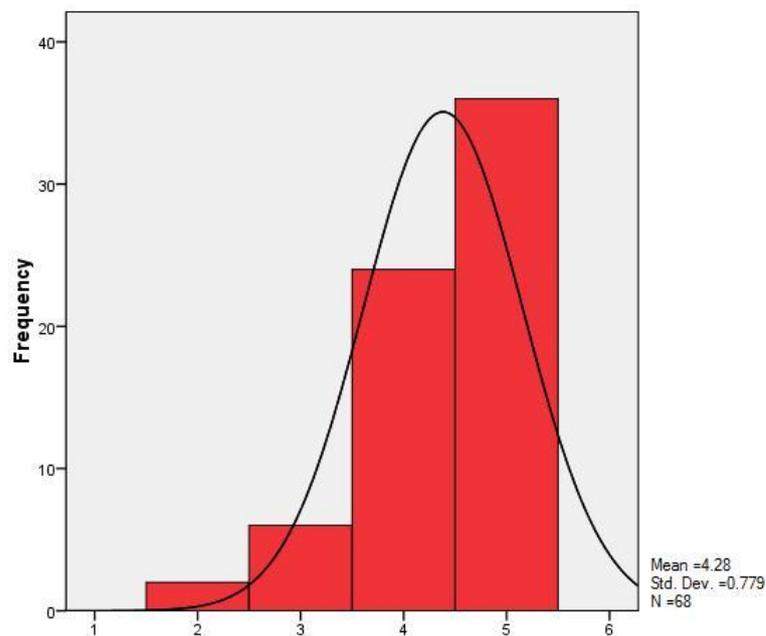
Figure 4.3   Mean Score Distribution of Students' Perceived Usefulness

As it is presented in Figure 4.3, most of the scores were located between 4.0 and 5.0. This shows that the average perceptions of the students were between "Agree" and "Strongly Agree". Also, it is clearly seen that high number of students scored 5; that is "Strongly Agree".

4.2.2.1 "Work More Quickly" Factor of Perceived Usefulness

To investigate this factor, two questions were asked and they were pair questions. As it is seen in Table 4.15, Students answered both S3.01 and S3.14 questions positively with the percentage of 80.8% while 13.3% of participants answering those questions negatively. Overall, as presented in Table 4.15, the mean score for this factor is 4.19 with standard deviation 1.022.

Table 4.15   Descriptive Statistics for "Work More Quickly" Factor of Perceived Usefulness

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.01 ... enabled us to accomplish computer courses more quickly.	4	5.9	2	2.9	4	5.9	12	17.6	46	67.6	4.38	1.120
S3.14 ... decreased my work speed in our computer courses.	8	11.8	4	5.9	4	5.9	16	23.5	36	52.9	4.00	1.382
Overall	**6.0**	**8.9**	**3.0**	**4.4**	**4.0**	**5.9**	**14.0**	**20.6**	**41.0**	**60.3**	**4.19**	**1.022**

Note: Question S3.14 is a reversely coded question.

4.2.2.2 "Job Performance" Factor of Perceived Usefulness

In order to investigate this "Job Performance" factor, two questions were asked to students. They were pair question for each other. Students answered those S3.02 and S3.13 pair questions. As it is presented in Table 4.16, 75.1% of the students reported these questions positively while 14.7% of them reporting negatively. Overall, the mean score for this factor is equal to 4.06 with standard deviation of 0.998.

Table 4.16   Descriptive Statistics for "Job Performance" Factor of Perceived Usefulness

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.02 ... improved my performance in our computer courses.	2	2.9	10	14.7	4	5.9	18	26.5	34	50.0	4.06	1.196
S3.13 ... has decreased my performance in our computer courses.	6	8.8	2	2.9	10	14.7	14	20.6	36	52.9	4.06	1.268
Overall	4.0	5.9	6.0	8.8	7.0	10.3	16.0	23.6	35.0	51.5	4.06	0.998

Note: Question S3.13 is a reversely coded question.

4.2.2.3 "Increase Productivity" Factor of Perceived Usefulness

Only one question, S3.05 was asked to students in order to examine this indicator. As it is showed in Table 4.17, 85.3% of the students stated positive answer while just

5.9% of them stating negatively to this question. The mean score for this factor is equal to 4.24 with standard deviation 1.038.

Table 4.17   Descriptive Statistics for "Increase Productivity" Factor of Perceived Usefulness

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.05 ... increased my productivity in our computer courses.	4	5.9	0	0	6	8.8	24	35.3	34	50.0	4.24	1.038
Overall	**4**	**5.9**	**0**	**0**	**6**	**8.8**	**24**	**35.3**	**34**	**50.0**	**4.24**	**1.038**

4.2.2.4 "Effectiveness" Factor of Perceived Usefulness

Only one question, S3.08 was asked to students in order to examine this indicator. As can be seen in Table 4.18, 88.2% of the students reported positive perceptions to this question while just 8.8% of them reported negatively. The mean score for this factor is equal to 4.41 with standard deviation 1.011.

Table 4.18   Descriptive Statistics for "Effectiveness" Factor of Perceived Usefulness

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.08 ... enhanced my effectiveness in our computer courses.	2	2.9	4	5.9	2	2.9	16	23.5	44	64.7	4.41	1.011
Overall	2	2.9	4	5.9	2	2.9	16	23.5	44	64.7	4.41	1.011

4.2.2.5 "Makes Job Easier" Factor of Perceived Usefulness

To examine this indicator, only one question, S3.09 was asked to students. As it is seen in Table 4.19, 82.4% of the students stated positive answer while just 8.8% of them stating negatively to this question. The mean score for this factor is equal to 4.24 with standard deviation 1.121.

Table 4.19   Descriptive Statistics for "Makes Job Easier" Factor of Perceived Usefulness

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.09 ... made it easier to study on our computer courses.	4	5.9	2	2.9	6	8.8	18	26.5	38	55.9	4.24	1.121
Overall	4	5.9	2	2.9	6	8.8	18	26.5	38	55.9	4.24	1.121

4.2.2.6 "Useful" Factor of Perceived Usefulness

In order to examine this factor, two questions were asked to students. Those questions have the highest percentage of positive answers among all the perception questions of the questionnaire. As it is presented in Table 4.20, 91.2% of the students answered to question S3.12 positively while only 5.9% of them stated negative responses. Also, the percentage of positive answers of question S3.16 was 91.2% while negative answers were just 5.9% as in question S3.12.

Overall, 91.3% of participants answered positively to these questions of Useful Factor and just 5.9% of them answered negatively. The overall mean score for this factor was 4.53 with standard deviation equals to 0.7539.

Table 4.20   Descriptive Statistics for "Useful" Factor of Perceived Usefulness

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.12 ... improved our opportunity to work on our computer courses.	0	0	4	5.9	2	2.9	18	26.5	44	64.7	4.50	0.820
S3.16 ... was useful in our computer courses.	0	0	4	5.9	2	2.9	14	20.6	48	70.6	4.56	0.817
Overall	0.0	0.0	4.0	5.9	2.0	2.9	16.0	23.6	46.0	67.7	4.53	0.753

4.2.3 Students' Perceptions about Ease of Use

Students' perceptions about the ease of use of "Small Basic" were investigated by the use of 9 questions grouped in 4 indicator factors reported in Perceived Usefulness construct of Technology Acceptance Model (Davis, 1989). Indicator factors were "Easy to Learn, Easy to Use, Easy to Become Skillful, Clear and Understandable", and descriptive statistics for those factors obtained from the results of SPKPL-Q reported in the table 4.21.

Table 4.21   Descriptive Statistics for Sub-Factors of Perceived Ease of Use

	SD	D	N	A	SA	Mean	Std. Dev.
	%	%	%	%	%		
Easy to Learn	5.9	8.9	7.4	20.6	57.4	4.15	0.958
Easy to Use	2.9	8.8	2.9	20.6	64.7	4.35	1.089
Easy to Become Skillful	0	8.8	11.8	20.6	58.8	4.29	0.993
Clear and Understandable	0.9	10	14.7	28.8	45.6	4.08	0.671
Overall	**2.4**	**9.1**	**9.2**	**22.7**	**56.6**	**4.22**	**0.781**

Note: Total number of participants (N) = 68

As it is presented in the Table 4.21, most of the students reported positive perceptions about the ease of use of Small Basic. It is clearly seen that all indicator factors; "Easy to Learn", "Easy to Use", "Easy to Become Skillful" and "Clear and Understandable" had positive answers which were greater than the percentage of 75%. As a result, overall mean is 4.22 with standard deviation equals to 0.781.

Overall, 79.3% of students that is much more than a half of all students reported positive perception while 11.5% of them reporting negative perception about the ease of use of "Small Basic".
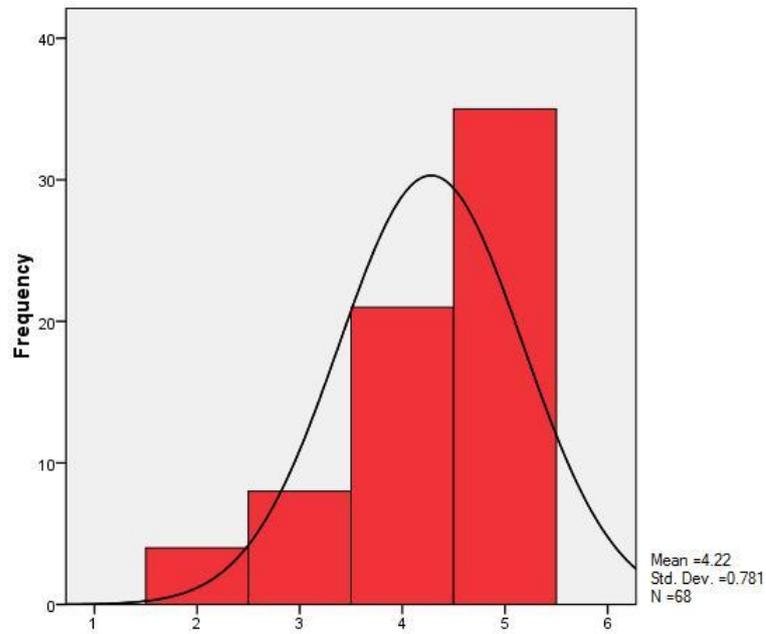
Figure 4.4　　Mean Score Distribution of Students' Perceived Ease of Use

As it is presented in Figure 4.4, most of the scores were located between 4.0 and 5.0. This shows that the average perceptions of the students were between "Agree" and "Strongly Agree". Also, it is clearly seen that high number of students scored 5; that is "Strongly Agree". This shows that students mostly reported positive perceptions about ease of use of Small Basic.

4.2.3.1 "Ease to Learn" Factor of Perceived Ease of Use

To investigate this factor, two questions were asked and they were pair questions. As it is presented in Table 4.22, Students answered both S4.01 and S4.05 questions positively with the percentage of 78.0% while 14.8% of participants answering those questions negatively. Overall, as presented in Table 4.22, the mean score for this factor is 4.15 with standard deviation 0.958.

Table 4.22   Descriptive Statistics for "Easy to Learn" Factor of Perceived Ease of Use

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S4.01. Learning to use "Small Basic" was easy for me.	2	2.9	4	5.9	6	8.8	16	23.5	40	58.8	4.29	1.052
S4.05. It was difficult to learn to use "Small Basic".	6	8.8	8	11.8	4	5.9	12	17.6	38	55.9	4.00	1.382
Overall	**4**	**5.9**	**6.0**	**8.9**	**5.0**	**7.4**	**14.0**	**20.6**	**39.0**	**57.4**	**4.15**	**0.958**

Note: Question S4.05 is a reversely coded question.

4.2.3.2 "Ease to Use" Factor of Perceived Ease of Use

Only one question, S4.09 was asked to students in order to examine this indicator. As it is showed in Table 4.23, 85.3% of the students stated positive answer while just

11.7% of them stating negatively to this question. The mean score for this factor is equal to 4.35 with standard deviation 1.089.

Table 4.23   Descriptive Statistics for "Easy to Use" Factor of Perceived Ease of Use

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S4.09. I found "Small Basic" easy to use.	2	2.9	6	8.8	2	2.9	14	20.6	44	64.7	4.35	1.089
Overall	**2**	**2.9**	**6**	**8.8**	**2**	**2.9**	**14**	**20.6**	**44**	**64.7**	**4.35**	**1.089**

4.2.3.3   "Ease to Become Skillful" Factor of Perceived Ease of Use

To examine this indicator, only one question, S4.02 was asked to students. As it is seen in Table 4.24, 79.4% of the students stated positive answer while just 8.8% of them stating negatively to this question. The mean score for this factor is equal to 4.29 with standard deviation 0.993.

