DESIGN AND DEVELOPMENT OF AN ELECTRONIC PERFORMANCE SUPPORT SYSTEM for NOVICE INSTRUCTIONAL DESIGNERS

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ABSTRACT

DESIGN AND DEVELOPMENT OF AN ELECTRONIC PERFORMANCE SUPPORT SYSTEM for NOVICE INSTRUCTIONAL DESIGNERS

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Instructional designers are the people whose purpose is to provide solutions to illdefined instructional problems to reach intended learning outcomes in a systematic way. The purpose of this dissertation study is to design and develop an electronic performance support system (EPSS) to support novice instructional designers (NIDs) in instructional system design process. The study also aims to reveal the key elements of an EPSS if it is designed to help novice instructional designers. A design and development research was carried out in this study and qualitative approaches were used to collect data during this study. Purposively selected 23 NIDs participated in this study. It is three-cycle design and development study including analysis, design, implementation and redesign in each phases in line with analysis, design, development, implementation and evaluation (ADDIE) model. Throughout the first and second phases of this study, an EPSS was designed and developed. After that in the final phase this EPSS was evaluated by the NIDs. Results of this study showed that tutorials, examples, resources, tools, wizard, user interface, database and help are the main components of an EPSS that designed for instructional designers. Moreover, according to perceptions of NIDs, using EPSS during instructional system design process has a positive effect of NIDs performances. This dissertation study concludes with suggestions for practitioners and researchers.

Keywords: Electronic Performance Support System (EPSS), Novice Instructional Designer, Instructional Design, Design And Development Research

DENEYİMSİZ ÖĞRETİM TASARIMCILARI İÇİN BİR ELEKTRONİK PERFORMANS DESTEK SİSTEMİ TASARLANMASI VE GELİŞTİRİLMESİ

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Doktora, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Tez Yöneticisi: Prof. Dr. Kürşat Çağıltay Ağustos 2015, 229 sayfa

Öğretim tasarımcıları amaçlanan öğrenme çıktılarına ulaşmak için tam tanımlanmamış eğitsel problemlere sistematik bir şekilde çözüm sağlamayı amaç edinen kişilerdir. Bu doktora tezi çalışmasının amacı, deneyimsiz öğretim tasarımcılarını öğretim sitemleri tasarımı sürecinde destekleyecek bir elektronik performans destek sistemini (EPDS) tasarlamak ve geliştirmektir. Bu çalışma ayrıca deneyimsiz eğitsel tasarımcılara eğitsel sistem tasarlama ve geliştirme sürecinde yardımcı olacak bir EPDS'nin sahip olması gereken önemli unsurları ortaya çıkarmayı amaçlamaktadır. Bu çalışmada tasarlama ve geliştirme araştırma modeli uygulanmış ve çalışma sürecinde veri toplamak için nitel yaklaşımlar kullanılmıştır. Bir amaca bağlı olarak seçilen 23 deneyimsiz öğretim tasarılama döngülerini her aşamada analiz, tasarlama, geliştirme, uygulama ve değerlendirme (ADDIE) modeline uygun olarak içeren 3 farklı aşamadan oluşan bir tasarlama ve geliştirme araştırmasıdır.

Bu çalışmada ilk iki aşamada bir EPDS tasarlanmış ve geliştirilmiştir. Daha sonra son aşamada bu EPDS deneyimsiz öğretim tasarımcıları tarafından değerlendirilmiştir. Bu çalışmanın sonuçlarına göre; eğitimler, örnekler, kaynaklar, araçlar, sihirbaz, arayüz, veritabanı ve yardım öğretim tasarımcıları için geliştirilecek olan bir EPDS'nin temel unsurlarıdır. Ayrıca, katılımcıların algılarına göre, öğretim sistemi tasarımı sürecinde bir EPDS kullanımının deneyimsiz öğretim tasarımcılarının performansına olumlu bir etkisi olduğu görülmüştür. Bu çalışma uygulayıcılar ve araştırmacılar için öneriler sunularak sonlandırılmıştır.

Anahtar Kelimeler: Elektronik Performans Destek Sistemi (EPDS), Deneyimsiz Öğretim Tasarımcısı, Öğretim Tasarımı, Tasarlama ve Geliştirme Araştırması To My Father and Mother

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

As instructional designers, while developing an instructional material, intervention or setting, we use some models and theories. However, before designing an instructional system, we should have some ideas about what instructional design is. Instructional design is described as "a discipline concerned with understanding and improving one aspect of education: the process of instruction" (Reigeluth, 1983, p.4) and if we want to describe it as a practice area it can be explained as "deciding what methods of instruction are best for bringing about desired changes in student knowledge and skills for a specific course of content and a specific student population" (Reigeluth, 1983, p.7). In other words, while designing an instruction, an instructional designer's ultimate goal is to help learners or learner groups in reaching intended outcomes. Moreover, instructional design is a system of procedures for designing short or long term instructional programs in a regular and dependable way and instructional models are the tools that describe how to perform the instructional design progress (Gustafson & Branch, 2002). Therefore, instructional designers should utilize an instructional design model while designing instruction.

Instructional design models present "conceptual and communicational tools that can be used to visualize, direct and manage processes for creating high quality instruction" (Gustafson & Branch, 2002, p.21). Instructional design models (IDMs) also provide a

guideline for instructional designers. Reigeluth and Allison stated that instructional design theories help us to clarify how instructional content should be thought (Reigeluth & Allison, 2006). Without this knowledge, it is hard to design a successful instructional system. IDMs generally help us to analyze, design, develop, implement and evaluate instructional system. These steps provide a visualized plan of an instructional system project. There are many IDMs in the literature, but if the IDM approaches the instructional problem in a systematic way, the analysis, design, development, implementation and evaluation steps are included in the model under different names. The generic IDM includes these steps called as ADDIE model.

Instructional systems include learners, teachers, administrators, content, context, learning theories etc. Each of these components plays an important role in the instructional system. While we are creating an instructional system, we should examine the system, make our instructional design according to this analysis and develop our product. If we do not follow the model, we cannot examine the instructional system, its needs and main objectives and as a result of this, we cannot realize a successful instructional system that we want to have at the beginning. As Schiffman (1995) stated, IDMs include researching on required educational theory, analyzing the instructional system and collecting and analyzing data about the system, designing project with the required acceptance among learners, teachers and administrators and project, managing interpersonal relationship and designing the contract between client and firm and managing the project.

Instructional design process includes ill-defined problems and instructional designers should be innovative, dynamic, and *iterative* in their design process (Gustafson & Branch, 2002). As a result, instructional designers are experienced people who have knowledge about how to apply a design model to solve an ill-structured instructional design problem. It is stated that expert and novice instructional designers approach ID problems differently and when experts solve an ill-defined instructional design problem they "(1) narrowed the problem space by identifying key design challenges, (2) used an amalgam of knowledge and experience to interpret the problem situation, (3)

incorporated a mental model of the ID process in their problem analyses, and (4) came to similar conclusions about how to respond to the situation, despite differences in their initial conceptualizations" (Ertmer et. al., 2008, p.17). Therefore, novice instructional designers lack the tacit knowledge of the experts in using instructional design models and developing an instruction with the help of IDMs. For this reason, they need some support to reach the expert level.

In this study, novice instructional designers are supported with the help of an electronic performance support system (EPSS). EPSS is defined as "computer mediated environments that are designed to generate immediate work performance, whether or not the individual performer has the knowledge or skill to perform the work independently without the performance support system" (Gery, 2002). In the literature, there are computer-based instructional design tools that were developed to support the design process. According to Merriënboer and Martens (2002), they are a kind of EPSS because they support the designers during the design process and they conclude that these tools designed for providing following supports: "(a) library and information support, by providing useful resources and databases, (b) standardization support, by providing rules, regulations and directions for performing specific tasks, (c) full or partial task automation, by providing automated tools, expert systems and wizards, and (d) instruction, by providing users just-in-time learning materials that may help to perform their tasks" (p.7). For example, CASCADE-MUCH project is one of these instructional design tools that aimed to provide an EPSS for teachers to develop "instructional scenarios for multimedia curricula" and research results showed that this EPSS is effective (Wang, Nieveen & Akker, 2007, p. 275).

1.2 Purpose of the Study

The purpose of this study is to design and develop an electronic performance support system to support novice instructional designers in instructional system design process by using ADDIE model. The study aims to reveal the key elements of such an EPSS.

1.3 Research Questions

1. What are the key elements of an EPSS that is designed to support NIDs during instructional system design and development?

2. How do NIDs view the value of the designed EPSS to improve their performance on instructional system design and development?

1.4 Significance of the Study

As stated in the previous part, using an IDM is very important for instructional design. Instructional problems are generally ill-defined problems because there are many components in the target setting and each component has different effect on the other components. Therefore, the skills for analyzing the problem statement and providing a solution demands high expertise. However, NIDs do not have this knowledge.

In our educational system, teachers are the key persons who try to provide solutions to instructional problems. They are subject matter experts but not always knowledgeable about the instructional design processes and models. Beyond this, there are people who deal with the preparation of condensed training sessions in the companies or workers who try to develop a brief instruction about a new system in the work environment or even how the employees will use the office tools. In these cases, a person who wears the instructional designer's hat generally is not experienced about instructional design and IDMs. The results of this study, the EPSS, address those people. The purpose of this study is to develop an EPSS for instructional design and development by using ADDIE model and this EPSS aims to support NIDs. Additionally, in this study, the final product is tested on novice instructional designers. Hence, this study provides information about the effect of an EPSS on the ability of the novice instructional designers about the application of an IDM in instructional design and development.

Moreover, results of this study provide design principles for EPSS design for NIDs. In the literature there are publication related to EPSS components and characteristics of EPSS but there are not enough studies about practical information about how to design an EPSS specifically for NIDs. Design principles can provide practical guidelines to designers. By using them, they can have a start point in designing EPSS and can improve these principles according to their experiences.

1.5 Definitions of the Terms

ADDIE model: a systematic instructional design model whose steps are analysis, design, development, implementation and evaluation.

Electronic Performance Support System: systems that are used to support performance and learning of people on the job. They provide guidance to users to accomplish tasks like an expert does.

Instructional design: A purposeful activity that results in a combination of strategies, activities and/or resources to facilitate learning (Spector et. al., 2008, p.822).

Instructional design model: A coherent set of mostly prescriptive theoretical statements on the appropriateness of particular instructional approaches or interventions (Spector et. al., 2008, p.822).

Instructional designer: A person with the knowledge and skills to design effective instruction (Spector et. al., 2008, p.822).