Table 4.24   Descriptive Statistics for "Easy to Become Skillful" Factor of Perceived Ease of Use

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S4.02. It was easy to become skillful at using "Small Basic".	0	0	6	8.8	8	11.8	14	20.6	40	58.8	4.29	0.993
Overall	**0**	**0**	**6**	**8.8**	**8**	**11.8**	**14**	**20.6**	**40**	**58.8**	**4.29**	**0.993**

4.2.3.4 "Clear and Understandable" Factor of Perceived Ease of Use

To investigate this factor, five questions were asked to students. Question S4.04 and Question S4.08 were pair questions. As it is presented in Table 4.25, the percentage of positive answers of these questions was 79.4% while negative ones were 14.7%. For question S4.03, 82.4% of participants stated positive perceptions for that question while 11.8% of them stated negative perceptions. Moreover, 64.7% of students stated positive perceptions to question S4.06 whereas 14.7% of them stated negatively. Also, 20.6% of them reported neutral. Finally, for question S4.07, 66.2% of students reported positive perceptions while 13.3% of them stated negative perceptions. Also, 20.6% of them reported neutral as in question S4.06.

Overall, the total ratio of positive answers of Clear and Understandable Factor is 76.6% and negative ones are 10.9%. The overall mean score is equal to 4.08 with standard deviation, 0.671.

Table 4.25   Descriptive Statistics for "Clear and Understandable" Factor of Perceived Ease of Use

	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S4.03. Messages of "Small Basic" were clear and understandable.	0	0	8	11.8	4	5.9	22	32.4	34	50.0	4.21	1.001
S4.04. User interfaces of "Small Basic" were user-friendly.	2	2.9	4	5.9	8	11.8	18	26.5	36	52.9	4.21	1.059
S4.06. Messages of "Small Basic" uses terms familiar to me.	0	0	10	14.7	14	20.6	16	23.5	28	41.2	3.91	1.103
S4.07. User interfaces of "Small Basic" uses terms familiar to me.	1	1.5	8	11.8	14	20.6	14	20.6	31	45.6	3.97	1.133
S4.08. It was hard to understand the user interface of "Small Basic".	0	0	4	5.9	10	14.7	28	41.2	26	38.2	4.12	0.873
Overall	**0.6**	**0.9**	**6.8**	**10.0**	**10.0**	**14.7**	**19.6**	**28.8**	**31.0**	**45.6**	**4.08**	**0.671**

Note: Question S4.08 is a reversely coded question.

4.3   Teachers' Perceptions about Small Basic (TPKPL - IG)

The teachers' perceptions about the use of Small Basic in computer courses were investigated by the use of interviews. Two interviews were conducted with the teachers of Plevne Elementary School. Interview data were analyzed by using descriptive analysis approach described by Yıldırım and Şimşek (2006). According to this approach, a conceptual framework was created. The conceptual framework used in this study for descriptive analysis of interview data can be seen in following table.

Table 4.26   Conceptual Framework for Interview Data Analysis

1. Effects of the use of Small Basic on Students' Perceived Motivation towards Computer Courses
    a. Interest / Enjoyment
    b. Perceived Competence
    c. Willingness
    d. Participation

2. Perceived Usefulness
    a. Work More Quickly
    b. Job Performance
    c. Increase Productivity
    d. Make Job Easier
    e. Useful

3. Perceived Ease of Use
    a. Easy to Learn
    b. Easy to Use
    c. Easy to Become Skillful
    d. Clear and Understandable

4. Advantages and Disadvantages

5. Suggestions

4.3.1 Teachers' Perceptions about the Effects of the Use of Small Basic on Students' Perceived Motivation towards the Computer Courses

First of all, in order to investigate the effects of the use of Small Basic on students' perceived motivation towards the computer courses, teachers were asked that "How did the use of this technology effect the motivation of the students towards their concentrating on computer courses? Positively, negatively or not effected?" Answers of both teachers were positive. To get detailed indicators of their observations, they were asked to explain the indicators which they observed to support their positive opinions. They stated following observations as indicators:

Teacher 1:

"First of all, I want to state that by the use of this technology, attendance of students to computer courses has increased. Since they were able to reach their notebooks whenever they want, they used Small Basic almost all their break times. Before that, they did not want to go computer labs because with respect to their ideas, computer lessons were boring; however, now they love it. They loved computer lessons and also programming!"

Teacher 2:

"I clearly state that students did not like computer lessons and did not enjoy using computers at lessons. I observed that by the use of this technology, they were highly motivated and students who did not love computer courses; now, love it and participated with high numbers to these classes."

4.3.1.1 "Interest / Enjoyment" Factor of Perceived Motivation

The first indicator for perceived motivation with respect to conceptual framework was "Interest / Enjoyment". In order to investigate the teachers' perceptions about this variable, they were asked two questions: one of them is about students' interests and the other one about their enjoyment in computer.

First, it was asked that "Have you observed that the use of this technology has increased students' interest to the computer courses?" Both teachers stated that by the use of Small Basic, students' interest to computer courses has dramatically increased. They stated the following observations:

Teacher 1:

"The use of this technology has increased the students' interest and students have used it till the end of semester. Although almost no lessons at the end of the semester and many students from other classes were absent, they have come and attend lessons and used Small Basic."

Teacher 2:

"Actually, I was surprised that some group of students who were boring and uninterested to computer lessons loves it very much and their interests to computer courses have been increased amazingly."

Second, it was asked that "Have you observed that the use of this technology has increased students' enjoyment in the computer courses?" Both teachers stated

positive observations and reported that by the use of Small Basic, students'
enjoyment in the courses has dramatically increased. They stated the following
observations:

Teacher 1:

"Since Small Basic showed the results of their works immediately; I mean they write
codes and show the outputs just hitting F5, they enjoyed from this situation very
much. Actually, they enjoyed the feeling of success and felt themselves as a creator
of something. They all created virtual objects as they saw in their computer games.
They loved this feeling."

Teacher 2:

"Students wanted to try and see the results of using this technology. After the usage,
they wanted to use it more and more. I also observed that while using it, they enjoyed
it very much; not only Small Basic but also computer lessons."

4.3.1.2 "Perceived Competence" Factor of Perceived Motivation

The second indicator for perceived motivation was "Perceived Competence". In
order to investigate the teachers' perceptions about this variable, they were asked that
"Have you observed that the use of this technology has increased students'
satisfaction about the computer courses?" The teachers stated positive opinions and
the following observations:

Teacher 1:

"They saw that they are successful and the result of this, their satisfaction has increased. They love and enjoy while writing codes and creating their own arts."

Teacher 2:

"Their satisfaction has sharply increased. First, they did not know anything about this technology; however, they bravely wanted to try it and saw that they were able to write codes; and the result, highly motivated little programmers who enjoys writing codes."

4.3.1.3 "Willingness" Factor of Perceived Motivation

The third indicator for perceived motivation was "Willingness". In order to investigate the teachers' perceptions about this variable, they were asked that "Have you observed that the use of this technology has increased students' willingness to work on the computer courses?" The teachers stated positive opinions and the following observations:

Teacher 1:

"Absolutely. Their willingness to work on the computer courses has increased. Students always asked more problems to be solved."

Teacher 2:

"Even some students who were uninterested to computer lessons before this technology wanted more work, more request and more problem situation to be solved. Their willingness to work has increased with the percentage of a hundred."

4.3.1.4 "Participation" Factor of Perceived Motivation

The last indicator for perceived motivation was "Participation". In order to investigate the teachers' perceptions about this variable, they were asked two questions. One was about students' participation and the other was about their study time in the computer courses.

First, it was asked that "Have you observed that the use of this technology has increased students' study time in the computer courses?" The teachers stated positive opinions and the following observations:

Teacher 1:

"First, I want to state that by the use of this technology, the participation of students to computer courses has increased. They were able to reach their notebooks whenever they want in computer courses. Also, they use Small Basic almost all their break times."

Teacher 2:

"I observed that students did not like computer lessons and did not enjoy using computers at lessons. However, by the use of this technology, they are highly motivated and participated almost all lessons with high numbers."

Second, it was asked that "Have you observed that the use of this technology has increased students' participation to the computer courses?" Both teachers stated positive observations and reported that by the use of Small Basic, students' study times in the courses have dramatically increased. They stated the following observations:

Teacher 1:

"I observed that students used their time in computer courses effectively and their study time in lessons has increased."

Teacher 2:

"I observed that every student has used this technology with a great interest and this made students' study time in computer courses increased. Also, productivity in that time has dramatically increased."

4.3.2 Teachers' Perceptions about Usefulness of Small Basic

First of all, in order to investigate the perceptions of the teachers about the usefulness of the use of Small Basic, teachers were asked that "What do you think about the usefulness of this technology in student's computer courses? Was it useful or not?"

Answers of both teachers were positive. To get detailed indicators of their observations, they were asked to explain the indicators which they observed to support their positive opinions. They stated following observations as indicators:

Teacher 1:

"I found it very useful. First, they liked to use computers in their lessons. Rather than just playing a game or surfing on Internet, they used it for studying and enjoy it like playing a game. Also, when in our talks with students, they stated that it also helped their mathematics, geometry and English lessons. They stated that they learnt a lot while coding a program."

Teacher 2:

"I think the practical usage of Small Basic was the main factor of the success of this project. Students found it very practical to create programs. Also, while writing codes, they developed their other skills such as mathematical thinking and problem solving. They learnt a lot while playing something and this process was not boring. They think that they were using it just for fun; however, they have been learning many things while writing codes. Now, many of them think that they may be software developer or programmer in the future. I think it was very useful and made the computers the part of real learning materials like pencils, books and notebooks."

4.3.2.1 "Work More Quickly" Factor of Perceived Usefulness

The first indicator for perceived usefulness was "Work More Quickly". In order to investigate the teachers' perceptions about this variable, they were asked that "Have

you observed that the use of this technology has increased students' work speed in the computer courses?" The teachers stated positive opinions and the following observations:

Teacher 1:

"The feeling of being a part of the solution made them they were the member of the situation. They felt themselves as an architect of buildings which they created while coding. They built every part of the buildings and saw the results of their wonders. This feeling has increased dramatically the work speed of students since they wanted to see immediately the results of their works."

Teacher 2:

"Since the students' interest and enjoyment has increased, their work speed has also increased. They completed their activities voluntarily and work fast since they wanted to see the results of their works."

4.3.2.2 "Job Performance" Factor of Perceived Usefulness

The second indicator for perceived usefulness was "Job Performance". In order to investigate the teachers' perceptions about this variable, they were asked that "Have you observed that the use of this technology has increased students' performance in the computer courses?" The teachers stated positive opinions and the following observations:

Teacher 1:

"By the result of great interest and willingness to this technology, their performances have also increased.

Teacher 2:

"Uninterested students' performances have also increased and this is the evidence of the success of this study."

4.3.2.3 "Increase Productivity" Factor of Perceived Usefulness

The third indicator for perceived usefulness was "Increase Productivity". In order to investigate the teachers' perceptions about this variable, they were asked that "Have you observed that the use of this technology has increased students' productivity in the computer courses?" The teachers stated positive opinions and the following observations:

Teacher 1:

"They have used the time in computer courses very efficient. While using technology, by the solutions they developed, they made lessons very productive for themselves. They were the creators of their works and this made them more productive and contributed their creativity skills they already have."

Teacher 2:

"While using Small Basic, in every educational activity, they were more productive than usual. They have used their creativity to form applications and this made students more productive than usual since they created their own solutions."

4.3.2.4 "Make Job Easier" Factor of Perceived Usefulness

The fourth indicator for perceived usefulness was "Make Job Easier". In order to investigate the teachers' perceptions about this variable, they were asked that "Have you observed that the use of this technology has made the development of projects on the computer courses easy?" The teachers stated positive opinions and the following observations:

Teacher 1:

"Students integrated other disciplines with computer courses such as physics, mathematics, geometry etc. They used knowledge they have already had with computer courses and expanded the computer projects which were assigned. Also, by using Small Basic, they all completed their projects and added more from themselves to their projects. This made them more enthusiastic."

Teacher 2:

"By the use of Small Basic, they developed great projects and related these projects with other disciplines. Also, they developed good solutions for assigned problems. They produced more works in a very limited time by the use of this technology compared to past computer activities."

4.3.2.5 "Overall Usefulness" Factor of Perceived Usefulness

The last indicator for perceived usefulness was "Overall Usefulness". In order to investigate the teachers' perceptions about this variable, they were asked three questions.

First, it was asked that "Have you observed that the use of this technology has increased students' contribution to the computer courses?" Both teachers stated that by the use of Small Basic, students' contribution to computer courses has dramatically increased. They stated the following observations:

Teacher 1:

"I clearly stated that by the solutions which students developed while using this technology, Small Basic made students think out of the box. Therefore, this has increased the students' contribution to computer courses."

Teacher 2:

"I observed that every student used this technology with a great interest and willingness. I think this was because every student wanted to be successful while using technology and made an effort to achieve this aim. Therefore, contribution of students to lessons has increased with the percentage of a hundred. Also, by this contribution, they were more motivated to lessons."

Second, it was asked that "Have you observed that the use of this technology has improved students' opportunity to work on projects on the computer courses?" Both teachers stated positive observations and reported that by the use of Small Basic, students' opportunity to work on projects on the computer courses has improved. They stated the following observations:

Teacher 1:

"I think this technology made students look more positive and decisive to other educational activities. Also, it increased the working opportunities. They really used computers in their educational activities and enjoyed while using it."