Novice Instructional Designer: An instructional designer who does not have expertise in instructional design is the novice instructional designers. In this study novice instructional designer specifically defined as pre-service students who did take no more than 2 instructional undergraduate courses and applied an IDM to design and develop an instructional material no more than one times considered as a NIDs in this study.

Subject matter expert: a person who is extensively knowledgeable about the subject that instructional material is about but usually does not have enough knowledge about instructional design.

Storyboard: "A document that details and specifies onscreen text, narrative scripts, and interaction in a paper-based format before it is converted into an online course" (Spector et. al., 2008, p.826).

1.6 Abbreviations

EPSS: Electronic Performance Support System

- NID: Novice Instructional Designer
- ADDIE: Analysis, Design, Development, Implementation and Evaluation
- IDM: Instructional Design Model

SME: Subject Matter Expert

CHAPTER 2

LITERATURE

In this part of the study, literature review is presented. First, what instructional design is explained and assumptions and properties of instructional design is summarized. After that, instructional design model and classification of instructional design models is briefly explained. Then, the reasons for using an instructional design model are described and the ADDIE model is described in detail. Next, the characteristics of novice instructional designers described with respect to literature. Finally, Electronic Performance Support Systems (EPSS) is explained in the framework of its definition, types, components and characteristics. This chapter is finalized with sample EPSS studies in the literature.

2.1 What is instructional design?

During our lives, we participated in many instructional processes to learn a skill, information, or etc. We know that some of the instructions that we attended were very effective to us and some of them were very poor or did not fit to our needs. What do you think the difference between the good and bad examples? What factors make the good example an efficient instruction and the others an incompetent learning experience? Was it the instruction, teaching method, materials, resources or all of them? Actually, one way or the other, the real reason was the design of the instruction.

Instructional design is described as "a discipline concerned with understanding and improving one aspect of education: the process of instruction" (Reigeluth, 1983, p.4) and if we want to describe it as a practice area it can be explained as "deciding what methods of instruction are best for bringing about desired changes in student knowledge and skills for a specific course of content and a specific student population" (Reigeluth, 1983, p.7). In other words, while designing an instruction, an instructional designer's ultimate goal is to help learners or learner groups in reaching intended outcomes. Moreover, Piskurich (2006) defines instructional design more practically and says that *instructional design* is a process to layout the instruction from the moment that you decide to develop an instruction until the moment that you have a proper instruction that matches to your aim. As understood from the definitions, instructional design is related to planning the instructional process from every angle and seeks to develop an efficient instruction which results in intended learning outcomes.

In an instruction there are many components like learner, instructor, content, learning environment, resources and etc. Moreover, each component has different characteristics. For example, learners have a background knowledge, level and gender. In other words, each component in an instruction has its own characteristics and these characteristics should be considered during the instructional design process. As described by Dick & Carey, system is a team of interconnected components that is practiced together to accomplish a common goal (2004). When we look at the instruction process, there are interrelated components like teacher, content, learner, goals of the instruction, context and etc. Moreover, all of these parts work together to reach a goal, to meet the gains and accomplish the goal of the instruction. Therefore, as Dick and Carey say, in the same way, we may see the instructional process as a system and value the roles of the components of this system in the success of the instruction (2004). For example, in a math course, if the student's background knowledge is not enough for the objectives of the course, no matter how well the rest of the instruction is designed, the intended learning outcomes may not be accomplished. Moreover, as a component of the instruction if the physical situation of the learning environment is not proper for the

instructional activity; for example, if it is a noisy environment or not properly lightened, again this badly influences the result of the learning process.

2.1.1 Assumptions of instructional design

Moreover, instructional design has some assumptions. Gagne, Wager, Golas and Keller described the assumptions of the instructional design as (1) goal of the instructional design is helping the learning process not the instructors, (2) instructional designers are aware of the reality that there are many components that have an effect on the learning process, (3) design models of the instruction may be useful for any levels, (4) instructional design process is recursive, (5) instructional design process is a system of secondary processes and (6) depending on our intended learning outcomes, requires diverse kinds of instruction (2005).

The first assumption, related to the target of the instructional design, means that although a successful instructional design helps the teacher and make easy to implement the instruction, the main aim of the instructional design is to aid the learning process. As a result, in an instructional design phase, the designer always considers making a good design to support the learning process and help the learner to reach the intended learning outcomes. As a result, designing an easy implemented instruction, like instructions with less activity which demands less teacher effort is not the main goal of the instructional design process.

In the second assumption, the authors underline that instructional design is a system (Dick & Carey, 2004). In other words, in these assumptions the components of the instruction such as learner, content, context and etc and their relationship are emphasized. Moreover, by this assumption, as a member of the instructional system, each component has an important effect on learning process and in instructional design process this components should be considered.

In the third assumption, authors underline that instructional design models are practical models for anyone who needs them. For example, a teacher can design instruction for a school term or for a short-time course. Also, a trainer can design a training program for a

special type of learning group. Moreover, an instructional design project may be an instructor or a group of instructional design team that includes subject matter experts, instructional designers and programmers. Of course, although the exact instructional design model that the instructor or instructional design team apply differs, the main components of the instructional design model remains the same (Gagne, Wager, Golas and Keller, 2005).

In the forth assumption, the authors address how the instructional design process should be carried out. It should be a recursive process. This means that an instructional design should include revisions and formative evaluations until the instruction meets the expectations. To do these revisions, learners should participate in the design process and designers should collect data to revise their design until it fulfills the expectations. Moreover, this assumption underlines that feedbacks that come from the learners are very important during the design of the instruction.

In the fifth assumption, authors mention about the sub-processes in instructional design. In instructional design, there are important and interrelated components such as content, instructor, intended outcomes, context and etc. Designing an instruction considering these components is a process. However, designing content is also a process under the instructional design. For example, deciding the scope of the content, tearing down the topic into relevant pieces and deciding the sequence is also a process. Another example of these sub-processes can be deciding the objectives of the courses.

In the final assumption, it is stressed that there is not only one correct way to design the instruction. According to the intended outcomes, the design of the instruction may change. For example, if intended learning outcomes are related to teaching a concept, the design of the instruction should be different than teaching a task. Moreover, according to the goal of the instruction the design of the learning activities, material, resources and etc should be varied.

2.1.2 Properties of the instructional design

According to Gustafson & Branch, instructional design is "learner-centered, goaloriented, focused on real-world performance, focused on outcomes, empirical and a teamwork" (Gustafson & Branch, 2002, p.21). Firstly, instructional design is *learner*centered, in other words the designer's main endeavor is to improve the learners performance in accomplishing the intended outcomes. This property of the instructional design is also parallel to the first assumption of the instruction that is mentioned above. Secondly, instructional design is *goal-oriented*, and the goals are the instructional design project's goals. For example, if the designer is designing an instruction for a flight attendant for an airline company, the expectations of the company from the instruction determine the goals of the instructional design project. Thirdly, instructional design is related to measurable and observable learning outcomes (Gustafson & Branch, 2002). Moreover, the goals of the instruction are parallel to the expected qualities that are expected in real-life situations. In other words, learners are not just learning the knowledge but they have a chance to apply their knowledge to real life situations. As a result, while designing an instructional system, the quality of the instruction should be proper for dealing with real-world problems and context of the instruction should be akin to the real case. Fourthly, instructional design is focused on outcomes and the evaluation of the outcomes is important. For example, if the goal of the instruction is teaching the appropriate skills for programming a database, rather than using multipletests about databases and meanings about the special commands in the programming language, the ability of the learners in programming a database should be assessed with an application question. Fifthly, instructional design is an empirical process. In other words, in an instructional design process, designers approach the design problem empirically. For example, if they design a material for K-12 students, they collect data, analyze them and interpret the data and they develop the material according to the results. Therefore, the process of data collection and interpretation are very important in the instructional design. Moreover, this property of the instruction is related to the *iterative* nature of the instruction that is described by Gagne, Wager, Golas and Keller (2005). In each cycle in the iterative process, there is a data collection and interpretation task. Therefore, in the final step, the designer finalizes the design process. Finally, instructional design involves teamwork. According to the size of the project, there are different people who are needed in an instructional design project. For example if the instructional designer does not have enough knowledge about the subject area, there should be a subject matter expert. Moreover, there can be a need for technical assistance in the design of the material.

2.2 Instructional Design Models

2.2.1 Classification of the Instructional Design Models

Before discussing what an instructional design model is, we should clarify what is a model? "A model is a simple representation of more complex forms, processes and functions of physical phenomena or ideas" (Gustafson & Branch, 2002, p.21). In other words models provide brief and simple demonstrations of an event or thought. For example, a small model of the world demonstrates the physical characteristics of the world and also provides information about the places on the world. Another example for the model may be the figurative description of the data processing of the computer. In each example, a model provides us with a general picture of the process and helps us to comprehend the real *phenomena or ideas* that a model represents.

Instructional design models present "conceptual and communicational tools that can be used to visualize, direct and manage processes for creating high quality instruction" (Gustafson & Branch, 2002, p.21). Hence, they are really important in the instructional design. There are many instructional design models, and since 1970, the number of instructional design models has increased (Molenda, Pershing & Reigeluth, 1996). Due to the number of the instructional design models, some researchers tried to develop a classification for the instructional design models. For example, Schiffman categorized the instructional design models according to view of the instructional design. These views are (1) media view, (2) the embryonic systemic view, (3) the narrow systems view, (4) the standard systems view and (5) instructional design process is selecting the

appropriate media. However, in *the embryonic systemic view* the focus includes the creation of the media. On the other hand, in *the narrow systems view* the systemic approach is started to affect the instructional design. However, this view lacks the *formative evaluation* and *needs assessment* parts of the systemic approach. Moreover, although it is a more developed view of instructional design and includes all the components of the design, *the standard systems view* differ from the *instructional systems design view* because it has a linear nature. However the instructional *systems design view* is not linear and not performed for a single person but a team (Schiffman, 1995).

In addition to that, Gustafson & Branch provide a different taxonomy for instructional design (ID) models and gather the instructional design models under three categories: classroom-oriented models, product-oriented models and systems-oriented models (Gustafson & Branch, 2002). While making the categorization, they first define the properties of each category and then place the instructional design models into these categories. First category is *classroom oriented models*. These IDMs are developed for teachers who generally approach the IDMs as a plan which should be tracked step by step (Plotnick, 1997). Second category is product oriented models. IDMs which are in this category have the following properties; (1) there is a necessity for the instructional product, (2) a new product should be developed instead of adjusting or choosing from already present resources, (3) in the design process, there will be great emphasis of testing and modifications, and (4) the users of the material is the students not the teachers, they have an organizer role in these models (Gustafson & Branch, 2002). The final category is the systems-oriented models. In this type of models, the production is generally of a team effort, the project generally has a large range (like a curriculum or a course design), practicability of the project is very important and as a result the analysis phase is very important (Plotnick, 1997).

To sum up, there are many instructional design models and some researchers categorize the models according to their properties.

2.2.2 Why to Use an Instructional Design Model?

Instructional design models (IDMs) provide a guideline for the instructional designers. Reigeluth & Allison stated that instructional design theories helps us to clarify how the instructional content should be learned (Reigeluth & Allison, ---). Without this knowledge we cannot design an instructional system. IDM generally help us to analyze, design, develop, implement and evaluate instructional system. These steps provide a visualized plan of an instructional system project. Moreover, instructional systems include learners, teachers, administrators, content, context, learning theories and etc. Each of the components plays an important role in the instructional system. While we are creating an instructional system, we should examine the system, make our instructional design according to this analysis and develop our product. If we do not follow the model, we cannot examine the instructional system, its needs and main objectives and as a result of this we cannot manipulate an instructional system that we want to reach at the beginning. Moreover, as Schiffman stated, IDMs include researching on required educational theory, analyzing the instructional system and collecting and analysis of data about the system, designing project with the required acceptance between learners, teachers and administrators and project, managing interpersonal relationship and design the contract between client and firm and managing the project (Schiffman, 1995).

2.3 ADDIE model

In the literature, there are many IDMs like ADDIE, Dick & Carey model, Rapid Prototyping, Kemp's model (Edmonds & And, 1994), 4C/ID-model (Merriënboer, Clark & Croock, 2002) and etc.



Figure 2.1 ADDIE model

Although the IDMs have different names and different steps, they generally have the analysis, design, development, implementation and evaluation phases. In other words, each model includes the steps of the ADDIE model in different expressions. Although this model seems to be a linear model, Piskurich and Gagne et al. state that this model is not a linear model and there should be relationship between the phases as summarized in Figure 1 (2006; 2005).

Moreover, as criticized by Morrison, Ross and Kemp, ADDIE model is "a colloquial label for systematic approach to instructional development" and it is not developed by an author and it just represents the main phases of the similar IDMs (2006, p.13). Although they criticized the model, it is accepted that for developing an instruction in a systematic view, designers should perform the phases of ADDIE model which are explained in the following lines.

2.3.1 Analysis

In this phase, the problem case is fully examined and tried to be defined in all aspects (Gagne, Wager, Golas & Keller, 2005), because, if the problem is not defined completely, the material which will be developed as a product; will be incompetent to provide a solution. Therefore, the detailed analysis of the need, learner, setting and job/task analysis should be performed by the instructional designer or the project team (Molenda, Pershing & Reigeluth, 1996). In the analysis phase, the need of the instruction

should be examined first. If we are planning to develop a course; we should clarify some points such as the aim of the course, the importance of the course in the student's career, the common need for this course, the relationship of the course with the other courses and etc. After that, the instructional goals aimed to be accomplished at the end of the instruction should be presented and the *cognitive*, affective and motor skill goals should be decided (Gagne, Wager, Golas & Keller, 2005). Then, we should examine the target group of the instructional design. For example, if we are developing a course, then we should analyze the students or we should examine the workers, if we are developing a small training for them. The background knowledge of the students; their general properties like age, developmental level, gender; and their learning styles should be examined in this step (Molenda, Pershing & Reigeluth, 1996). Finally, the environment in which instruction will be implemented and the time period that will be assigned for the instruction should be analyzed (Gagne, Wager, Golas & Keller, 2005). For example, if an instructional design is developed for a technology reached environment but there is not enough equipment to run the technology in the classroom, then the developed material will not be suitable for our learners. Hence, the instructional setting should be analyzed before the design of the product.

2.3.2 Design

After the analysis phase, the design of the material or instructional solution is started. At the first step in this phase, the instructional goal that is analyzed in the analysis phase is converted into the meaningful objectives (Gagne, Wager, Golas & Keller, 2005). According to Molenda, Pershing & Reigeluth, the objectives should be *performance objectives* and these objectives should (1) set up precise teacher and learner purposes, (2) offer a definite reference point for evaluation, and (3) facilitate the choice of the instructional techniques (1996). In this phase, it is important to carry the data results of the analysis phases into the design phase and design the objectives with the help of these data. Then, the instructional designer should segment the instruction (Gagne, Wager, Golas & Keller, 2005; Molenda, Pershing & Reigeluth, 1996). Sequencing of the instruction is a process in which the designer splits the instruction into meaningful parts

according to the type of the content and learners. The type of the learner and the content is determined by the data results of the content and the learner analysis. Also, time management of the instruction is designed in this phase and finally, instructional activities and the outcomes of the activities that lead us while developing assessment benchmarks is described in this step (Gagne, Wager, Golas & Keller, 2005).

2.3.3 Development

In the development phase, instructional designers apply their plans that they develop in the design phase and build up the solution or the instructional material. In this phase, the material is prepared according to designed instructional plan (Gagne, Wager, Golas & Keller, 2005; Molenda, Pershing & Reigeluth, 1996). If it is a computer based instructional material, it is developed by using relevant programming tools and content or if it is a course design, the lecture plans, activities, materials and assessment tools are developed in this step. In this phase, a draft of the material or the instruction is developed first and tested by a group of intended audience (Gagne, Wager, Golas & Keller, 2005; Molenda, Pershing & Reigeluth, 1996). It is very important to assess the draft material with a group of target audience because no matter how qualified the design team is, some points might be missed out in the previous phases. Hence, the point of view of the target audience and their feedbacks are very crucial in the design phase. After that, according to feedbacks of the intended audience group, revisions should be made on the draft material (Gagne, Wager, Golas & Keller, 2005). These revisions and draft tests can prevent serious problems that can occur in the next phases. Finally, the designed instruction or material requires an instructor drill or a user's manual (Gagne, Wager, Golas & Keller, 2005; Molenda, Pershing & Reigeluth, 1996).

2.3.4 Implementation

In his phase, the final product of the development phase is implemented and instructional designers are supposed to provide assistance for both learners and instructors (Gagne, Wager, Golas & Keller, 2005). For example, if the product of the design project is a computer based program, the learners and teachers might need assistance during the installation of and understanding how the program is utilized.

2.3.5 Evaluation

In the evaluation phase both the learners' performance and the product performance are evaluated and if needed, revisions are made (Gagne, Wager, Golas & Keller, 2005). The learners' performance is assessed according to the evaluation tools that are developed in the development phase. Moreover, the product performance should be evaluated by the learners and teachers. According to results, if needed, revisions should be applied to the product.

2.4 Novice Instructional Designers

Instructional design process includes ill-defined problems and an instructional designer should be innovative, dynamic, and *iterative* in their design process (Gustafson & Branch, 2002). As a result, instructional designers are experienced people who have knowledge about how to apply a design model to solve an ill-structured instructional design problem. According to a study, instructional designers give highest importance to elements in analysis phase and specifically they pay attention to learner characteristics (Ozdilek & Robeck, 2009). Instructional designers not only have priorities in instructional design processes, but also apply different strategies according to their expertise level. For example, it is stated that expert and novice instructional designers approach ID problems differently and when experts solve an ill-defined instructional design problem they "(1) narrowed the problem space by identifying key design challenges, (2) used an amalgam of knowledge and experience to interpret the problem situation, (3) incorporated a mental model of the ID process in their problem analyses, and (4) came to similar conclusions about how to respond to the situation, despite differences in their initial conceptualizations" (Ertmer & et. al., 2008, p.17). On the other hand, novice instructional designers such as subject matter experts, teachers, instructors who has to design an instruction but do not have expertise in this field lack the tacit knowledge that experts have and it is stated that they generally do not use a systematic approach for instructional design (Verstegen, Barnard & Pilot, 2008).

Another study shows the differences between experts and novices in solving instructional problems as, (1) experts and novices use distinctive design models with
respect to their problem solving strategies, (2) novices use less design principles and different sources of information than experts, (3) novices spent less time for planning and comprehending field than experts and they instantly start to think about many detailed design approaches, (4) novice design model can be considered as depth first by linking minimum interconnection while expert's design models are extensive first with significant explanations between interconnections, (5) experts integrate, iterate and cycle during the design process, and (6) experts design models is not constant linear process but includes iterative cycles that entails originality and reasoning (Perez, Johnson, & Emery, 1995). Rowland also underlines that expert and novice instructional designers have different strategies in instructional design (1992). Hence, novice instructional design endeds, they lack practical knowledge and tactics in applying solutions to these problems. In the literature, there are studies that show how novices can succeed in instructional design with support.

Research studies show that with appropriate support, novice instructional designers can be successful in solving ill-defined instructional design problems as experts do. For example, in the study of Ge, Chen, and Davis, researchers used question prompts to scaffold novice instructional designers during solving ill-defined instructional problems and concluded that "both Question Elaboration and Questions Guidance prompts had beneficial effects in guiding learners through problem-solving processes, elaborating their thinking, and monitoring and evaluating the solution Process" (2005, p.). Similarly, a different study showed that novice instructional designers such as SMEs can solve realistic and complex design problems if they are provided with required support and spent enough time on problem (Verstegen, Barnard, & Pilot, 2008).

In another study, experts are defined as professional instructional designers who have one or more graduate degrees in the field and have been working for at least 8 years in the field professionally and novices are defined as individuals who have been working for less than 3 years in the field and have completed one postgraduate course about instructional design and according to results of this experimental study, researchers concluded that "explicit guidance can increase the problem-solving skills of novices, enabling them to perform more like experts" (Ertmer et al., 2009, p. 128). Similarly, when set of guidelines that are formed according to experts behaviors are used by novice instructional designers for analysis, the results show that this scaffolding method help novice instructional designers in problem-finding skills (Stepich & Ertmer, 2009). Furthermore, to support students in instructional design field instructors can do the followings: "1) helping students accumulate experiences, 2) helping students index those experiences and 3) scaffolding students' efforts as they are developing" (Stepich & Ertmer, 2009, p.166).

To sum up, although experts and novice instructional designers both use instructional design models, they apply these models differently. However, studies in the literature underline that novice instructional designers' performances on instructional design can be improved by proper support.