Teacher 2:

"Students' approaches to projects have increased the students' opportunities to work on projects on the computer courses. It solved many problems while students created their solutions and made students reach many ways to complete the projects. They also found the ways to share their solutions with their friends."

Finally, it was asked that "Overall, was the use of this technology useful?" Both teachers stated positive observations and reported that the use of Small Basic was useful. They stated the following observations:

Teacher 1:

"Absolutely, it was useful. I clearly observed that from students' attitudes. It has to be used in all computer courses around Turkey."

Teacher 2:

"I clearly stated that it was very useful for students. Not only volunteer students but also uninterested students wanted to be successful in their projects. Also, they wanted to develop more solutions for their projects which were not assigned. They voluntarily added more solutions to their projects and enjoyed very much while doing it. In order to make students more interested to computer courses, Small Basic has to be used. It will also help their other skills such as problem solving and critical thinking."

4.3.3   Teachers' Perceptions about Ease Use of Small Basic

In order to investigate the perceptions of the teachers about the ease of the use of Small Basic, teachers were asked four groups of questions. Answers of both teachers were quite positive. To get detailed indicators of their observations, they were asked to explain the indicators which they observed to support their positive opinions. They stated following observations as indicators:

4.3.3.1   "Easy to Learn" Factor of Perceived Ease of Use

The first indicator for perceived ease of use was "Easy to Learn". In order to investigate the teachers' perceptions about this variable, they were asked that "Was learning to use Small Basic easy for your students?" The teachers stated positive opinions and the following observations:

Teacher 1:

"Sure. They learnt the using of this application easily since they enjoyed it very much. Also, the ease usage of helped a lot to be learnt easily. Although some students who did not know anything about the usage of computers, they also learnt the usage of it easily."

Teacher 2:

"I think it was easy. Although in the beginning, some students found it difficult, in a very short time, they all learnt how to use it easily. In just one hour, I observed that they were compiling their codes."

4.3.3.2 "Easy to Become Skillful" Factor of Perceived Ease of Use

The second indicator for perceived ease of use was "Easy to Become Skillful". In order to investigate the teachers' perceptions about this variable, they were asked that "Was becoming skillful at using Small Basic easy for your students?" The teachers stated positive opinions and the following observations:

Teacher 1:

"Since they learnt easily how to use it, I clearly stated that almost all students became skillful at using Small Basic. Also, some students who did not show their performances very much become successful. I think that 85 percentages of students became skillful at using it."

Teacher 2:

"Many students become master at using Small Basic. I had some students and I think that they did not complete their assigned works; however, surprisingly, they did not resist to this new system and they also became skillful easily while using it. Almost 80 percent of students created their own solutions in their free times and showed me their works. They were amazing works compared to examples which I showed to them."

4.3.3.3 "Clear and Understandable" Factor of Perceived Ease of Use

The third indicator for perceived ease of use was "Clear and Understandable". In order to investigate the teachers' perceptions about this variable, they were asked four questions.

First, it was asked that "Were user interfaces and messages of Small Basic clear and understandable for your students?" Both teachers stated that they found it clear and understandable for students. They stated the following observations:

Teacher 1:
"I found it very clear and understandable. My students easily analyzed and learnt how to use the interfaces of it. At the beginning, they just learnt the meanings of the messages while asking to me."

Teacher 2:
"Yes. We did not have any difficulties by the usage of the interface; however, for the messages, they were asked the meaning of them at the beginning."

Second, it was asked that "Were user interfaces and messages of Small Basic user friendly for your students?" Both teachers stated that they found it user friendly for students. They stated the following observations:

Teacher 1:

"Yes. In general, students were not faced with any problem. However, I think that they may prefer the program localized into Turkish."

Teacher 2:

"Yes. Students were not faced with any problem about the usage of Small Basic. However, this is my personal opinion; some visual items may be replaced or added with respect to grade level"

Third, it was asked that "Does user interfaces and messages of Small Basic use terms familiar for your students?" Both teachers stated positive perceptions about it and they stated the following observations:

Teacher 1:

"Yes. They have already known some terms before this study. For unknown terms, they were asked once and learnt them very easily. Overall, I stated that Small Basic use familiar terms for students."

Teacher 2:

"Yes. They particularly knew direction terms. I clearly state that they were not faced with any difficulties except a few questions about terms which they did not knew the meanings."

Finally, it was asked that "Was it hard to understand the user interfaces of Small Basic for your students?" Both teachers stated that they found it very easy to understand for students. They stated the following observations:

Teacher 1:

"No. They were very interested about using it and this made them discover it in a very short time. Also, this made them use it easily. I think that the user interfaces of Small Basic were very easy to understand."

Teacher 2:

"We were not faced with any difficulties about the usage of it. At the beginning, some students who have some learning difficulties were faced with some problems about understanding; however, in a very short time, they overcame these problems. All students were easily used it."

4.3.3.4 "Overall Easy to Use" Factor of Perceived Ease of Use

The last indicator for perceived ease of use was "Overall Easy to Use". In order to investigate the teachers' perceptions about this variable, they were asked that

"Overall, was the use of Small Basic easy for your students?" The teachers stated positive opinions and the following observations:

Teacher 1:

"Yes, overall, the usage of it was very easy and the students used it efficiently."

Teacher 2:

"Yes, the usage of it was very easy. Students found it very easy and become master easily. Maybe, some cute visuals may be used for little students."

4.3.4 Suggestions of Teachers about the Use of Small Basic

In the interviews, the teachers were also asked to share their suggestions about the future usages of this technology. They stated the following suggestions.

Teacher 1:

- By using this software, topics about algorithm and flowcharts can be supported for 4 and 5 grade students.
- Since its usage is easy and it promotes students' interest very much, students' motivation to computer lessons can be increased.
- Before programming courses of upper level classroom students, this software can be used and by this way, their learning process can be supported about programming before learning higher level programming languages.
- Also, university students can easily learn programming concepts easily by using Small Basic.

Teacher 2:

- This software can be used immediately as supportive tool after teaching basic concepts of programming such as algorithm and flowcharts topic about the addition or multiplication of two numbers.

- Small Basic can be used as starting software about programming languages.

- This software can be used easily in computer and internet students clubs to develop programs.

- This software can be used easily in secondary schools and universities.

4.3.5 Advantages and Disadvantages of Small Basic from the Teachers' Point of View

Finally, the teachers were also asked the advantages and disadvantages of this technology. They stated the following advantages and disadvantages:

4.3.5.1 Advantages of Small Basic

Teacher 1:

- Small Basic helps to understand the other programming languages.

- It promotes the feeling of success from students' point of view since they see the outputs and results of written codes immediately.

- It also supports other courses' contents such as mathematics and English.

- It helps to develop students' problem solving and critical thinking skills.

Teacher 2:

- Small Basic changes students' view to computer courses positively.

- It helps to develop thinking and analyzing skills of students who have learning disabilities.

- It contributes to be understood other courses' topics such as mathematics, geometry, physics and English.

- It contributes positively to students by providing the feeling of success.

- It contributes students' problem solving and critical thinking skills. For example, students when they are faced with some problematic situations, they start to find and solve this problem and define what to cause it and how to solve it. Finally, they define the problem and create solutions to resolve them.

- By using Small Basic, they learn how to behave in problematic situation. They are patient while they are faced with problems and they create steps to solve it. They know how to think to overcome the problematic situations.

- By the help of Small Basic, they create predictions and are not afraid of trying. They try and try to find the solutions.

- It helps to students' creativity. Since they write the codes step by step and think that these programs are their own products, they always try to create new different works and products.

- It absolutely contributes to students' logical mathematical intelligence and helps to developments of characteristics of students.

- It is suitable and beneficial for all grade students and it should be used all computer courses.

4.3.5.2 Disadvantages of Small Basic

Teacher 1:

- Although it contains English terms, students can easily solve this problem.

- User interface of Small Basic is in English.

- I do not think any disadvantages except for English terms.

Teacher 2:

- Students may not understand some English words.

- Help files and intellisense feature of Small Basic is in English.

- Except for this, I do not think that Small Basic has any disadvantages.

CHAPTER 5

DISCUSSION, CONCLUSION

AND RECOMMEDATIONS

"Imagination is more important than knowledge.
Knowledge is limited; imagination encircles the
world. "
Albert Einstein

In this chapter, according to the results presented in the previous chapter; discussion, interpretation of the results and conclusion are presented. Moreover, suggestions for practice and recommendations for future researches are presented.

5.1   Discussion

Interest in programming languages has been still a major problem in the recruitment of new students to computer science departments and related works. The general programming concept still creates misunderstandings in the minds of children. They think that programming is boring, difficult and inaccessible.

Although many different approaches have been suggested for developing students' computer skills by the usage of programming languages, programming has not been popular and mostly ignored. For that reasons, in the educational communities including education authorities, there is a great deal of negative perceptions regarding the benefits of teaching children's computer skills. The reason of this situation is based on some thoughts:

- programming is difficult for most children; that is, although new generation programming languages are mathematically very elegant, they are still difficult to learn and master (Kahn, 1995),
- it does not promote any students' skills; there is no persuasive evidence "that writing programs will automatically improve the students' creativity or general reasoning ability or higher order cognitive skills" (Shafto, 1986, p. 297),
- and it is not directly related with education curriculum.

Computing science continues to advance rapidly and these rapid developments do not seem to decelerate (Schwartz, Stagner & Morrison, 2006). For that reason, it is obviously seen that programming is technological profession which needs to be promoted not only in higher education but also in secondary and elementary education.

In order to make beginner learners of programming languages more adaptive the advance computing technologies, to decrease that learning curve as much as is possible, and to remove the technical difficulties that beginner programmers are face with, educational and kid's programming languages have been developed (Schwartz, Stagner & Morrison, 2006).

According to Papert (1993), by the experiences gained by programming languages, children will extend their skills beyond the programming environment to other problem solving areas.

The solution used in this study as kid's programming language in order to teach basic concepts of programming languages was Small Basic.

Small Basic is an effective in stimulating interest in programming concepts. It is successful in making computer science extremely easy, fun, approachable and interesting while at the same time, challenging kids to think about meaningful programming topics.

Computers contribute children's learning process. Also, computer programming languages creates transferable problem solving and thinking skills (Goldenson, 1996). By the use of Small Basic, while helping students' learning process, it is also provided a base for almost all modern programming languages and by this way, beginner learners of programming languages more adaptive the advance computing technologies.

Although such kinds of technologies are created to be used and they provide a lot of advantages for their users, this does not mean computer systems make the child teach and improve their performances if they are not used (Papert, 1993). According to Technology Acceptance Model (TAM), the usefulness of these types of technologies can be investigated by the indicator factors reported in perceived usefulness and perceived ease of use constructs of TAM (Davis, 1989). Therefore, it is also needed to investigate the usefulness and ease of use of these new technologies. Also, their effects on users' motivation should be also investigated carefully before integrating them into learning processes.

The purpose of the study is to investigate the perceptions of students and teachers of about the use of Small Basic in their computer courses in terms of its effects on students' perceived motivation, perceived usefulness and perceived ease of use. Also, it is aimed to gather information from teachers about advantages and disadvantages of this technology. Moreover, it is aimed to get the suggestions of teachers about the use of this technology and the content.

5.1.1 Perceived Effects on Students' Motivation

As discussed earlier in literature review section, Ames stated that motivation is an essential condition of learning and motivation in education is deal with students' motivation and "If we place a value on developing a motivation to learn in students, we are concerned with whether students initiate learning activities and maintain an involvement in learning as well as a commitment to the process of learning" (as cited in Ray, 1992, p. 4).

When the results of the Small Basic's effects on students' perceived motivation are examined, overall mean is 4.29 with standard deviation equals to 0.735. Overall, 79.6% of students that is much more than a half of all students reported positive perception while just 7.0% of them reporting negative perception about the use of "Small Basic" on their motivation towards the computer courses. It is clearly seen that according to the results of this study, many of the students stated positive perceptions about the effects of the use of Small Basic on their perceived motivation towards the computer course.

On the teacher side, results are also positive. According to teachers, students have positive perception about the effect of the use of this technology. For example, one of the teachers stated that by the use of this technology, attendance of students to computer courses has increased. She observed that they used Small Basic almost all their break times. Although they did not want to go computer labs before because with respect to their ideas, computer lessons were boring; however, now they love it. They loved computer lessons and also programming. Another teacher also stated that

students did not like computer lessons and did not enjoy using computers at lessons before. He observed that by the use of this technology, they were highly motivated and students who did not love computer courses; now, love it and participated with high numbers to these classes.

According to the results of this study and previous studies reported in literature, it can be said that students have positive perception about the effect of the use of this technology on their perceived motivation. Also, the remaining indecisive students can be minimized by providing longer usage period in future researches.

Also, according to the results of the literature review, this study is one of the initial studies about the effects of Small Basic on students' perceived motivation.

The results of perceived motivation part of this study correspond to the results of the study conducted by Sesko (1999). As the results of this study, researcher reported positive effects of computers in the field of computer programming on students' perceived motivation. In this work, Sesko found that (1999) students participated in the study believed that the computer let them to learn and to complete their tasks in ways that were different what was expected of them in school. They used the computers by exploring and by finding ways in order to fit them into their everyday lives. According to Sesko (1999), for these students, the computer became a meaningful part of their lives.

5.1.2 Perceived Usefulness and Perceived Ease of Use

In literature, previous studies from the field of technology acceptance research prove that for the advantages of a technology to be gained, the technology must be accepted and used (as cited in Abbad et. al., 2009). Although the application of the technology acceptance model (TAM) to kid's programming languages is relatively new, the power of Small Basic has a potential for students' acceptance of this technology by advantages which it provides. As discussed earlier in literature review section, according to TAM developed by Davis (1989), perceived usefulness and perceived ease of use of a technology are the major indicators of the acceptance of this technology.

When the results of the perceived usefulness of Small Basic are examined, overall mean is 4.28 with standard deviation equals to 0.779. Overall, 83.9% of students; that is much more than a half of all students reported positive perception while just 9.6% of them reporting negative perception about "Perceived Usefulness" of Small Basic. It is clearly seen that according to the results of this study, Small Basic was useful for them.

On the teacher side, results are also positive. According to teachers, Small Basic is a very useful tool. For example, they state that Small Basic helps to develop thinking and analyzing skills of students who have learning disabilities. Also, it contributes to be understood other courses' topics such as mathematics, geometry, physics and English. They stated that they will use this tool in their computer courses because of all the advantages it provides.

When the results of the perceived ease of use of Small Basic are examined, overall mean is 4.22 with standard deviation equals to 0.781. Overall, 79.3% of students that is much more than a half of all students reported positive perception while 11.5% of them reporting negative perception about the ease of use of "Small Basic". It is clearly seen that according to the results of this study, the use of Small Basic was easy for them.

Also, according to the interview results, all of the teachers reflected their positive opinions about the ease to use of this tool.

The results of perceived usefulness and perceived ease of use part of this study correspond to the results of the previous researches. For example, Abbad, Morris and de Nahlik (2009) investigated "factors affecting the student adoption of e-learning systems". Also, Wei and Zhang (2008) investigated "the impact of internet knowledge on college students' intention to continue to use the internet". Moreover, Sivo and Pan (2005) examined the "undergraduate engineering and psychology students' use of a course management system". All of these researchers used TAM to investigate the effects of the use of new technologies and investigated the acceptance of this technology with the indicators of perceived usefulness and perceived ease of use of a technology. All conclude their researches by similar ways and reported that their new technologies were found useful and easy to use by students.

According to the results of this study and previous studies reported in literature, it can be said that Small Basic is accepted by high number of students and all teachers. Also, the remaining indecisive students can be minimized by providing longer usage period in future researches.

5.1.3 Advantages and Disadvantages of Small Basic from the Teachers Point of View, and Suggestions of Teachers about Small Basic

As a result of the interviews conducted with the teachers, several advantages and disadvantages of Small Basic were reported by them. They also reported some suggestions for Small Basic.

5.1.3.1 Advantages of Small Basic from the Teachers' Point of View

- Small Basic helps to understand the other programming languages.

- It promotes the feeling of success from students' point of view since they see the outputs and results of written codes immediately.

- It supports other courses' contents such as mathematics, geometry and English.

- It helps to develop students' problem solving and critical thinking skills.

- It changes students' view to computer courses positively.

- It helps to develop thinking and analyzing skills of students who have learning disabilities.

- It contributes to be understood other courses' topics such as mathematics, geometry, physics and English.

- It contributes positively to students by providing the feeling of success.

- It contributes students' problem solving and critical thinking skills. For example, students when they are faced with some problematic situations, they start to find and solve this problem and define what to cause it and how to solve it. Finally, they define the problem and create solutions to resolve them.

- By using Small Basic, they learn how to behave in problematic situation. They are patient while they are faced with problems and they create steps to solve it. They know how to think to overcome the problematic situations.

- By the help of Small Basic, they create predictions and are not afraid of trying. They try and try to find the solutions.

- It helps to students' creativity. Since they write the codes step by step and think that these programs are their own products, they always try to create new different works and products.

- It absolutely contributes to students' logical mathematical intelligence and helps to developments of characteristics of students.

- It is suitable and beneficial for all grade students and it should be used all computer courses.

5.1.3.2 Disadvantages of Small Basic from the Teachers' Point of View

- User interface of Small Basic is in English.
  - **Solution:** User interface of Small Basic has been translated into Turkish and new versions of it will support Turkish interface. Now, it can be used in Turkish.

- Help files and intellisense feature of Small Basic is in English.
  - **Solution:** Help files and intellisense feature of Small Basic has been translated into Turkish and in new versions, all English sentences will also be translated into Turkish. Now, it can be used in Turkish.

5.1.3.3 Suggestions of Teachers about Small Basic

- By using Small Basic, topics about algorithm and flowcharts can be supported for 4 and 5 grade students.
- Since its usage is easy and it promotes students' interest very much, students' motivation to computer lessons can be increased.
- Before programming courses of upper level classroom students, this software can be used and by this way, their learning process can be supported about programming before learning higher level programming languages.
- Also, university students can easily learn programming concepts easily by using Small Basic.

- This software can be used immediately as supportive tool after teaching basic concepts of programming such as algorithm and flowcharts topic about the addition or multiplication of two numbers.

- Small Basic can be used as starting software about programming languages.

- This software can be used easily in computer and internet students clubs to develop programs.

- This software can be used easily in secondary schools and universities.

5.2   Conclusions

In this study, Small Basic was used in computer courses as kid's programming language. First of all, although many people think that programming language are difficult to learn and teach, it was found that Small Basic is an easy to learn programming language. Moreover, although the programming language topic and the students' backgrounds were both explicitly different and it was difficult to connect with the students, there was great demand for the computer course. This was because Small Basic is an ease to use software for students and teachers.

The purpose of this study was to analyze the integration of Small Basic as a new technology in computer courses of elementary schools in Turkey and this study aimed to investigate the perceptions of students and teachers about the use of Small Basic in computer courses. In this research, the perceptions of students and teachers of elementary school about the use of Small Basic in their computer courses in terms of its effects on students' perceived motivation, perceived usefulness and perceived ease of use were investigated. Also, advantages and disadvantages of this technology

were investigated from the teachers' point of view. Moreover, it was aimed to get the suggestions of teachers about the use of this technology and the content.

Two research questions with sub-questions were asked in this study to achieve the purpose of the study.

First, for Small Basic's effects on students' perceived motivation towards the computer courses, it was found that the use of this technology effects the students' perceived motivation significantly positive. For all sub factors, both two teachers and many of the students were reported positive perceptions. Therefore, it can be said that the use of this technology has a positive effect on students' motivations.

Second, for Small Basic's perceived usefulness, it was found that for all sub factors, both two teachers and many of the students were reported positive perceptions. Therefore, it can be said that this technology was easy to use and useful for the teachers and the students.

Third, for Small Basic's perceived ease of use, it was found that for all sub factors, both two teachers and many of the students were reported positive perceptions. Therefore, it can be said that this technology was easy to use and easy to learn for the teachers and the students.

According to Technology Acceptance Model (TAM) developed by Davis (1989), perceived usefulness and perceived ease of use of a technology are the major

indicators of the acceptance of technology. If we combine the second and third results of research questions, it can be said that according to TAM and although the application of TAM to kid's programming languages is relatively new, this new technology was accepted by the students' and teachers of Plevne Elementary School in which this study was conducted.

Fourthly, when it is looked the advantages and disadvantages of the use of Small Basic in computer courses from the teachers' point of view, according to teachers, the use of this technology brings variety of advantages for both students and teachers. Also, there were a few disadvantages reported; however, all of them have been solved by the directions of teachers. All advantages and disadvantages stated by teachers can be found above in section 5.1.3.

Finally, there are number of suggestions about the use of this technology reported by teachers. All suggestions stated by teachers can be found above in section 5.1.3.

5.3   Suggestions and Recommendations for Future Researches

For future researchers, suggestions for practice and recommendations are stated in this section. If any more information is needed, researchers also contact with the researcher of this study to get detailed information.

5.3.1   Suggestions for Practice

Following suggestions may help teachers or researchers in the design and implementation of such a Small Basic sessions in computer courses.

- In this study, learning sessions were divided into three sessions. First, in the instruction phase, teachers gave the basic concepts of Small Basic on that day's topics and introduced sections of programming tools. However, I think it was very short session. Allocation of at least 20 minutes lecture would be better.

- Second, in practices phase, students made some exercises on learning topic using programming language and worked on practices provided by their teachers. In this phase, teachers need to actively participate in the learning process to help the students who needs assistance; especially technical assistance.

- Third, in sharing experiences and practicing on problematic issue phase, students engaged in some problematic issues provided by their teachers. In this phase, teachers should not provide any solution to the students and they need to be out in learning process. Students need to develop their own ways to solve the problems.

- Teachers or system administrators need to install required software to students' computers. If just Small Basic is used in learning environment,

latest Small Basic application needs to be downloaded and installed to computers.

- If any e-learning environment needs to be used, Microsoft® Learning Gateway or any other e-learning setup needs to be built.

- While preparing learning materials, be careful. Materials need to fit the grade levels of students to motivate them better to learning environment and increase their performances.

- Learning Content Development System is an easy way to develop contents for students. This tool would be used while creating learning materials for students.

5.3.2   Recommendations for Future Researches

The present study answered many questions about the perception of students and teachers about the use of Small Basic in computer courses. However, more detailed analyses of the usage of Small Basic in computer courses are needed. This study is considered as one step for the learning of Small Basic. Additional researches on the effects of Small Basic would help to:

- verify the claims of this review that Small Basic has a positive effect on the perceptions of students and teachers

- understand the learning process and relevant differences in students' abilities,

- understand its effects on mathematical knowledge, and

- understand its effects on problem solving and critical thinking skills of students.

Also, this study can be replicated in different grade levels with many more subjects to investigate the similar variables and investigate them with more general subjects since this study was conducted just with 4 and 5 grade elementary school students.

If the results of this study are validated by future researches, then the case for Small Basic's effectiveness becomes more solidly built. I believe this study suggests the need for additional Small Basic research.

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"ÇOCUK PROGRAMLAMA DILI – SMALL BASIC" YAZILIMI

HAKKINDA ÖĞRENCI ALGI ANKETI (SPKPL-Q)

(TURKISH)

Bu anket, Plevne İlköğretim Okulu 4. ve 5. sınıf öğrencilerinin "Çocuk Programlama Dili – Small Basic" yazılımının bilgisayar derslerindeki kullanımları hakkındaki algılarını araştırmak için hazırlanmıştır.

Bu anket, Orta Doğu Teknik Üniversitesi – Bilgisayar ve Öğretim Teknolojileri Eğitimi bölümünde yapılan yüksek lisans tez çalışmasında kullanmak üzere hazırlanmıştır.

Verilen cevaplar tamamı ile gizli tutulacak ve sadece bu çalışma için kullanılacaktır.

İletişim

Tayfun AKÇAY (e138199@metu.edu.tr)

Akademik Danışman

Prof. Dr. M. Yaşar ÖZDEN

Lütfen kendiniz hakkında aşağıdaki bilgileri doldurun.

Cinsiyet: Erkek ⭕   Kız   ⭕

BÖLÜM 1:

Bu bölümde 7 teknoloji listelenmektedir. Lütfen her bir teknoloji için, yetkinlik seviyelerinden sizin yetkinliğinizi en iyi ifade edeni seçiniz. Seçiminizi yaparken farenizi kullanınız ve lütfen her bir teknoloji için <u>yalnızca bir seçim</u> yapınız.

			Hiç Kullanmadım	Başlangıç	Orta Düzey	Uzman
1.1	Web tarayıcılar (Örnek: Internet Explorer, Firefox, Netscape, Opera)		O	O	O	O
1.2	Arama motorları (Örnek: Live, Google, Altavista, Yahoo, MSN, Lycos)		O	O	O	O
1.3	E-posta (Örnek: Hotmail, Yahoo! Mail, Gmail, Outlook, etc.)		O	O	O	O
1.4	Çevrimiçi (Online) Forumlar & Web günlükleri		O	O	O	O
1.5	Çevrimiçi Mesajlaşma (Online Chat) Uygulamaları (Örnek: IRC, MSN Messenger, Yahoo! Messenger etc.)		O	O	O	O
1.6	Microsoft Office Uygulamaları					
	1.6.1	Microsoft Word	O	O	O	O
	1.6.2	Microsoft Excel	O	O	O	O
	1.6.3	Microsoft PowerPoint	O	O	O	O
1.7	Programlama Dili (Örnek: Small Basic, Basic, Logo, Phrogram, etc.)		O	O	O	O

BÖLÜM 2:

Bu bölüm sizin online ve web tabanlı öğrenme ortamları hakkındaki geçmiş deneyimleriniz hakkında sorular içermektedir. Seçiminizi yaparken farenizi kullanınız ve lütfen her bir teknoloji için <u>yalnızca bir seçim</u> yapınız.