2.5 Electronic Performance Support System (EPSS)

2.5.1 Purpose and Definition of EPSS

Electronic Performance Support Systems (EPSS) are the systems that are used to support performance and learning of people on the job. The main purpose of EPSS is defined by Gery as "to provide whatever is necessary to generate performance and learning at the moment of need" (Gery, 1991, p.34). As it is seen from the goal of EPSS, it is designed to provide the needed support. One of the definitions of EPSS is "computer mediated environments that are designed to generate immediate work performance, whether or not the individual performer has the knowledge or skill to perform the work independently *without the performance support system*" (Gery, 2002). Similarly, Raybould defines EPSS as "the electronic infrastructure that captures, stores and distributes individual and corporate knowledge assets throughout and organization to enable individuals to achieve required levels of performance in the fastest possible time and with a minimum of support from other people" (1997, p.171) As it is understood from these definitions, electronic performance support systems are the systems that support and guide users

while they are performing their tasks. One of the comprehensive definitions of EPSS is presented in the following lines:

EPSS is a computer-based system that:

- is comprised of a collection of integrated software components;
- is a part of an organization's knowledge management system;
- is user-controlled and easy to use;
- provides support at the moment it is needed (right time); and

• presents relevant (right type) and context-focused (right amount) information that a task performer needs, in a real work environment (right place). (Cagiltay, 2006, p.94)

In this definition, researcher underlines the importance of providing right type of support in right time, right amount and right place.

Performance support systems are mostly used in workplaces to improve workers performance on the tasks in which they have lack of knowledge and skills to complete. Workers are adults. According to the adult learning theory, adults only keep the information that they need in their minds and an EPSS that offers information about explicit work areas would be an important performance intervention (Nguyen, 2005). Therefore, EPSS can be used in work area to support and improve the performances of workers.

2.5.2 Types, Components and Characteristics of EPSS

The main goal of EPSS is to improve users' performance on their job, even though, they do not have required knowledge or skills that experts of related fields have. According to Gery, there are three types of performance support: *intrinsic, extrinsic* and *external* (1995). *Intrinsic support* is the support that is integrated in work systems and it is not easy to differentiate it from the work systems. If intrinsic support system has enough attributes and behaviors, workers can just feel that they are doing their tasks (Gery, 1995). On the other hand, *extrinsic support* is the support is the support that is not integrated in work systems. During the work, if support is needed, it suggests help but worker can shut it down. (Gery, 1995) Similarly, *external support* is not integrated to the work system.

Moreover, it is not computer-based and does not have an alert system. Gery states that "training programs, documentation, job aids, peer support, Help desks, bulletin boards and computer conferencing environments" are the examples of external support (1995, p. 53). In other words, intrinsic support is the most intelligent and effective way of support because it provides support when needed and do not disturb workers. However, in extrinsic and external support, users decide to accept or decline support. Extrinsic support is superior to external because it is a computer-based support. According to a study, performance scores of participants are higher with intrinsic and extrinsic support systems than external or no EPSS groups (Nguyen, Klein, & Sullivan, 2005). Hence, intrinsic and extrinsic support systems can improve the performances of workers.

Beside the types of the EPSS, components of EPSS are also described in the literature. According to Gery, EPSS includes: "**task structuring** (including work process, procedures, thinking, and navigation to appropriate work spaces), **knowledge** (including content, rules, and relationships), **data** (including organizational data and external data), **tools** (including software utilities, calculators, and special purpose programs), and **communications** (including e-mail, fax, and real-time or sequential computer-mediated interaction with others)" (Gery, 2002, p.472). *Task structuring* is the part in which the work task is handled; it includes procedures, rules and other conceptual issues related to work. *Knowledge* is the information that includes rules and relationships related to tasks that EPSS supports. *Data* is the information that is related to organization and other items. *Tools* are software that support users during tasks like a calculator, spreadsheet, drawing tool and etc. *Communication* includes all the connection possibilities between the user and related person/people and groups.

On the other hand, Hannafin suggests that EPSS has potential to answer to the increasing need for just-in-time, personalized learning rests upon reusable digital sources and *resources, contexts, tools, and scaffolds* are the main components of this type of EPSSs (2000). In another study, Chang summarizes the components of an EPSS that is

presented in the literature and forms a list that includes six items (Chang, 2004). These items are; *an advisory system* (a system that guide users in problems and mentor them during decision process), *a data/information system* (a system that provides necessary information to complete tasks), *a learning/training support facility* (a system that provides individualized, self-paced learning related to job), *online help/reference* (help for EPSS usage), *productivity software* (tools that needed to perform tasks) and *an end-user interface* (a system that navigate users through components) (Chang, 2004). Chang's components are similar to Gery's components except *communication* component. According to the results of his study, user interface and online help/reference are perceived as the most effective components of an EPSS (Chang, 2004).

Table 2.1 Attributes of Performance support systems (Gery, 1995, p. 53)

Attributes of Performance Centered Systems
1. Establish and maintain a work context
2. Aid goal establishment
3. Structure work, process and progression through tasks and logic
4. Instutionalize business strategy and best approach
5. Contain embedded knowledge in the interface support resources and
system logic
6. Use metaphors, language and direct manipulation to capitalize on prior
learning and physical reality
7. Reflect natural work situation
8. Provide alternative views of application, interface and resources
9. Observe and advise

- 10. Show evidence of work progression
- 11. Provide contextual feedback
- 12. Provide support, resources without breaking the task context
- 13. Provide layers to accommodate performer diversity

Table 2.1 (continued)

- 14. Provide access to underlying logic
- 15. Automate tasks
- 16. Provide alternative knowledge search and navigation mechanism
- 17. Allow customization
- 18. Provide obvious option, next step and resources
- Employ consistent use of visual conventions, language, visual positioning and other system behavior

To design an EPSS, the instructional designer should know what characteristics an EPSS should have to be considered as an effective EPSS. Sleight (1993) states that the key characteristics of an EPSS are as follows:

- It is computer-based
- It provides access to the discrete, specific information needed to perform a task at the time the task is to be performed
- It is used on the job, or in simulations or other practice of the job
- It is controlled by the user
- It reduces the need for prior training in order to accomplish the task.

These characteristics are parallel to the definition of EPSS. All of the described characteristics support the main goal of an EPSS that supports the performer to perform a task on the job by an electronic support software. Moreover, in the literature Gery also makes a list about high-impact intrinsic support system's attributes. This list is presented in Table 2.1.

2.5.3 Examples of EPSS

Although EPSS is widely used in workplaces, it is also used in educational settings. As stated in Xun, Ching-Huei and Davis's study, scaffolding during the instructional design process helps novice instructional designers to solve complex design problems (2005), and an EPSS can provide this support. In the literature, there are computer-based instructional design tools that are developed to support the design process and according

van Merriënboer and Martens, they are a kind of EPSS as they support the designers during the design process, and they summarize that these tools are designed for providing the following supports: "(a) library and information support, by providing useful resources and databases, (b) standardization support, by providing rules, regulations and directions for performing specific tasks, (c) full or partial task automation, by providing automated tools, expert systems and wizards, and (d) instruction, by providing users just-in-time learning materials that may help to perform their tasks" (2002, p. 7). Moreover, according to Çağıltay (2006) EPSSs can provide scaffolding and types of scaffolding that EPSS can provide are conceptual, metacognitive, procedural and strategic scaffolding. There are many examples in the existing literature related to EPSSs that support instructional design. One of the early examples of EPSS in education is GAIDA (Guided Approach to Instructional Design Advising). GAIDA was a automated performance support tool to support courseware designers (novice instructional designers) and the results of the study show that courseware that were developed by GAIDA were effective (Spector & Whitehead, 1994).

There is another project called the CASCADE (Computer Assistant Curriculum Analysis, Design and Development) project which is designed to support teachers for curriculum development (McKenney, Nieveen, & Akker, 2002). In their project, they aimed to support Dutch curriculum developers by developing an EPSS and their study revealed that EPSS can confidently affect the performance of curriculum developers (McKenney et al., 2002). After that project, they proceeded their studies and developed a new version of their EPSS, CASCADE-SEA (Computer Assisted Curriculum Analysis, Design and Evaluation for Science (and mathematics) Education in Africa) to support science and math teachers curriculum material development and the results of the study showed that this EPSS improved the quality of teachers' material and decision-making skills of them in material design (Mckenney & van den Akker, 2005). Then, researchers continued their studies and developed a new version of these aforementioned EPSSs. They developed an EPSS called CASCADE-MUCH (Computer Assisted Curriculum

Analysis, Design and Evaluation: Multimedia Curriculum Design in China) whose purpose was to provide support to teachers in developing "instructional scenarios for multimedia curricula" and the results showed that this EPSS is practical for users and it improves users knowledge (Wang, Nieveen, & Akker, 2007, p.275). All of the CASCADE studies are design and development research studies and also include information about design and development steps of EPSSs.

Another example EPSS study to support instructional design process is Designer Edge 3.0. This EPSS was designed to support instructional designers during instructional design process and the purpose of the study is to search the usage of automated design tools on naïve, novice and expert instructional designers (Uduma & Morrison, 2007). According to the results of this study, expert, novice and naïve instructional designers use the EPSS differently. While, experts utilize the EPSS as word processor with a broad database of instructional design tasks (Uduma & Morrison, 2007). This result is also supported by Nguyen's study which concludes that experts and novices have different expectations from EPSS's and integrated EPSS with associated training is better for novices (Nguyen, 2003).

In the literature, there are also studies that support teachers' work performances. One of the EPSS's that was designed to support teachers is UPSST (Ubiquitous Performance Support System for Teachers) and its purpose is to support teachers in reaching students' academic, counseling and other records by PDAs (Personal Digital Assistants) (Chen, Hwang, Yang, Chen, & Huang, 2009). This EPSS was designed to support the workload of teachers in keeping academic, counseling and other records of students and assisted them on their job like a parental meeting. According to the results of their study, teachers state that this system has many benefits to assist their work and they have a positive attitude to use this support tool (Chen et al., 2009).

In the literature, there are also studies that include design and development of EPSSs to improve the knowledge of participants in different areas. These studies also underline that EPSS serves as a scaffolding tool. First, in a study, EPSS is used to support university students in a qualitative research course and the results show that EPSS can be used to improve students' performance on qualitative research but the study also underlines that there is not a significant correlation between students knowledge on topic and success in utilizing EPSS (van Schaik, Pearson, & Barker, 2002). Second example for these types of EPSS is Epsilon. Epsilon is an EPSS that was designed to scaffold university students in identifying, locating resources in an academic library and the results of this study show that although there were no significant differences in knowledge, there were significant differences in students' confidence levels (Barker, van Schaik, & Famakinwa, 2007). Third example is a study that aimed to improve classroom technology integration skills of preservice teachers by an EPSS called MAPS (Matrix Aided Performance Support) and according to the results of this study there were no significant differences in learning improvement but users had a positive attitude to use MAPS (Kalota & Hung, 2013). In the fourth example, researchers developed an EPSS to improve computer ethic education and ethical decision – process and the results of this study show that EPSS improved ethical decision-making skills of participants (Kert, Uz, & Gecü, 2014).