#	Soru	EVET	HAYIR
2.1	Bugüne kadar herhangi bir web destekli ya da çevrimiçi kurs aldınız mı?	○	○
2.2	Şimdiye kadar herhangi bir web destekli programlama dili kursu aldınız mı?	○	○
2.3	Bugüne kadar derslerinizle ilgili çalışmalarınızda interneti kullandınız mı? (Örnek: Araştırma, ev ödevi, projeler, vs.)	○	○
2.4	Bugüne kadar herhangi bir programlama dilini kullandınız mı? (Örnek: Small Basic, Basic, Logo, Phrogram, vs.)	○	○

BÖLÜM 3:

Lütfen aşağıda belirtilen ifadelere ne kadar katıldığınızı belirtin. Seçiminizi yaparken farenizi kullanınız ve lütfen her bir teknoloji için yalnızca bir seçim yapınız.

"Çocuk Programlama Dili – Small Basic" yazılımını kullanma …		Kesinlikle Katılmıyorum	Katılmıyorum	Fikrim Yok	Katılıyorum	Kesinlikle Katılıyorum
3.1	… bilgisayar derslerini daha çabuk anlamamıza yardımcı oldu.	O	O	O	O	O
3.2	... bilgisayar derslerimdeki performansımı arttırdı.	O	O	O	O	O
3.3	... bilgisayar derslerime katılımımı arttırdı.	O	O	O	O	O
3.4	... bilgisayar derslerime olan ilgimi arttırdı.	O	O	O	O	O
3.5	... bilgisayar derslerimdeki verimliliğimi arttırdı.	O	O	O	O	O
3.6	... bilgisayar derslerimi daha eğlenceli hale getirdi.	O	O	O	O	O
3.7	... bilgisayar derslerime çalışma isteğimi azalttı.	O	O	O	O	O
3.8	... bilgisayar derslerimdeki etkinliğimi arttırdı.	O	O	O	O	O
3.9	... bilgisayar derslerimdeki çalışmamı daha kolay hale getirdi.	O	O	O	O	O
3.10	... bilgisayar derslerine olan motivasyonumu arttırdı.	O	O	O	O	O

"Çocuk Programlama Dili – Small Basic" yazılımını kullanma						
3.11	... bilgisayar derslerine <u>çalışma süremi</u> arttırdı.	O	O	O	O	O
3.12	... bilgisayar derslerime <u>çalışmak için imkanlarımı</u> geliştirdi.	O	O	O	O	O
3.13	... bilgisayar derslerimdeki <u>performansımı</u> düşürdü.	O	O	O	O	O
3.14	... bilgisayar derslerimdeki <u>çalışma hızımı</u> düşürdü.	O	O	O	O	O
3.15	... bilgisayar derslerim hakkındaki <u>memnuniyetimi</u> arttırdı.	O	O	O	O	O
3.16	... bilgisayar derslerime daha çok önem vermem konusunda <u>yararı</u> oldu.	O	O	O	O	O
3.17	... bilgisayar derslerime çalışma <u>isteğimi</u> arttırdı.	O	O	O	O	O
3.18	... bilgisayar derslerimi <u>sıkıcı</u> hale getirdi.	O	O	O	O	O

BÖLÜM 4:

Lütfen aşağıda belirtilen ifadelere ne kadar katıldığınızı belirtin. Seçiminizi yaparken farenizi kullanınız ve lütfen her bir teknoloji için yalnızca bir seçim yapınız.

		Kesinlikle Katılmıyorum	Katılmıyorum	Fikrim Yok	Katılıyorum	Kesinlikle Katılmıyorum
4.1	"Small Basic" yazılımını kullanmayı öğrenmek benim için kolaydı.	O	O	O	O	O
4.2	"Small Basic" yazılımında kod yazmada ustalaşmak benim için kolaydı.	O	O	O	O	O
4.3	"Small Basic" yazılımının mesajları sade ve anlaşılırdı.	O	O	O	O	O
4.4	"Small Basic" yazılımının kullanıcı arayüzü sade ve anlaşılırdı.	O	O	O	O	O
4.5	"Small Basic" yazılımının kullanımını öğrenmek zordu.	O	O	O	O	O
4.6	"Small Basic" yazılımının mesajları bana yabancı olmayan terimler kullanıyor.	O	O	O	O	O
4.7	"Small Basic" yazılımının kullanıcı arayüzü bana yabancı olmayan terimler kullanıyor.	O	O	O	O	O
4.8	"Small Basic" yazılımının kullanıcı arayüzünü anlamak zordu.	O	O	O	O	O
4.9	"Small Basic" yazılımının kullanımı kolaydı.	O	O	O	O	O

BÖLÜM 5:

#	Soru
5.1	Small Basic yazılımını bilgisayar derslerinde yaklaşık olarak <u>ne sıklıkta</u> kullandın? Lütfen, kullanımı en iyi ifade eden seçeneklerden birini seç. ○ hiç ○ haftada 1-3 kez ○ haftada 3-5 kez ○ her gün ○ günde birden fazla Lütfen, nedenini ifade edin:
5.2	Small Basic yazılımını bilgisayar dersi sınıfının dışında yaklaşık olarak <u>ne sıklıkta</u> kullandın? Lütfen, aşağıdaki kutuya cevabını yaz. ○ hiç ○ haftada 1-3 kez ○ haftada 3-5 kez ○ her gün ○ günde birden fazla Lütfen, nedenini ifade edin:

APPENDIX B

STUDENTS' PERCEPTIONS ABOUT "KID'S PROGRAMMING

LANGUAGE – SMALL BASIC" QUESTIONNAIRE (SPKPL-Q)

(ENGLISH)

This questionnaire is prepared to explore the Plevne Elementary School 4th and 5th level students' perceptions about the use of "Kid's Programming Language – Small Basic" that is used in computer courses.

The questionnaire is prepared to be used for the master thesis study performed in Computer Education and Instructional Technologies Department in the Middle East Technical University.

Your responses will be kept confidential and will only be used for this study.

Contact

Tayfun AKÇAY (e138199@metu.edu.tr)

Academic Supervisor

Prof. Dr. M. Yaşar ÖZDEN

Please enter following information about yourself.

Gender: Male   ◯   Female ◯

SECTION 1:

In this section, 7 technologies are listed. For each of the technology, please select one of the competency levels that best describes your competency. Use your mouse pointer for selecting your choice and please select only one for each technology.

			Not Used	Beginner	Intermediate	Expert
1.1	Web browsers (Examples: Internet Explorer, Firefox, Netscape, Opera)		○	○	○	○
1.2	Search engines (Examples: Live, Google, Altavista, Yahoo, MSN, Lycos)		○	○	○	○
1.3	E-mail (Examples: Hotmail, Yahoo! Mail, Gmail, Outlook, etc.)		○	○	○	○
1.4	Online Forums & Blogs		○	○	○	○
1.5	Online Chat Applications (Examples: IRC, MSN Messenger, Yahoo! Messenger etc.)		○	○	○	○
1.6	Microsoft Office Applications					
	1.6.1	Microsoft Word	○	○	○	○
	1.6.2	Microsoft Excel	○	○	○	○
	1.6.3	Microsoft PowerPoint	○	○	○	○
1.7	Programming Language Software (Examples: Small Basic, Basic, Logo, Phrogram, etc.)		○	○	○	○

SECTION 2:

This section contains questions about your previous experiences about online and web supported learning environments. Use your mouse pointer for selecting your answer and please select only one answer for each question.

#	Question	YES	NO
2.1	Have you ever taken any web-supported or online course until now?	○	○
2.2	Have you ever taken any web-supported programming language courses before this semester?	○	○
2.3	Have you ever used the internet for your course studies until now? (Examples: Researches, homework, projects, etc.)	○	○
2.4	Have you have ever used any programming language software in your computer courses until now? (Examples: Small Basic, Basic, Logo, Phrogram, etc.)	○	○

SECTION 3:

Please indicate how much you agree or disagree with following statements listed below. Use your mouse to select your choice and please select only one for each statement.

Using "Kid's Programming Language – Small Basic";		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.1	... enabled us to accomplish computer courses more quickly.	O	O	O	O	O
3.2	... improved my performance in our computer courses.	O	O	O	O	O
3.3	... increased my participation to our computer courses.	O	O	O	O	O
3.4	... increased my interest on our computer courses.	O	O	O	O	O
3.5	... increased my productivity in our computer courses.	O	O	O	O	O
3.6	... made our computer courses enjoyable.	O	O	O	O	O
3.7	... decreased my willingness to work on our computer courses.	O	O	O	O	O
3.8	... enhanced my effectiveness in our computer courses.	O	O	O	O	O
3.9	... made it easier to study on our computer courses.	O	O	O	O	O
3.10	... increased my motivation towards our computer courses.	O	O	O	O	O

	Using "Kid's Programming Language – Small Basic";					
3.11	... increased my study time on our computer courses.	O	O	O	O	O
3.12	... improved our opportunity to work on our computer courses.	O	O	O	O	O
3.13	... has decreased my performance in our computer courses.	O	O	O	O	O
3.14	... decreased my work speed in our computer courses.	O	O	O	O	O
3.15	... increased my satisfaction about our computer courses.	O	O	O	O	O
3.16	... was useful in our computer courses.	O	O	O	O	O
3.17	... increased willingness to work on our computer courses.	O	O	O	O	O
3.18	... made our computer courses boring.	O	O	O	O	O

SECTION 4:

Please indicate how much you agree or disagree with each of the following statements listed below. Use your mouse pointer for selecting your choice and please select only one for each statement.

		Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
4.1	Learning to use "Small Basic" was easy for me.	O	O	O	O	O
4.2	It was easy to become skillful at using "Small Basic".	O	O	O	O	O
4.3	Messages of "Small Basic" were clear and understandable.	O	O	O	O	O
4.4	User interfaces of "Small Basic" were user-friendly.	O	O	O	O	O
4.5	It was difficult to learn to use "Small Basic".	O	O	O	O	O
4.6	Messages of "Small Basic" uses terms familiar to me.	O	O	O	O	O
4.7	User interfaces of "Small Basic" uses terms familiar to me.	O	O	O	O	O
4.8	It was hard to understand the user interface of "Small Basic".	O	O	O	O	O
4.9	I found "Small Basic" easy to use.	O	O	O	O	O

SECTION 5:

#	Question
5.1	Approximately, how frequently did you use "Small Basic" in your computer courses? Please select one of the choices which best describes your usage. ○ never ○ 1-3 times in a week ○ 3-5 times in a week ○ everyday ○ more than one in a day Please indicate your reason:
5.2	Approximately, how frequently did you use "Small Basic" in your out-of-class computer courses? Please enter your answer in the following box. ○ never ○ 1-3 times in a week ○ 3-5 times in a week ○ everyday ○ more than one in a day Please indicate your reason:

Pairs Questions

Positive Pair	Negative Pair
3.02	3.13
3.01	3.14
3.17	3.07
3.06	3.18
4.01	4.05
4.04	4.08

Subscale Items

Descriptive Subscales

1 Self-Reported Computer Competency

S1.01	Web Browsers
S1.02	Search Engines
S1.03	E-Mail
S1.04	Online Forums & Blogs
S1.05	Online Chat Applications
S1.06	Microsoft Office Applications
S1.07	Programming Language Software

2 Self-Reported E-Learning / Programming Language Experience

S2.01	Have you ever taken any web-supported or online course until now?
S2.02	Have you ever taken any web-supported programming language courses before this semester?
S2.03	Have you ever used the internet for your course studies until now?

S2.04   Have you have ever used any programming language software in your computer courses until now?

Perception Subscales

3   Effects of the use of kid's programming language – Small Basic on students' perceived motivation in their computer courses;

Using "Kid's Programming Language – Small Basic";

S3.03   ... increased my participation to our computer courses.

S3.04   ... increased my interest on our computer courses.

S3.06   ... made our computer courses enjoyable.

S3.07   ... decreased my willingness to work on our computer courses.

S3.10   ... increased my motivation towards our computer courses.

S3.11   ... increased my study time on our computer courses.

S3.15   ... increased my satisfaction about our computer courses.

S3.17   ... increased willingness to work on our computer courses.

S3.18   ... made our computer courses boring.

4   Perceived Usefulness

Using "Kid's Programming Language – Small Basic";

S3.01   ... enabled us to accomplish computer courses more quickly.

S3.02   ... improved my performance in our computer courses.

S3.05   ... increased my productivity in our computer courses.

S3.08   ... enhanced my effectiveness in our computer courses.

S3.09   ... made it easier to study on our computer courses.

S3.12   ... improved our opportunity to work on our computer courses.

S3.13   ... has decreased my performance in our computer courses.

S3.14   ... decreased my work speed in our computer courses.

S3.16   ... was useful in our computer courses.

5   Perceived Ease of Use

S4.01   Learning to use "Small Basic" was easy for me.

S4.02   It was easy to become skillful at using "Small Basic".

S4.03   Messages of "Small Basic" were clear and understandable.

S4.04   User interfaces of "Small Basic" were user-friendly.

S4.05   It was difficult to learn to use "Small Basic".

S4.06   Messages of "Small Basic" uses terms familiar to me.

S4.07   User interfaces of "Small Basic" uses terms familiar to me.

S4.08   It was hard to understand the user interface of "Small Basic".

S4.09   I found "Small Basic" easy to use.

6   Self-Reported Usage

S5.01   Approximately, how frequently did you use "Small Basic" in your computer courses? Please select one of the choices which best describes your usage.

S5.02   Approximately, how frequently did you use "Small Basic" in your out-of-class computer courses? Please enter your answer in the following box.

Reverse Coded Items

S3.07   ... decreased my willingness to work on our computer courses.

S3.18   ... made our computer courses boring.

S3.13   ... has decreased my performance in our computer courses.

S3.14   ... decreased my work speed in our computer courses.

S4.05   It was difficult to learn to use "Small Basic".

S4.08   It was hard to understand the user interface of "Small Basic".

Data Coding Guide

Factor Name	Section	Description / Code
Gender	Introduction Page	2-points nominal 1 = Male 2 = Female
Self-Reported Computer Competency	Section 1	Competency indicator items, 5-points ordinal, 0-4 (0=Not Applicable, 1=Beginner, 2=Novice, 3=Intermediate,4=Expert)
Self-Reported E-learning Experience	Section 2	Experience indicator items, 2-points nominal, 1 = Yes 2 = No
Perceived Usefulness, Perceived Effects on motivation in computer courses	Section 3	Perception indicator items, Likert-Type Scale, 1-5 (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree)
Perceived Ease of Use	Section 4	Perception indicator items, Likert-Type Scale, 1-5 (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree)
Self-Reported Usage	Section 5	Usage indicator items, Likert-Type Scale, 1-5 (1=never, 2=1-3 times in a week, 3=3-5 times in a week, 4=everyday, 5=more than one in a day)

"ÇOCUK PROGRAMLAMA DILI – SMALL BASIC" YAZILIMI HAKKINDA ÖĞRETMEN ALGISI GÖRÜŞME KILAVUZU (TPKPL-IG) (TURKISH)

Bu görüşme, Plevne İlköğretim Okulu 4. ve 5. sınıf öğrencilerinin bilgisayar derslerinde kullandıkları "Çocuk Programlama Dili – Small Basic" yazılımı hakkında öğretmenlerin algılarını araştırmak için hazırlanmıştır.

Bu görüşme, Orta Doğu Teknik Üniversitesi – Bilgisayar ve Öğretim Teknolojileri Eğitimi bölümünde yapılan yüksek lisans tez çalışmasında kullanmak üzere hazırlanmıştır.

Eğer sizin için de uygunsa, görüşmemiz ile ilgili hiçbir noktayı kaçırmamak adına bu görüşmeyi kayıt edeceğim.

Verilen cevaplar tamamı ile gizli tutulacak ve sadece bu çalışma için kullanılacaktır.

İletişim

Tayfun AKÇAY (e138199@metu.edu.tr)

Akademik Danışman

Prof. Dr. M. Yaşar ÖZDEN

Görüşme Tarihi	:	___ / ___ / _____
Görüşmeyi Yapan Kişi	:	_____
Görüşmeci	:	_____

BÖLÜM 1:

1. Ne kadar süredir Plevne İlköğretim Okulu'nda öğretmen olarak çalışıyorsunuz?

2. Ne kadar süredir bilgisayar dersi veriyorsunuz?

3. Daha önce herhangi bir e-öğrenme platformu kullandınız mı?

4. Daha önce herhangi bir programlama dilini derslerinizde kullandınız mı?

    Eğer cevap evet ise, aşağıdaki sorularla devam edin;

    4.1. Programlama dili kullanmada amacınız neydi?

    4.2. Deneyiminiz süresince hangi programlama dillerini kullandınız?

    4.3. Yararlı buldunuz mu?

    4.3.1. Neden?

BÖLÜM 2:

5. Bu teknolojinin kullanımı öğrencilerin bilgisayar derslerindeki motivasyonlarını nasıl etkiledi? Pozitif olarak, negatif olarak ya da etkilemedi?

Eğer cevap "etkilemedi" ise, aşağıdaki sorularla devam edin;

    5.1. Bu teknolojinin kullanımının öğrencilerin motivasyonunu neden etkilemediğini düşünüyorsunuz? Size göre ne gibi faktörler olabilir?

    Negatif cevaptan emin olmak ve daha detaylı bilgi alabilmek için 5.2.1 numaralı soru ile devam edin.

Eğer cevap "negatif olarak" ise, aşağıdaki sorularla devam edin;

    5.1. Bu teknolojinin kullanımının öğrencilerin motivasyonunu neden negatif olarak etkilediğini düşünüyorsunuz? Size göre ne gibi faktörler olabilir?

Negatif cevaptan emin olmak ve daha detaylı bilgi alabilmek için 5.2.1 numaralı soru ile devam edin.

Eğer cevap "pozitif olarak" ise, aşağıdaki sorularla devam edin;

5.2. Bu teknolojinin kullanımıyla öğrencilerin motivasyonun arttığının göstergeleri nelerdir?

Eğer aşağıdaki göstergelerin üzerinden geçilmediyse, aşağıdaki soruları sorun.

Bu teknolojinin kullanımının ...

5.2.1. ... öğrencinin bilgisayar derslerine katılımını ...

5.2.2. ... öğrencinin bilgisayar derslerine ilgisini ...

5.2.3. ... öğrencinin bilgisayar derslerindeki hoşnutluğunu / zevkini ...

5.2.4. ... öğrencinin bilgisayar derslerindeki çalışma süresini ...

5.2.5. ... öğrencinin bilgisayar dersleri hakkındaki memnuniyetini ...

5.2.6. ... öğrencinin bilgisayar derslerine çalışma isteğini

... arttırdığını gözlemlediniz mi?

BÖLÜM 3:

6. Bu teknolojinin öğrencinin bilgisayar derslerine yararlılığı hakkında ne düşünüyorsunuz? Yararlı mı, değil mi?

Eğer cevap "olumsuz" ise, aşağıdaki sorularla devam edin;

6.1. Neden bu teknolojinin kullanımının yararlı olmadığını düşünüyorsunuz?

6.1.1. Yetersiz özellikler mi vardı?

6.1.2. Ne tür geliştirmeler mümkün olabilir?

Negatif cevaptan emin olmak ve daha detaylı bilgi alabilmek için 6.2.1 numaralı soru ile devam edin.

Eğer cevap "olumlu" ise, aşağıdaki sorularla devam edin;

6.2. Hangi yönleriyle bu teknoloji, öğrencilerin bilgisayar dersleri için yararlı idi?

Eğer aşağıdaki göstergelerin üzerinden geçilmediyse, aşağıdaki soruları sorun.

Bu teknolojinin kullanımının ...

6.2.1. ... öğrencilerin bilgisayar derslerindeki çalışma hızlarını arttırdığını ...

6.2.2. ... öğrencilerin bilgisayar derslerindeki performanslarını arttırdığını ...

6.2.3. ... öğrencilerin bilgisayar derslerindeki verimliliklerini arttırdığını ...

6.2.4. ... öğrencilerin bilgisayar derslerine katkısını arttırdığını ...

6.2.5. ... bilgisayar derslerindeki projelerinin geliştirilmesini kolay hale getirdiğini ...

6.2.6. ... bilgisayar derslerindeki projelerde çalışmak için imkanlarını arttırdığını ...

... gözlemlediniz mi?

6.3. Genel olarak bu teknolojinin kullanımı yararlı mıydı?

BÖLÜM 4:

Lütfen aşağıdaki sorulara gözlemlerinize göre cevap veriniz.

7. "Çocuk Programlama Dili (Small Basic)" yazılımının kullanımını öğrenmek öğrencileriniz için kolay oldu mu?

8. "Small Basic" yazılımını kullanımında öğrencilerinizin yüzde kaçı sizin bakış açınız ile usta kategorisinde yer aldı?

9. "Small Basic" yazılımının kullanıcı ara yüzleri ve mesajları öğrencileriniz için sade ve anlaşılır mıydı?

10. "Small Basic" yazılımının kullanıcı ara yüzü ve mesajları öğrencileriniz için kullanıcı dostu muydu?

11. "Small Basic" yazılımı, kullanıcı ara yüzü ve mesajlarında öğrencileriniz için yabancı olmayan terimler mi kullanıyor?

12. "Small Basic" yazılımının kullanıcı ara yüzünü anlama da öğrencileriniz zorluk yaşadı mı?

13. Genel olarak, "Small Basic" yazılımının kullanımı öğrencileriniz için kolay mıydı?

BÖLÜM 5:

14. Bu teknolojinin bilgisayar derslerindeki kullanımları ve geleceği hakkındaki önerileriniz nelerdir?

15. Bu teknolojinin kullanımının diğer avantajları neler olabilir?

16. Bu teknolojinin kullanımının diğer dezavantajları neler olabilir?

Sorularım burada bitiyor. Katkınız için çok teşekkürler.

Sorular ve konu ile ilgili herhangi bir yorumunuz var mı?

TEACHERS' PERCEPTIONS ABOUT "KID'S PROGRAMMING LANGUAGE – SMALL BASIC" INTERVIEW GUIDE (TPKPL-IG) (ENGLISH)

This interview is prepared to explore the teachers' perceptions about the use of "Kid's Programming Language – Small Basic" that is used by Plevne Elementary School 4th and 5th level students in computer courses.

The interview is prepared to be used for the master thesis study performed in Computer Education and Instructional Technologies Department in the Middle East Technical University.

If it is all right for you, I would like to record our conversation to make sure that will not miss any point of the interview.

Your responses will be kept confidential and will only be used for this study.

Contact

Tayfun AKÇAY (e138199@metu.edu.tr)

Academic Supervisor

Prof. Dr. M. Yaşar ÖZDEN

Interview Date   :   ___ / ___ / _____

Interviewer   :   _____

Interviewee   :   _____

SECTION 1:

1. How long have you been working as a teacher in Plevne Elementary Schools?

2. How long have you been giving computer course?

3. Have you ever used any e-learning portal before?

4. Have you ever used any programming language in your courses before?

If the answer is yes, continue with following questions;

4.1. What was your purpose when using programming language?

4.2. Which programming languages did you use in your experience?

4.3. Did you find it beneficial?

4.3.1. Why?

SECTION 2:

5. How did the use of this technology effect the motivation of the students towards their concentrating on computer courses? Positively, negatively or not effected?

If the answer is "not effected", continue with the following questions;

5.1. Why do you think that the use of this technology not effected student's motivation? What can be the possible factors in your opinion?

Continue with question 5.2.1 to drill down to get detailed information and to ensure negative answer.

If the answer is "negatively", continue with the following questions;

5.1. Why do you think that the use of this technology effected student's motivation negatively? What can be the possible factors in your opinion? Continue with question 5.2.1 to drill down to get detailed information and to ensure negative answer.

If the answer is "positively", continue with the following questions;

5.2. What are the indicators of the increase of the students' motivation by the use of this technology?

If the following indicators are not covered, ask following questions.

Have you observed that the use of this technology has increased?

5.2.1. … student's participation to the computer courses?

5.2.2. … student's interest to the computer courses?

5.2.3. … student's enjoyment in the computer courses?

5.2.4. … student's study time in the computer courses?

5.2.5. … student's satisfaction about the computer courses?

5.2.6. … student's willingness to work on the computer courses?

SECTION 3:

6. What do you think about the usefulness of this technology in student's computer courses? Was it useful or not?

If the answer is negative, continue with the following questions;

6.1. Why do you think that the use of this technology was not useful?

6.1.1. What were the insufficient features?

6.1.2. What can be the possible improvements?

Continue with question 6.2.1 to drill down to get detailed information and
ensure negative answer.

If the answer is positive, continue with the following questions;

6.2. In what ways, was this technology useful in student's computer courses?

If the following indicators are not covered, ask the following questions.

Have you observed that the use of the technology has;

6.2.1. … increased students' work speed in the computer courses?

6.2.2. … increased students' performance in the computer courses?

6.2.3. … increased students' productivity in the computer courses?

6.2.4. … increased students' contribution to the computer courses?

6.2.5. … made the development of projects on the computer courses easy?

6.2.6. … improved students' opportunity to work on projects on the
computer courses?

6.3. Overall, was the use of this technology useful?

SECTION 4:

Please answer the following questions based on your observations.