In the existing literature, there is another example EPSS (the Behavior Matrix) that was designed to "actively support the participants' reasoning process and to support the development of metacognitive skills" (Hung, Smith, Harris, & Lockard, 2010, p.77). Participants of this study were teachers. The results of this study indicate that users have positive attitudes to use EPSS and it scaffolds teachers' reasoning process (Hung, Smith, Harris, & Lockard, 2010, p.77).

Another example of EPSS that is used to scaffold students is an EPSS that was designed to support users' self-regulated learning skills in a computer programming language course and it was an empirical study. The results of this study show that the group that used EPSS was significantly different then non-user group in cognitive, meta-cognitive and resource management skills (Kert & Kurt, 2012). In another study, EPSS was used to solve performance problems in organizations by graduate students and using EPSS increased the self-efficacy level of students (Darabi, Mackal, & Nelson, 2005).

There are also examples of EPSS use in special education in the existing literature. For example, in a study, an EPSS called Strategy Tools Support System was developed to investigate usability and perceived effectiveness of EPSSs in special education and the results of the study show that EPSS is considered useful by students and they " indicated that the tools had been useful in helping them to recognize triggers and their inappropriate responses as well as in identifying alternative, more appropriate responses" (Mitchem, Kight, Fitzgerald, Koury, & Boonseng, 2007, p.11). In another EPSS that was carried on special education, an EPSS was designed to support 9th and 12th grade students with disabilities. According to the findings of this study, it "demonstrated an improvement in target behaviors when the intervention was introduced in the training setting for ninth grade and twelfth grade students with high-incidence disabilities and in addition, each student showed some improvement in the target behavior when the intervention was implemented across settings" (K. J. Mitchem, Fitzgerald, Miller, & Hollingsead, 2013).

It is clear that novice instructional designers need support during the design process and this support can be provided by an EPSS. The purpose of this study is to develop an EPSS that helps novice instructional designers in applying the ADDIE model in the instructional design process. This research study includes both the development of the EPSS and the implementation of this EPSS by novice instructional designers.

2.6 Summary

Piskurich (2006) defines instructional design as: *instructional design* is a process to layout the instruction from the moment that you decide to develop an instruction until the moment that you have a proper instruction that matches to your aim. Hence,

instructional design requires an enduring effort to reach the desired outcomes. Instructional design process includes ill-defined problems and an instructional designer should be innovative, dynamic, and *iterative* in their design process (Gustafson & Branch, 2002). As a result, instructional designers are experienced people who have knowledge about how to apply a design model to solve an ill-structured instructional design problem. Therefore, being an experienced instructional designer requires both knowledge about instructional design models and processes and skills like being innovative, dynamic and iterative. However novice instructional designers (NIDs) do not have these knowledge and skills like expert instructional designers have.

In this study, an EPSS is designed to support NIDs during instructional system design process. EPSSs are software that provide on the job support and guide users while they are doing tasks. It aims to improve users' performance and support them to perform their job as qualified as an expert does. There are many examples about using EPSS to scaffold and guide instructional designers in solving complex problems. CASCADE, GAIDA and Designer Edge 3.0 projects were examples of this type of projects. Moreover, there are also studies that are related to use of EPSS to improve the knowledge of the participants, teacher's performance and etc.

Although there are many uses of EPSS examples in the literature, there are limited studies about how to design an EPSS or what type of models can an EPSS designer use. In the example EPSS studies generally EPSSs were designed by instructional design models like ADDIE and rapid prototyping. One of the limited examples for EPSS design model was Adaptive Dynamic EPSS Model (ADEM) (Cagiltay, 2002). Moreover, there are not enough studies about practical design principles for EPSS design. Hence, this design and development research study aimed to reveal the key elements of an EPSS which designed to support instructional designers and also aimed to provide practical design principles for EPSS design.

CHAPTER 3

METHODOLOGY

This part of the study provides detailed information about the methodology of the study. The researcher first underlines the purpose of the study, explains the design and provides detailed information about the research method which is design and development research. After that, the participants of the study are described in detail and researcher's role in this study is explained. Then, the data collection process is explained across the phases of the study along with the instruments and data analysis. Last but not least, the chapter is concluded with the issues of trustworthiness.

3.1 Purpose of the Study and Research Questions

The purpose of this study is to design and develop an electronic performance support system to support novice instructional designers in instructional system design process by using ADDIE model. The study also aims to reveal the key elements of an EPSS if it is designed to help novice instructional designers during instructional system design and development.

Research questions of this study are:

1. What are the key elements of an EPSS that is designed to support novice instructional designers during instructional system design and development?

2. How do novice instructional designers view the value of the designed EPSS to improve their performance on instructional system design and development?

3.2 Design of the study

This is a design and development research study that was conducted in a qualitative perspective. The purpose of this study is to design and develop an electronic performance support system to support novice instructional designers in instructional system design process by using ADDIE model. The study also aims to reveal the key elements of such an EPSS. To achieve this goal researcher had to design and develop an EPSS. Therefore, due to the purpose of this study, design and development research is used as the research methodology.

This research type is defined as "the systematic study of design, development and evaluation processes with the aim of establishing an empirical basis for the creation of instructional and non-instructional products and tools and new or enhanced models that governed their development" (Richey& Klein, 2007, p.xv). As emphasized in the definition, in this study, the development phases of the EPSS are also systematically analyzed and empirical bases for the development of this kind of tools are suggested as a result of this study. Also, this type of research defined by Wang and Hannafin (2005) as, "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextuallysensitive design principles and theories" (p.6). This definition also provides information about the characteristics of this research methodology. The characteristics of the design and development research are "(a) pragmatic; (b) grounded; (c) interactive, iterative, and flexible; (d) integrative; and (e) contextual" (Wang & Hannafin, 2005, p.7). The explanations of these characteristics and relation with this study's research purpose are explained in Table 3.1.

In a design and development research there are some steps that researchers should follow. Figure 3.1 describes these steps and the relationship of these. According to Richey and Klein (2007), design and development research studies can be categorized under two main types: *product and tool research* and *model research*.

Changeteristic	Evaluation	Relationship of the characteristic
Characteristic	Explanation	with this study
Pragmatic	it merges both theoretical	The aim of this study includes
	knowledge and how to	development of an EPSS by using
	perform this knowledge into	theoretical knowledge
	real life	
Grounded	The design process is based	In this study, the design process is
	on theories and research	based on the analysis of the related
	and applied in real-world	literature and theories about the novice
	situation	instructional designers. Moreover,
		designed EPSS was implemented on
		novice designers.
Interactive,	There is collaboration	Both designer and users participated in
iterative and	between designers and users	the study. There were continuous
flexible	and there are revisions until	revisions according to feedbacks of the
	it match the demands of the	users. Moreover, rather than following
	users. Moreover, the design	a linear design pattern, an iterative
	process is flexible.	design cycle was followed.
Integrative	Using multiple data	In this study, some types of data
	collection methods and	collection methods were used as the
	integrating these results	source of data and the integrated result
		of them are presented.
Contextual	The research results are	The results of this study are related to
	related to design and the	practical area of the instructional
	setting for which the design	system design and development
	conducted.	

Table 3.1 Relationship of the characteristics of design and development research with this study

In the first type, the production of the tool is the main focus; the phases of the research project include; *analysis, design, development, evaluation*; and development of the tool and the use of it is important (Richey & Klein, 2007). Therefore, this study is under the first type that is product and tool research because the development of the tool is the main focus of this research.



Refinements of Problems, Solutions and Methods

Figure 3.1 Design and development research (Reeves, Herrington& Oliver, 2004, p. 60)

3.3 Participants

In this study purposeful sampling was used as a sampling strategy. In purposeful sampling, researchers work with *information-rich cases* to study in depth and gather qualified, useful and rich data (Patton, 1990). As Patton describes there are many types of purposeful sampling (Patton, 1990), and in this study criterion sampling was used. The researcher needed to work with people who are NIDs to answer the research questions properly. Pre-service students who did take no more than 2 instructional undergraduate courses and applied an IDM to design and develop an instructional material no more than one times considered as a NIDs in this study. In the first two phases of this study participants were NIDs who used an IDM and produce an instructional material. They were also novices but had some experiences about the process. These groups used in this phases purposefully to gather data about their experiences, needs and suggestions related to needs of NIDs during instructional system design process.

Totally, 23 NIDs who enrolled Multimedia Design & Development course and Instructional Design course in different semesters participated in different phases of this study.

Gender	Phase 1	Phase 2	Phase 3
Male	3	5	4
Female	2	3	6
Total	5	8	10

Table 3.2 Gender distribution of the participants

Due to the iterative nature of design and development research studies, in this study there were 3 phases. In each phase, there were different participant groups. The number of the participants, explanations about them and in which part of study they were participated is provided in Table 3.2.

In the analysis phase, all of the participants were 3rd year students of the Computer Education and Instructional Technology department of Middle East Technical University, Ankara in 2011. They were registered to Multimedia Design and Development course. There were 61 students registered to the course. In this course, students are supposed to design two multimedia instructional materials. The first one is an interactive material that is designed in Adobe Flash design program. It was about teaching a mathematics concept such as geometric shapes, equations and etc. The second multimedia project was a 5 minutes educational video and the purpose of the video was teaching a procedure to the target group. The researcher announced to the students face to face and via e-mail that she wanted to interview them about their experiences related to instructional design. Five of the students were volunteered to participate in the analysis phase. Participants of this study had previously designed and developed their materials by using an IDM (ADDIE) and also used this model on a simpler material development project in their second year in the Instructional Design course. Participants of this phase of the study were novice instructional designers who had some

instructional design experience. Hence, they were knowledgeable about problems that an NID can be faced during instructional design process. Participants of this phase provided data about the needs of NIDs.

As stated in the Table 3.3, in the second phase of the study there were 8 participants who were registered to *Multimedia Design and Development* course of the Computer Education and Instructional Technology department of Middle East Technical University, Ankara in 2012. In this phase, students used an EPSS prototype that was designed to support NID's during instructional design. There were 45 students who were registered to the course. The researcher announced to the students face to face and via e-mail that she want to interview them about their experiences related to design and development of instructional material and prototype EPSS. 8 of the students were volunteered to participate in the second phase. Similar to the first phase, participants of the second phase were also assigned to develop two instructional design materials in their course. The researcher had made interviews with them after their first project while they were studying on their second project. Hence, participants were not only NIDs but also NIDs who used first prototype of the EPSS. They had experience with the prototype. That's why the researcher purposefully selected these participants. The data collected from these participants were used to improve first prototype of the EPSS.

# of the Phase	Phase of the Study	Number of	Course That Participants
		Participants	Attend
First phase	Analysis	5	Multimedia Design and
			Development (2011 fall)
Second phase	Design and	8	Multimedia Design and
	Development		Development (2012 fall)
Third phase	Evaluation	10	Instructional Design (2014
			spring)

Table 3.3 Participants across the phases

In the third phase of the study, participants consisted of 2nd year students of the same department in 2014. There were 23 students who were registered to Instructional Design course in 2014 spring term. All of the students were registered to the course had used the second prototype of the EPSS that was designed by researcher while they were designing their instructional materials. After materials designed, the researcher asked students to participate in this study as interviewees via e-mail and the researcher also made an announcement in class. 10 of the students were volunteered to participate in the study.

3.4 Context

This study was conducted in two courses: Multimedia Design & Development course and Instructional Design course. Aim of the first course is to provide students information, skills and expertise that they need during instructional system development with the help of technology. This course is taken by 3rd year students. Specifically, in this course; participants have to develop two instructional materials. First one is a multimedia instructional material that is designed to teach a concept. The second instructional material is a video that is designed to teach a procedure. In the lecture, students who are enrolled this course assigned project groups randomly for the first project and started to design their multimedia instructional material as a group. On the other hand, they chose their group members in the second project. In every project, students have to use an IDM to produce their instructional materials. In this course, students attend lecture hours, lab hours and weekly project meetings during the course. During the projects, students compose Analysis, Design and Evaluation reports for their projects and at the end of each project they submit their final reports and instructional materials.

Purpose of the second course is to emphasize the processes for designing effective and efficient instruction. This course is designed to provide an introduction to the stages of instructional design. In this course, students formed project groups and produced an instructional material throughout the semester. They chose their project topics and design an instructional material by using ADDIE model. In the course, there are lecture

hours for teaching ADDIE model, lab sessions to learn development tool (Adobe Flash), and weekly project meetings to discuss issues related to their projects with their project facilitators. During the instructional design process students submit analysis, design and evaluation reports for their projects. At the end of the course, final project reports and instructional materials are submitted by students.

3.5 Researcher's Role

Data collection of this study took 3 terms and the researcher was an active participant in all of these semesters. The researcher participated in classes as a project facilitator. The main role of the researcher as a facilitator was to guide students through the instructional design projects. As a facilitator, the researcher met with students every week throughout each semester and guided them in the instructional design project. She provided them feedbacks about their projects. She also read and graded students' projects. In addition to that, she also facilitated group work and project management and provided solutions to problems related to both project and group work. During these semesters the researcher communicated with students in lectures, through weekly meetings and also by e-mail and online communication tools such as social media tools. Moreover, researcher was the designer of prototype 1 and prototype 2. She had designed these prototypes according to the findings of each cycle of design and development research. She developed prototype 1 with an individual software developer and prototype 2 with a software company.

As stated by Marshall and Rossman, "In the qualitative studies, the researcher is the instrument" (2006, p.72). The researcher actively participated in classes as a facilitator and all of the data were collected by the researcher herself for this study. The researcher participated in all of the classes during the semesters and had the chance to observe all of the class activities. Also, the researcher had the opportunity to follow the lecture presentations. The researcher conducted interviews at the end of each semester. Due to the interactions between the researcher and participants throughout the semesters, the researcher and participants knew each-other and there was a friendly atmosphere during the interviews. Hence, the researcher did not affect the natural environment negatively.

3.6 Data Collection Process

This study was conducted in three phases. These were analysis, design and development, and evaluation phases of the EPSS that was designed through this study. These phases, participants of the phases and data collection instruments of related phases are summarized in Table 3.4. Each phase is a cycle because of the iterative nature of the design and development research. Outputs of each phase were used as inputs of the next phase.

Phases	Actions	Participants	Data collection tool
	Novice instructional designers'	Novice	Interview 1, Final
Analysis	views about their expectations	instructional	project reports
	from an EPSS	designers (NID)	
Design &	Design and Implementation of	Researcher, NIDs	Interview2, Final
development	Prototype 1. (epds.gen.tr)		project reports
	Design and Development of	Researcher	
	Prototype 2		
	(ogret.ceit.metu.edu.tr)		
Evaluation	Implementation of Prototype 2	NIDs	Interview3
	Evaluation of Prototype 2		
	Reporting the development	researcher	Project materials,
	process, Answering the RQs		Weekly Project
			Reports in EPSS,
			Final project reports

Table 3.4 Summary of the study

This study was completed in three terms. Timeline of the study is provided in Figure 3.2.



Figure 3.2 Timeline of the study

3.6.1 Analysis Phase

This phase was conducted in 2011 fall term in Multimedia Design and Development course. In that course students designed two multimedia materials. In this course, students had to develop a flash based material whose purpose was to teach a concept in 10 weeks and a video material whose purpose was to teach a procedure in 5 weeks. These projects were group projects and students worked as groups of 2-3 during the project. At the end of the term, students developed two running multimedia projects and two detailed project reports that explain analysis, design, development, evaluation processes of the projects. During the projects students had to attend classes, meet their facilitator weekly and also attend laboratories during which development tools of the projects were taught.

In this phase, students designed and developed their project in natural course environment and the researcher participated in this course as a facilitator. She attended the courses with the participants, held weekly project meetings and provided feedbacks to assigned groups in meetings. She also provided feedback via e-mail and social network tools such as Facebook.

At the end of the course, the researcher announced the purpose of her research to 61 students of the course and 5 students volunteered to be interviewed for this study. After conducting interview 1, the analysis phase was completed.

3.6.2 Design and Development Phase

In this phase, the researcher first analyzed the results of the first interview. According to the results, the researcher designed a prototype EPSS (prototype 1) that aims to support NIDs during instructional design. After that, the researcher applied this prototype during the 2012 fall term. The students who were registered to Multimedia Design and Development course used prototype 1during that term.

At this course, the students had to design two instructional design materials. One of them was a flash based material that was designed to teach a concept. The students had 10 weeks to complete the project. The second one was a video material that was designed to teach a procedure and the students had 5 weeks to complete the project. There were 45 students who were registered to the course. At the beginning of the term, the researcher explained the purpose of the prototype and asked them to use the prototype during the analysis, design, development and evaluation phases of the project. Using prototype 1 was not compulsory but the students were encouraged to use it. At the end of the project, the students submitted their projects. After that, the researcher explained to the students that she was planning to conduct interviews with them to talk about their experiences about prototype 1. She also underlined that they could participate in this study voluntarily. As a result, the interviews were conducted with 8 students who had used the prototype during their instructional material development project.

Next, the researcher analyzed the interviews and according to the collected data, she made revisions on the prototype 1. This phase was completed after making revisions on prototype 1. While making revisions on prototype 1, professional technical support was

needed and a software development company made the technical development of prototype 2. After the design of the prototype 2, this phase was completed.

3.6.2.1 Prototype 1

Prototype 1 is a website that aims to support NIDs during instructional design and development. NIDs logged into the website with their own IDs and passwords. The main steps of instructional design like analysis, design and etc. were provided as question answer parts in the website. Users made use of the site individually and prototype 1 helped them to apply steps and print out a draft report.

The content and format of prototype 1 were designed according to the results of Analysis phase and the results of interview 1. Therefore, the detailed description about prototype 1 is provided in Chapter 4.

3.6.2.2 Prototype 2

Prototype 2 was designed to improve prototype 1 according to findings of design and development phase and interview 2. It is an improved version of prototype 2 based on the suggestions and evaluations of NIDs. Its technical design was completed by a software development company.

It aims to support NIDs during instructional design and development process. It was designed according to the outputs of design and development phase. Therefore, it is described in Chapter 4 in detail.

3.6.3 Evaluation Phase

Evaluation phase of this study was conducted in the 2014 spring term. Evaluation phase consists of application of prototype 2 and collecting data related to NIDs experiences, evaluations and suggestions about prototype 2.

For the evaluation phase, the Instructional Design course was chosen. The reason for choosing this course was that it is the first course in the department whose purpose is to teach learners the main steps in systematic instructional design process. The main goal of the course was to introduce the main phases in the systematic design of instruction. In

this course, students learn the ADDIE model while they are applying all phases of it in an instructional material development project. Hence, the students who were registered to this course were NIDs and experienced using an instructional design model for the first time.

In this course, implementation of prototype 2 took 14 weeks. The students learned and applied the phases of ADDIE through the weeks. In this process, students also used the prototype 2 through the analysis, design and evaluation phases. In this phase prototype 2 was one of the tools of the course and students had to use prototype 2.

At the end of the course, students completed their projects and reports. After that the researcher conducted interviews with the students who volunteered to participate in this study. The researcher conducted interviews with 10 students among 23. After the interviews were completed, the researcher analyzed the results.

3.7 Data Collection Methods and Instruments

Qualitative data collection methods were used to collect data in this study. Qualitative data collection methods are "(a) participating in the setting, (b)observing directly, (c) interviewing in depth, and (d) analyzing documents and material culture" (Marshall and Rossman, 2006, p.97). In this study, mainly interviews were used as a data collection method. Also, document analysis was used. These data collection methods were used to answer the research questions of this study.

3.7.1 Interviews

In this study, interviews were the main sources of data collection. Interview is a planned talk that has decided answer sets and in interviews, the researcher looks for a few general subjects to reveal the participants' opinions but also lets the participants to organize their opinions in their own way (Marshall & Rossman, 2006). In this study, the researcher sought answers to NIDs' needs and perspectives about EPSS in instructional system design process and interview is the tool that can provide this information. Because the researcher tried to find out what participants think about ideal EPSS and

how they evaluate prototypes, as stated by Fraenkel and Wallen the aim of conducting interviews I to explore what people have in their mind (2006).

There were three interviews in this study and each of them was organized to find out different perspectives of the participants. The main aim of Interview 1 was to find out the participants' perspectives about instructional system design process and their needs during this process. Moreover, interview1 (See interview schedule 1 in Appendix A) was also conducted to find out participants' expectations and needs from an EPSS that is designed to support NIDs during instructional system design process. In this interview, there were 2 questions about participant's level in instructional system design, 15 questions about participants experience in instructional system design and their perceptions about their needs during this process and their expectations from a possible EPSS. Interviewees were voluntary students who were registered to the Multimedia Design and Development course in 2011. There were 5 voluntary participants and the researcher conducted interviews by herself. She recorded interviews and total recorded data were 209.39 minutes. The average duration for the interviews was 41:55 for each interview in interview 1.