7. Was learning to use "Small Basic" easy for your students?

8. Was becoming skillful at using "Small Basic" easy for your students?

9. Were user interfaces and messages of "Small Basic" clear and understandable for
your students?

10. Were user interfaces and messages of "Small Basic" user friendly for your
students?

11. Does user interfaces and messages of "Small Basic" uses terms familiar for your students?

12. Was it hard to understand the user interfaces of "Small Basic" for your students?

13. Overall, was the use of "Small Basic" easy for your students?

SECTION 5:

14. What can be your suggestions about the future and other possible uses of this technology in the computer courses?

15. What can be other advantages of the use of this technology?

16. What can be other disadvantages of the use of this technology?

My questions end here. Thank you very much for your contribution.

Do you have any other comments on the issue or the questions?

APPENDIX E

SMALL BASIC

In this appendix, information about Small Basic was presented and official MSDN resources were provided (MSDN, 2009).

Microsoft Small Basic is programming language for children. It is created to provide easy, approachable and entertaining programming environment for beginners. By Small Basic, it is aimed to bring down the barrier to learn programming languages and serve this programming language as a stepping stone to more professional computer programming environments.

Small Basic is a project and it's aimed to provide entertaining environment for children about programming. By providing very small and easy to learn programming language in a friendly development environment, Small Basic lets beginners code in funny environment as playing a game. Small Basic helps beginners to take the first step into the glorious world of programming. It is both ideal for kids and beginner adults.

- Small Basic's inspiration emerges from the original BASIC programming language. It is based on the Microsoft .NET platform. It includes only 15

keywords and uses minimal programming concepts. By this way, some difficulties while learning programming are overcome for beginner learners.

- The development environment of Small Basic is very simple. However, it also provides powerful modern environment features such as instant context sensitive help and Intellisense.

- Moreover, Small Basic allows other third-party libraries to be added in easily. By this way, it is offered many programming communities to enhance the experience in fun and interesting ways.

The Small Basic Environment

When SmallBasic is first launched, it will be seen a window that looks like as the following figure.
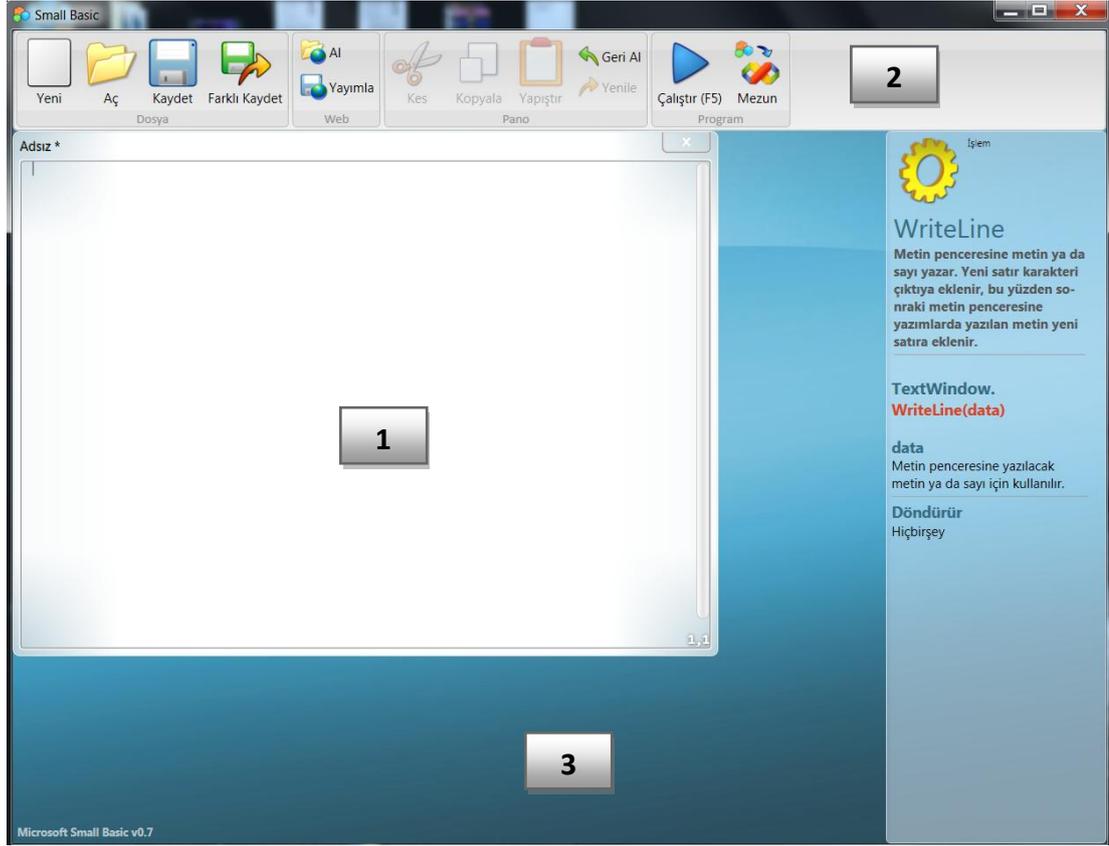
Figure E.1   Small Basic Environment

This is the Small Basic Environment, where learners will write and run their Small Basic programs. This environment has several distinct elements which are identified by numbers.

The Editor, identified by (1) is where learners will write their Small Basic programs. When learners open a sample program or a previously saved program, it will show up on this editor. Learners can then modify it and save if for later use.

Learners can also open and work with more than one program at one time. Each program they are working with will be displayed in a separate editor. The editor that contains the program they are currently working with is called the active editor.

The Toolbar, identified by (2) is used to issue commands either to the active editor or the environment. Learners will learn about the various commands in the toolbar as they go.

The Surface, identified by (3) is the place where all the editor windows go.

Also, for this study, by the lights of participants' recommendations, Small Basic has been translated into Turkish including help files and intellisense feature.
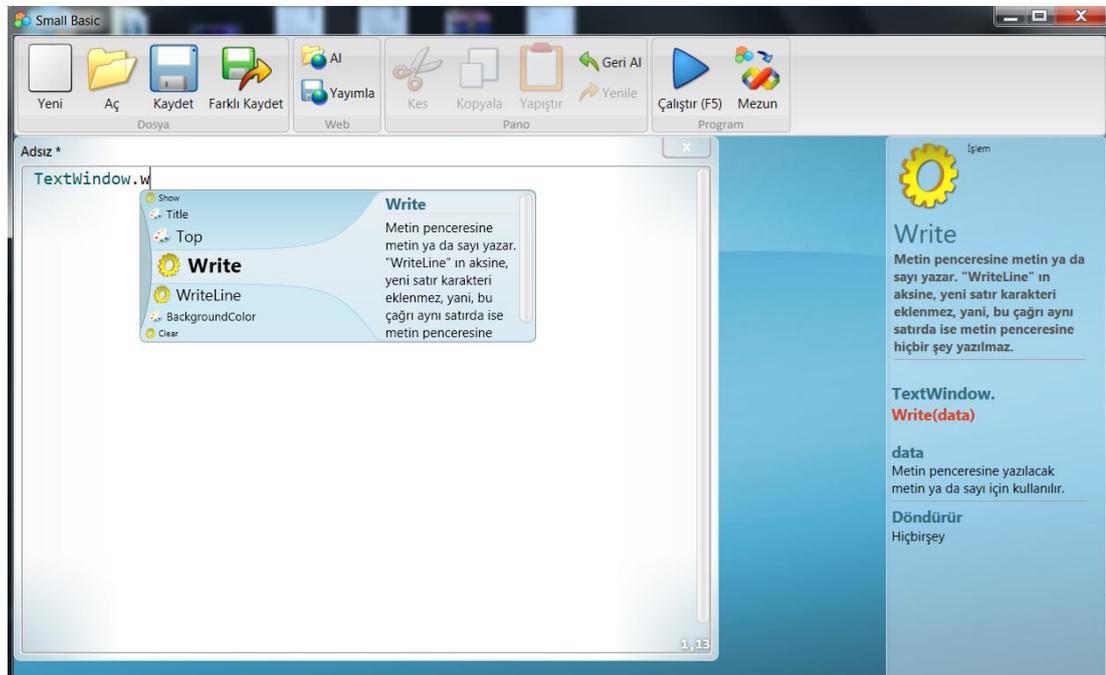

**Figure E.2**   Small Basic Intellisense Feature and Instant Help
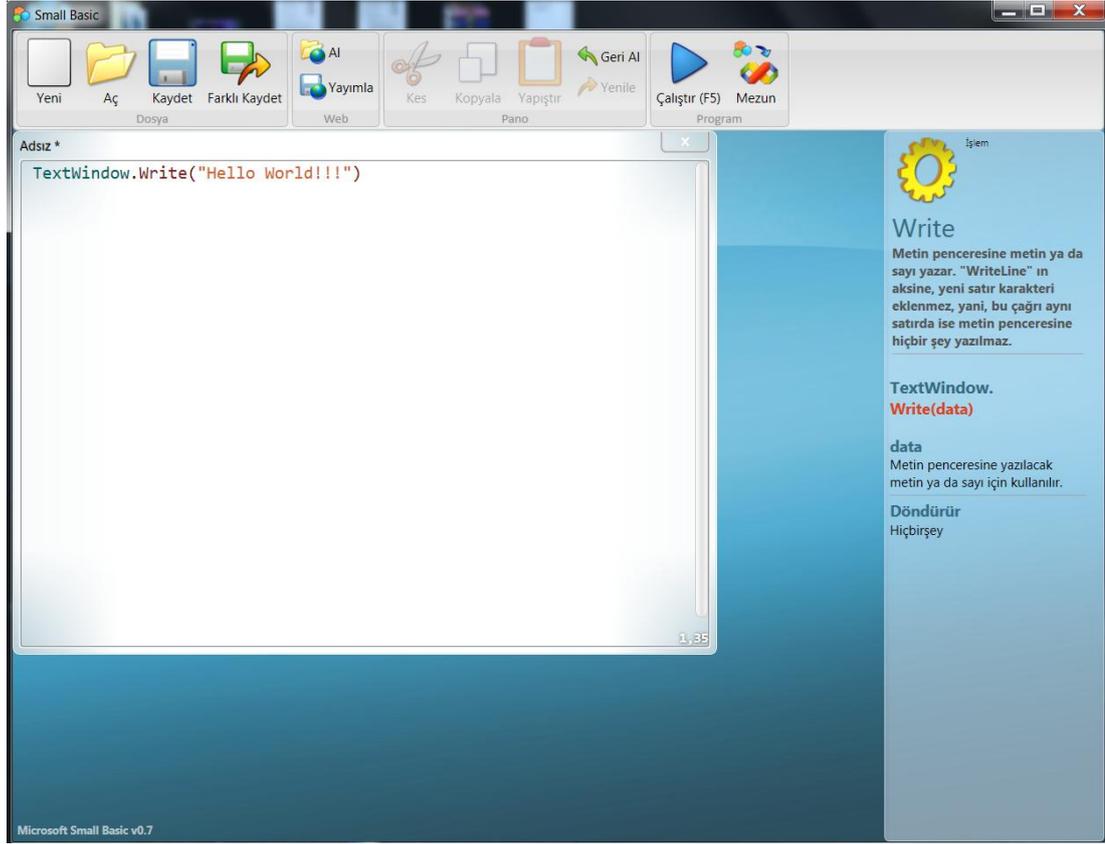
Figure E.3 Sample Small Basic Program