Interview 2 was conducted in the design and development phase of this study. This interview was conducted after the participants used prototype 1 that was designed according to the data collected in analysis phase. In this interview, participants were novice instructional designers who had developed an instructional material in the Multimedia Design and Development course while they were using prototype 1. Just after they had developed a flash based instructional material, the researcher conducted an interview with the participants and asked them questions related to their experiences. The main part of the interview included:

- Questions about the participants' previous knowledge related to instructional design
- Questions about their experiences in using prototype 1 during instructional system design

• Questions about their expectations of the students from an EPSS during the instructional design process

There were 9 questions in interview 2 (see interview schedule 2 in Appendix B). Interviewees were voluntary students who were registered in the Multimedia Design and Development course in 2012 and they were all familiar with prototype 1 and used it before. There were 8 voluntary participants and the researcher conducted interviews by herself. She had recorded the interviews and the interviews lasted 218.23 minutes in total. The average interview duration was 27:17 minutes.

After analyzing the results of interview 2, the researcher made revisions on prototype 1 and designed and developed prototype 2 with the support of a software development company. This prototype was implemented in 2014 spring term and after that, the interview schedule was developed to evaluate the prototype 2 (see interview schedule 3 in Appendix C). Interview 3 was conducted in the evaluation phase of the study to evaluate prototype 2. The participants of this interview were 10 voluntary students who were registered in the Instructional Design course in 2014 spring term. All of the participants designed an instructional material and wrote project reports in that course before they participated interview 3. Participants had also used prototype 2 during the instructional material design process. In interview 3, there were 3 parts and 21 questions. These parts and distribution of the questions are presented in Table 3.5.

Table 3.5 Distribution of Questions in Interview 3

Name of the parts	Number of Questions
Demographic questions	4
Detailed evaluation of prototype 2	6
Experience of participants in project design with	11
prototype 2	

Interview 3 was recorded and record duration was 154:16 minutes in total. Interview 3 took 15:25 minutes on average for each interview.

3.7.2 Documents

Participants' project reports were also used as data sources in this study. In each phases of the study, the participants have written detailed project reports about what processes they have conducted and what decisions they had taken during their projects. Project reports that participants wrote were group reports, some of the participants worked in groups in different projects. 25 project reports were used as data source in this project. Details about project reports are summarized in Table. 3. 6.

Phase	Participant	Project1	Project 2
Analysis	A1	Group 1	Group 1
	A2	Group 2	Group 2
	A3	Group 1	Group 3
	A4	Group 2	Group 4
	A5	Group 1	Group 5
Design		Project 1	Project 2
	D1	Group 1	Group 1
	D2	Group 1	Group 2
	D3	Group 2	Group 3
	D4	Group 3	Group 4
	D5	Group 3	Group 5
	D6	Group 4	Group 3
	D7	Group 5	Group 4
	D8	Group 6	Group 3
Evaluation		Project report	
	E1	Group 1	
	E2	Group 2	

Table 3.6 Groups and reports of participants across phases of the study

	E3	Group 3
	E4	Group 4
	E5	Group 5
	E6	Group 6
	E7	Group 3
	E8	Group 4
	E9	Group 3
	E10	Group 2
Total	23 participants	24 group reports

Table 3.6 (continued)

As it is seen from the table, in each phase of the study, the participants were in different groups and some of the participants were in the same group. Project reports were written as a group. Hence, the number of reports that used as a data source in this study changed according to group members of participants.

For example, at the end of the analysis phase, the researcher analyzed 7 reports that consisted of 2 reports for the first project and 5 reports for the second project. Similarly at the end of the design phase, the researcher analyzed 11 project reports that consisted of 6 reports for the first project and 4 reports for the second project. In the evaluation phase, there was one project and the researcher analyzed 6 group projects to analyze project reports of the participants of this phase. Therefore, 24 final project reports of participants were analyzed for this study.

In the evaluation phase, there were also 30 individual reports of participants related to analysis, design and evaluation phases of their projects. These individual reports were the reports that participants composed by using prototype 2 and downloaded from it.

For the evaluation of the reports rubrics that were prepared by the instructor of the courses were used by the researcher to grade the project reports of the participants.

3.8 Data Analysis

Qualitative data is sophisticated and difficult to transform into numbers and standard quantifiable units and in qualitative studies data collection and analysis of data generally are applied simultaneously to form logical interpretations from data (Marshall & Rossman, 2006). In this study, the collected qualitative data were analyzed with an interpretive point of view. Although the data analysis process of qualitative data is not procedural and clear as in quantitative data analysis methods, the researcher used analytic procedure that was defined by Marshall and Rossman in this study. In their book, the data analysis process in the qualitative studies is described as "(a) organizing data, (b) immersion in the data, (c) generating categories and themes, (d) coding the data, (e) offering interpretations through analytic memos, (f) searching for alternative understandings, and (g) writing up" and this process is not linear (Marshall & Rossman, 2006, p.156). In this study all of the steps were applied in the data analysis.

First, in the data organization process the researcher made an organization chart for the interviews. She had organized them according to the date, the characteristics of interviewees and the duration of the interview. There were 23 interview records in this study. The total duration of interviews was 582:18 minutes. After that, she transcribed all of the interview records into text files. Then she controlled the text files and edited any typological errors. After transcriptions of the interviews, the researcher imported those text files into a qualitative data analysis program. Then, researcher organized the participants' project reports. In this study, there were 3 phases. In each phase the purpose of the interviews was different. Hence, the researcher analyzed each phase separately.

After the organization of the data, the researcher read and reread the data to become familiar with them. In this step, the researcher had the chance to get the whole picture roughly and scan all of the interviews in related steps.

Second, the researcher started coding the data before categorization and thematization. "Codes are labels used to describe a segment of text or an image" (Creswell, 2012, p.244). Although categorizing and naming themes are the next steps in the analysis process, the researcher's choice was code the data first and then form themes. This was also suggested by Creswell in qualitative data analysis. He suggested coding data first and then reducing list into five to seven themes (Creswell, 2012).

Hence, the researcher named text parts in the data by considering the relevance of the text to the research questions. As stated by Bogdan and Biklen, there are different types of codes like *situation codes, context codes, perspectives held by subjects, subject's way of thinking about people and objects, process codes, activity codes, event codes, strategy codes, relationship and social structure codes, narrative codes and method codes (2007).* With keeping in mind these categories of codes, the researcher coded all of the interviews phase by phase. An example of coding process is presented in Figure 3.2. After coding, the researcher prepared a codebook to share with another coder.

Third, researchers examined the codes and categorized them under themes. In each phase, there were separate coding and theming processes. Themes or categories are "similar codes aggregated together to form a major idea in the database" (Creswell, 2012, p.245). The researcher revised the codes and categorized them according to their relevance. After that, the researcher named those categories.

Then, by scanning themes and codes, the researcher made rough interpretations as memos. Finally, the researcher went through the data for different understandings and concluded the analyzing process by writing the results of the analysis through organizing the data with respect to themes and summarizing the findings.

Data in the project reports first graded according to the rubrics. Then, participant's phrases in their reports were analyzed according to codes and themes that were emerged during the analysis of interviews. In other word researcher first, analyzed the interviews and formed the codebooks of interviews. Then, project reports were analyzed according to these codebooks.

3.9 Trustworthiness of this study

Qualitative research is different than quantitative research. The difference of qualitative research is explained by Denzin and Lincoln (2008) as follows: "qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them" (p. 4). Thus, deciding the rigor of a qualitative research study is more difficult than that of a quantitative research study. Similarly, as Creswell explains, qualitative research is interpretive and the researcher should express his or her position in the study, interpreting style of results and his or her background that forms his or her interpretations (2012). Generally, qualitative studies are different from quantitative studies in that they are inductive rather than deductive, and they regard experiences within context rather than calculating for variables as in an experimental study (Bogdan & Biklen, 2007; Lincoln & Guba, 1985).

Therefore, qualitative research has different terminology and types of methods to ensure reliability and validity of the study. One of the core resources about validity and reliability of qualitative research is provided by Lincoln and Guba (1985) and they suggested different terms like *credibility*, *transferability*, *dependability* and conformability to ensure trustworthiness (validity and reliability) of a qualitative study. According to them, first, credibility is the term that is used for internal validity of a qualitative research and it shows that whether they are considered true from the participants' and other researcher's perspectives. Second, transferability is used for external validity in qualitative studies and its purpose is to show whether findings can applied other contexts or not. Third, the term dependability is used for reliability issue in qualitative research and it means that results of a study is consistent and can be repeated. Finally, the term conformability is used for objectivity issue and it ensures the objectivity of the results and how these results are affected from the participants' and researchers' bias. They suggest methods to ensure these issues and they are summarized in Table 3.7 (Lincoln & Guba, 1986).

To ensure the trustworthiness of this study, the researcher used prolonged engagement, member-checking, thick description, dependability audit, conformability audit and triangulation.

Quantitative	Qualitative	Methods
Research	Research	
Internal Validity	Credibility	Prolonged engagement
		Persistent observation
		• Triangulation
		• Peer debriefing
		• Negative case analysis
		• Referential adequacy
		• Member-checking
External Validity	Transferability	Thick Description
Reliability	Dependability	• Dependability audit
objectivity	Conformability	Conformability audit
		• Audit trail

Table 3.7 Summary of trustworthiness issues according to Lincoln and Guba (1986).

3.9.1 Prolonged Engagement

Prolonged engagement can be defined as spending adequate time in the research field to grasp the social context, culture of the environment or interested events. In this study, the researcher collected the data in three semesters and she worked as the project facilitator in those semesters. She attended the courses with the students, held project meetings and gave feedbacks for project reports of the participants. She was an active participant and spent enough time in the research context.

3.9.2 Member-checking

Member checking is defined as "a process in which the researcher asks one or more participants in the study to check the accuracy of the account" (Creswell, 2012, p.259). In data collection process, all of the interviews were recorded and then transcribed. After that, the participants were asked to check the transcribed text and state if they are accurate or not via e-mail. 3 of the participants responded and they said that texts were accurate.

3.9.3 Thick Description

In this study, the researcher provided detailed explanations about how the study was conducted. The Interview schedules are provided in Appendix A, B and C. Moreover, data collection methods and the coding process are described in detail. After that detailed descriptions of prototype 1 and 2 and screen shots of them are provided in Chapter 4. All of these explanations are given to increase the transferability of this study. Moreover, purposive sampling is used to collect reach the data related to these issues.

3.9.4 Dependability and Conformability audits

To ensure the dependability of this study, the researcher first formed a codebook of the 3 interview schedules with an experienced researcher who has experience in qualitative research and has a PhD. Degree in the instructional technology field. The Researcher of this study and the other researcher formed codebooks independently and compared them to find out conflicting ideas about the codes and themes. Then they discussed these issues and compromised on the codes. Hence, codebooks and themes were checked by another experienced researcher.