Screenshots from Students' Turtle Graphics Works
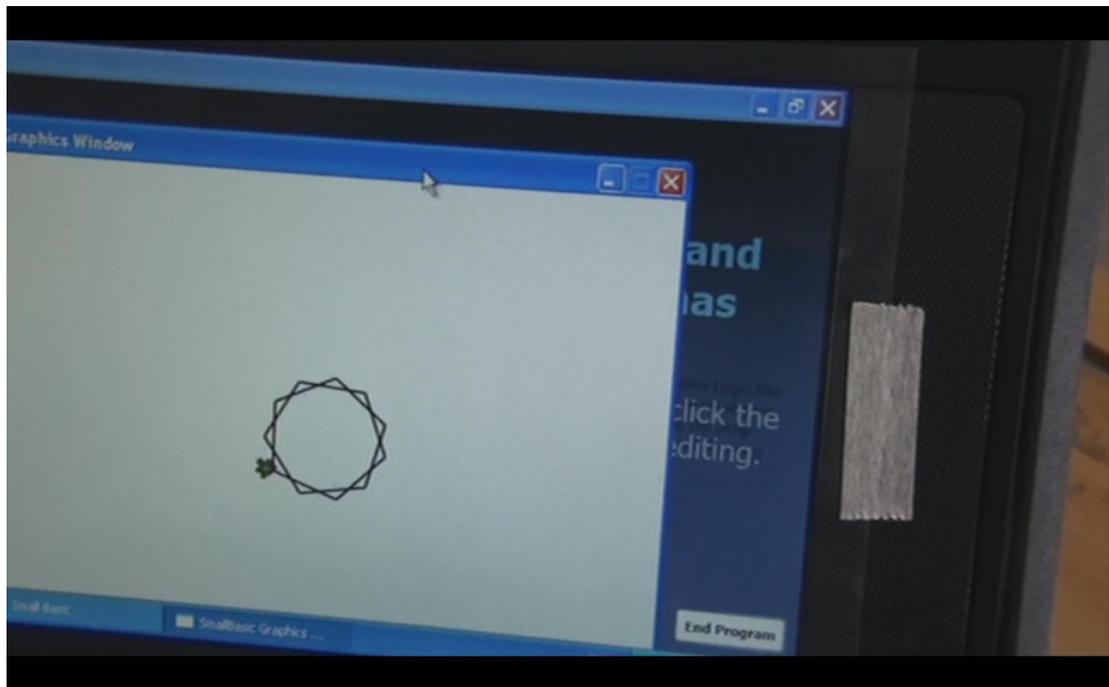
Figure E.4   Screenshot 1
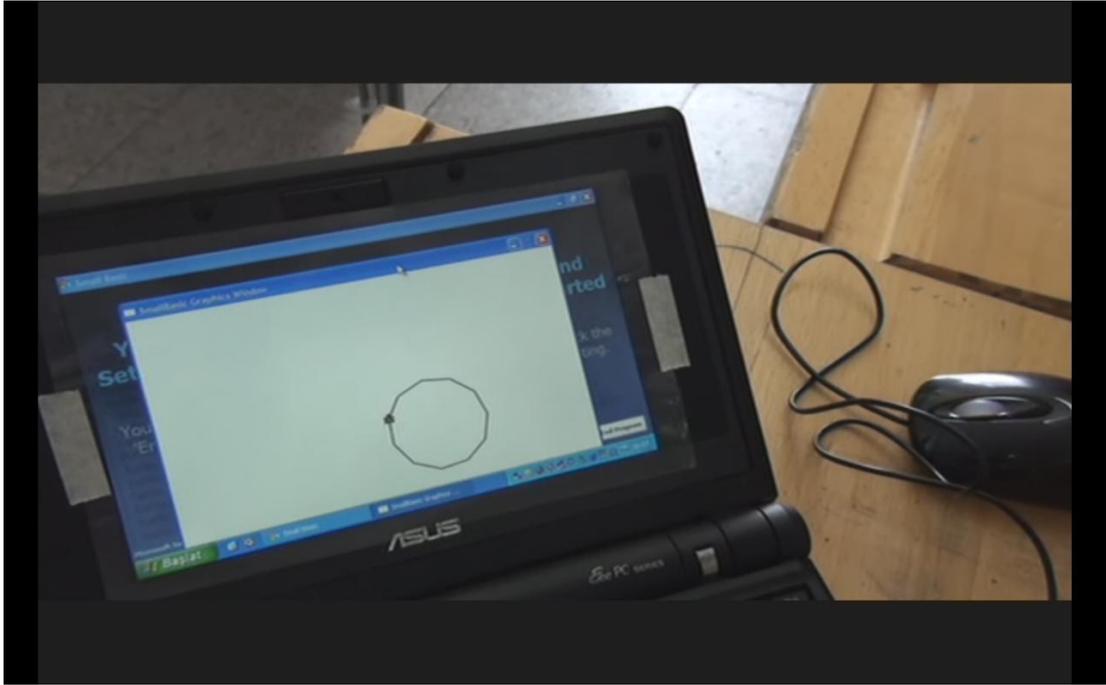
**Figure E.5**   Screenshot 2
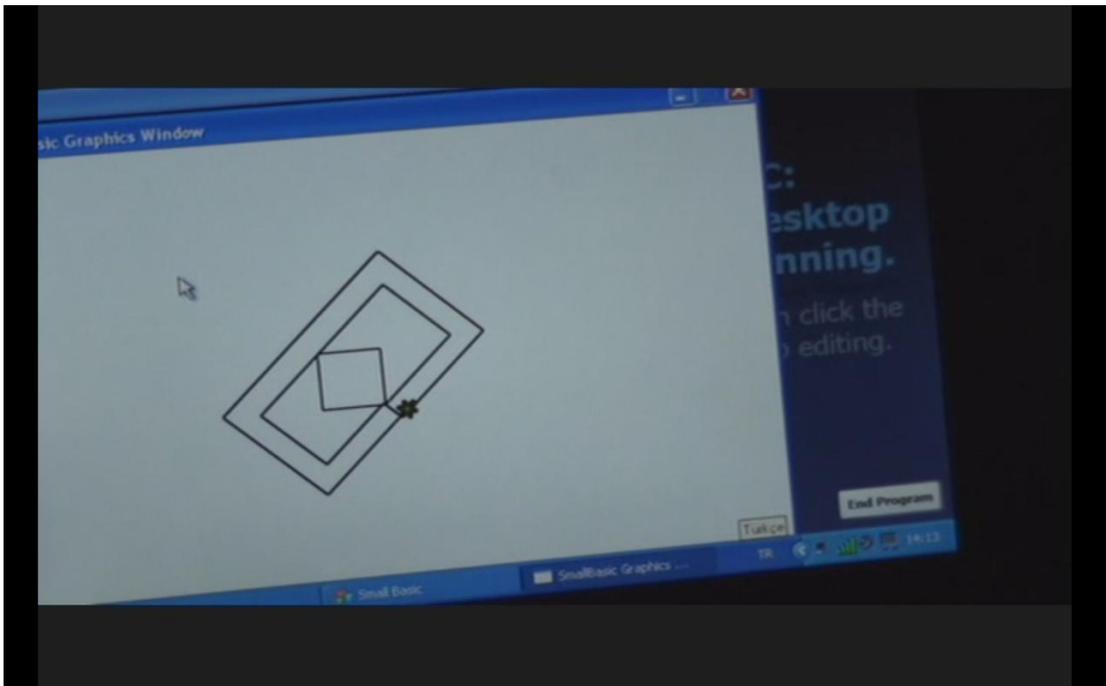
**Figure E.6**   Screenshot 3
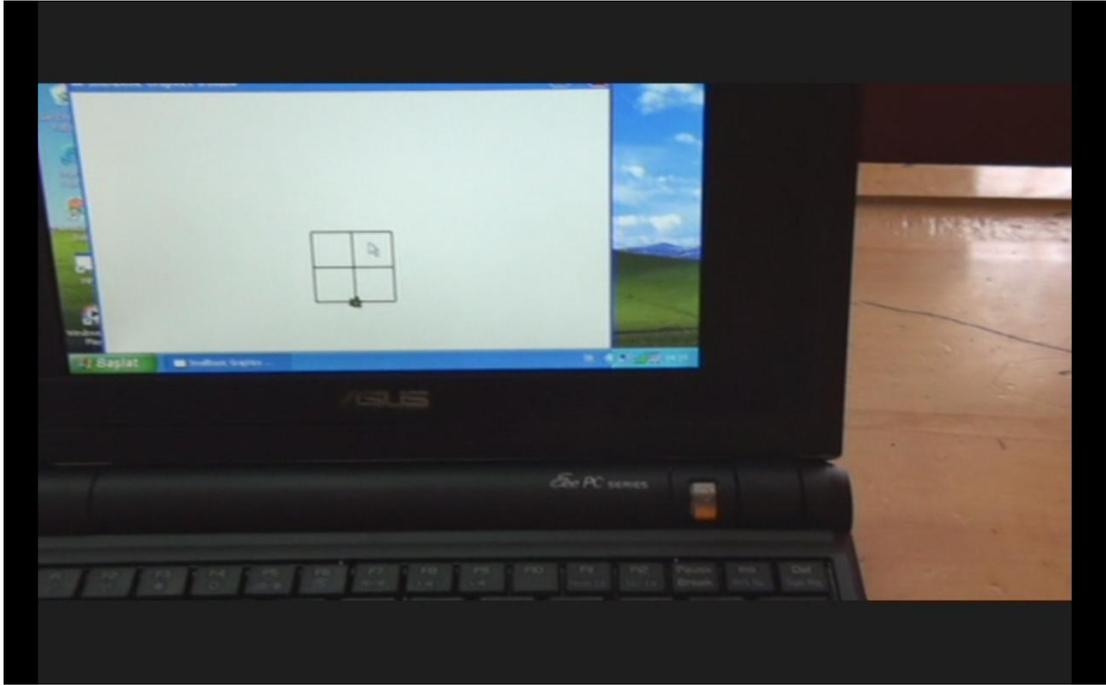
Figure E.7   Screenshot 4
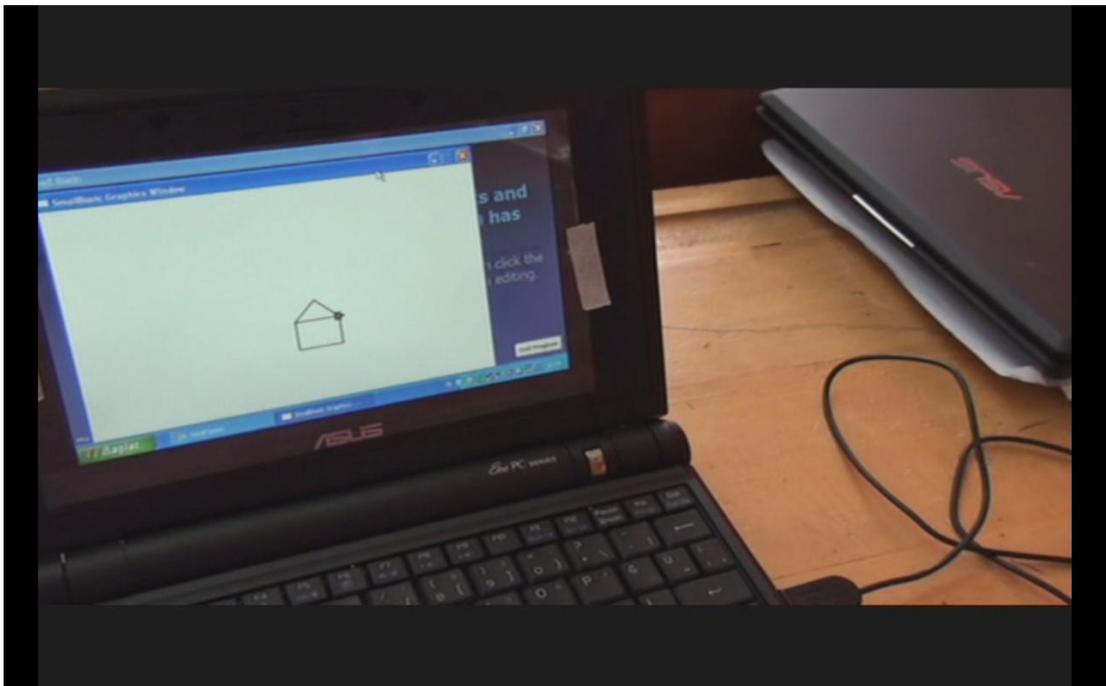
Figure E.8   Screenshot 5

APPENDIX F

DESCRIPTIVE STATISTICS OF QUESTIONS FOR STUDENTS'

PERCEPTIONS ABOUT SMALL BASIC QUESTIONNAIRE

Table F.1   Descriptive Statistics of Questions for Students' Perceptions about Small Basic Questionnaire

Question	SD		D		N		A		SA		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
S3.01	4	5.9	2	2.9	4	5.9	12	17.6	46	67.6	4.38	1.120
S3.02	2	2.9	10	14.7	4	5.9	18	26.5	34	50.0	4.06	1.196
S3.03	2	2.9	2	2.9	12	17.6	12	17.6	40	58.8	4.26	1.045
S3.04	2	2.9	4	5.9	6	8.8	14	20.6	42	61.8	4.32	1.057
S3.05	4	5.9	0	0	6	8.8	24	35.3	34	50.0	4.24	1.038
S3.06	2	2.9	2	2.9	6	8.8	8	11.8	50	73.5	4.50	0.985
S3.07	2	2.9	2	2.9	10	14.7	16	23.5	38	55.9	4.26	1.017
S3.08	2	2.9	4	5.9	2	2.9	16	23.5	44	64.7	4.41	1.011
S3.09	4	5.9	2	2.9	6	8.8	18	26.5	38	55.9	4.24	1.121
S3.10	2	2.9	0	0	14	20.6	18	26.5	34	50.0	4.21	0.971
S3.11	6	8.8	0	0	4	5.9	16	23.5	42	61.8	4.29	1.185
S3.12	0	0	4	5.9	2	2.9	18	26.5	44	64.7	4.50	0.820
S3.13	6	8.8	2	2.9	10	14.7	14	20.6	36	52.9	4.06	1.268
S3.14	8	11.8	4	5.9	4	5.9	16	23.5	36	52.9	4.00	1.382
S3.15	0	0	4	5.9	10	14.7	16	23.5	38	55.9	4.29	0.931
S3.16	0	0	4	5.9	2	2.9	14	20.6	48	70.6	4.56	0.817
S3.17	0	0	4	5.9	8	11.8	8	11.8	48	70.6	4.47	0.922
S3.18	10	14.7	0	0	12	17.6	4	5.9	42	61.8	4.00	1.466