After that each the researcher of this study and the experienced researcher coded three interviews which are from different interviews. The Agreement levels on these codes were calculated by the following formula that Miles and Huberman suggested for the reliability of qualitative studies (Miles & Huberman, 1994, p.64)

$reliability = \frac{number \ of \ agreement}{total \ number \ of \ agreements + \ disagreements}$

Number of agreement is the codes that both the current researcher and experienced researcher agreed on and *disagreements* are the codes on which they did not agree or one of the researchers coded and the other did not. As a result level of agreement for intercoder reliability results are 0.72 for the interview 1 that was conducted in the first cycle, 0.80 for the interview 2 that was conducted in the second cycle and 0.74 for the interview 3 that was conducted in the final cycle. Miles and Huberman (1994) suggest at least 0.80 inter-coder reliability and values were close to this limit. After that, the researcher continued to code remaining interviews.

Finally, this study was conducted under the control of a thesis advisor committee and they checked the appropriateness of data collection, analysis and interpretation processes as experts. Hence, they have contributed to this study's trustworthiness by serving as dependability and conformability audits.

3.9.5 Triangulation

Triangulation is defined by Creswell as "the process of corroborating evidence from different individuals, types of data, or methods of data collection in descriptions and themes in qualitative research" (Creswell, 2012). The main data source for this study was interviews but project reports and materials were also used as supporting data in explaining related themes. In this study, experiences and perceptions of the participants were the main concern of the researcher. Hence, triangulation with different individuals was not applied.

3.10 Limitations of the Study

There are some limitations of this study. First of all, this study is limited to 23 participants and the researcher. Second, except forming codebooks of 3 interviews and the inter-coder reliability test, all of the data analysis was done by the researcher. Hence,

the validity of this study is highly dependent on the honesty of the researcher. The results of this study are based on the perceptions of the participants, which might be seen as another limitation. Also, this study did not include quantitative data that shows any significant results.

Additionally, the design of the prototype 1 is dependent on the researcher's software design knowledge and this might be considered as a limitation to design better EPSS prototype that contain all of the needs and suggestions of participants that are related to design of EPSS. Moreover, technical capability of selected software tool was also a limitation for prototype design. Then, second prototype was designed with a software development company and there were communication problems with this company. Hence, revisions that were intended by researcher were not completely applied in Prototype 2. There were also differences in time schedules of the researcher and the company. This was also a limitation of this study which affected the timeline of this study.

Finally, the researcher was also a participant of the study as a project facilitator. Although, this limitation was tried to be minimized by inter-coder reliability, triangulation, member-checking and experts guidance through all the steps of this study, the researcher effect might still be seen as a limitation for this study.
CHAPTER 4

RESULTS

This chapter provides detailed information about the findings of the study. First, the researcher presents the findings of analysis phase of the study and describes Prototype 1 of EPSS. Then, the findings of the second phase of this study are presented and research question 1 is answered with respect to the findings of these phases. After that, prototype 2 is described. Then, the findings of evaluation phase are presented and research question 2 is answered.

4.1 Research Question 1

What are the key elements of an EPSS that is designed to support novice instructional designers during instructional system design and development?

To answer RQ1 firstly, Phase I - analysis was conducted and needs of the NIDs were clarified with respect to their instructional design experiences and expectations from an EPSS related to this process. After this phase prototype 1 was developed. Then, NIDs used prototype 1 in instructional design process in the second (design and development) phase of this study. After NIDs experience with prototype 1 NIDs' instructional design process experiences and their expectations from the EPSS with respect to this process was analyzed. Research question 1 is answered with the combination of data that were gathered during these two phases.

4.2 Phase I: Analysis

As stated in the Chapter 3, in the analysis phase, NIDs who had completed two multimedia instructional materials (one for teaching a concept and one for teaching a procedure) participated in this part. They attended interviews and also NIDs' project reports for these instructional materials were used for the analysis part. Project reports were produced by group members. In this phase, the participants are named as A1, A3 and A5 were from one project group and A2 and A4 were from another project group. The results of this phase are reported in two main parts, which are instructional design process and expectations of NIDs from an EPSS.

4.2.1 Instructional Design Process

In order to design an EPSS to support novice instructional designers (NIDs) throughout the instructional design process, it was important to find out how they designed instructional systems. In this part, five themes were emerged from the data to explain the instructional design process that NIDs' applied. These themes were

- Analysis
- Design and development
- Evaluation
- Group work
- Source of data

4.2.1.1 Analysis

Analysis is an important phase in instructional design process and all of the participants had stated that they have accomplished this phase. *Need, learner, content, context analysis* and *writing objectives* were mentioned by participants in this phase.

Need analysis

Need analysis is an important step in instructional design process. The participants collected data from learners, teachers and subject matter experts (SMEs) to find out the needs. One of the participants explained this step as

In need analysis, we made [interviews] with teacher and students... These students said we had difficulty in this course in this topic; we determine two topics and select one of them. Also, teacher said that students had difficulty to understand these topics, understanding them might be easier if there would be additional materials. We choose [topic] according to this. We did need analysis in this way. (A5)

İhtiyaç analizinde işte hoca ile yaptığımız [görüşmeler] ve öğrencilerle de. ... O öğrenciler hani şu derste şu konuyu yaparken zorlanıyoruz filan derken o zorlandıkları iki konuyu belirledik. Biz onların arasından birini seçtik. Birde hoca da dedi. İşte çocuklar bu konuları anlarken zorlanıyorlar hani ek materyal olsa daha da kolaylaşabilir anlamaları diye. Biz ona göre [konuyu] seçtik. İhtiyaç analizini öyle yaptık. (A5)

In defining the needs of the target group, talking with target group, teachers and SMEs was necessary but participants did not describe a planned data collection process. One participant presented the unorganized data collection method of him in the following expression:

I went to mathematics department and interviewed a few assistants. I gathered their ideas related to what are topics, why they are necessary, and such things. (A2)

Şeye gittim şu matematik bölümüne bir kaç asistanla görüştüm orda. İşte konular nedir işte niye gereklidir işte öle şeyler için referans aldım. (A2)

Moreover, this unorganized data collection issue was also visible in their project reports. As a group A1, A3 and A5 were group members and their need analysis part in their report only included teacher's opinions about the needs of students in terms of difficult topics for students. However, they should report needs of both learners and teachers and also define data collection instruments. Their project report did not cover all of these parts. In their report they have written that

"When choosing this topic, we asked Z. T. who is a math teacher in H. S. Primary Education School and a 8th grade class. According to Z. T., more difficult topics are circle, solving equation, negative square but for student's coordinate system, circle and probability." (Project report of A1, A3 and A5) As a result, participants had problems in how they are going to collect data in need analysis and with whom they should contact with to collect data for need analysis. They needed a guide to organize data collection process.

Learner Analysis

In the learner analysis step, participants tried to find out characteristics, prior knowledge, learning preferences, and developmental stage of their target group. They also required analyzing what motivated the target group and their attitudes toward the topic. One of the participants explained what they did in this step as

Learner analysis. We consider conditions in Turkey in this. Besides, there was information that we learned in educational psychology course. There were age groups. Those divided by Piaget. We did [learner analysis] according to them. In theoretical perspective [we consider Piaget's age group]. In practical, in practice it may be different from them. Hence, we tried to write according to our interview results, observations from children and observations of children who are around us. Moreover, according to conditions in Turkey. (A5)

Öğrencinin analizi. Ee onda da yani Türkiye'deki şartları göz önüne aldık. Birde eğitim psikolojisi dersinden kalan bilgilerimiz vardı. O yaş grupları var. Piaget'in ayırdığı yaş grupları filan. Onlara göre yaptık biraz. Hani bilimsel yanını onlara göre. Pratik yanı da, yani pratik derken hani oradakilerin aynısı olmayabilir. Hani o yüzden yaptığımız interview sonucu çocuklarda gözlemlediğimiz, çevremizde gözlemlediğimiz çocuklara göre biraz bir şeyler yazmaya çalıştık. Birde Türkiye şartlarına göre. (A5)

One of the participants also underlined that they consider prior knowledge of their target group in her words;

... Whether they had knowledge [about topic], for example they had any information about circle and disc or we are going to teach first. We investigate these also. We have learned that they made a short entrance to circle and disc in 4th and 5th levels. (A1)

...daha önceden bir bilgiye sahipler miydi mesela çember ve daire konusunda önceden hiç bilgi aldılar mı yoksa direk ilk biz mi öğreteceğiz. Bunları da araştırdık. İşte onların 4. 5. sınıfta galiba çember ve daireye kısa bir giriş yaptıklarını öğrendik (A1) In the interviews, participants did not provide details about their data collection methods in this phase and neither did they mention this in their project reports. For example, A1, A3 and A5's project reports provided little information about target group's developmental level according to literature and teacher, but did not provide any information about the target groups' learning preferences or their motivational preferences.

According to the results, participants did not employ a full target group analysis in their project. They needed guidance in what to cover in this part. For example, learning preferences of target groups, what motivates them and their attitudes to topic also should be covered in this part. Moreover, they needed to know what to use to collect data and how to apply these instruments.

Content Analysis

According to the results, in the content analysis step, the participants emphasized *choosing topic, organizing content* and *source of content* issues. In their course, they have provided 100 topics in math subject and they were asked to choose one of them. Organizing the content of their instructional material was their responsibility in the course. In the interviews, they stated that they had chosen their topic according to their wishes. After that, they organized their content. The participants followed different ways to organize their content. For example, A3 stated that as a group each member collected different sources related to topic and they had chosen from these sources. On the other hand, A2 stated that they only searched for the Ministry of Education's web page for organizing the content.

Although; the participants described a collection of possible sources and careful selection process in organizing content, the project reports of the participants showed otherwise. The group reports of A1, A3 and A5's, and A2 and A4's included unorganized contents that were directly copied from text books. This result showed that content analysis step was not conducted effectively in instructional design process.

Besides, according to the results, the participants had used the Ministry of Education's website (3 participants) and textbook (2 participants) as the source of content.

The results showed that NIDs should be informed about how to choose their topic according to the need analysis results. Also, they needed guidance about how to organize their contents. Moreover, they should be provided ways with which to reach possible sources for their content.

Context Analysis

In the context analysis step, the participants had to decide about the physical conditions of the place that their instructional material would be used for. According to the interviews, the participants handled this issue in two different perspectives. They described the ideal context and designed their material for this context or they designed an instructional material for the current context. A1 and A4 approached the issue in the same way and tried to find out the ideal environment that their instructional material should be used. A4 explained this as follows:

We thought what it should be. But current context, i.e. classes that include 45 students, is not considered. Mostly, we considered classes for 20 - 25 students or laboratories for 20 - 25 students and do [our project] but we did not considered current conditions. (A4)

Hani olması gerekeni biz düşündük. Yani şimdiki ortamla yani 45 kişilik sınıflar falan filan gibi düşünülmedi. Hani daha çok işte 20-25 kişilik bir sınıf, ya da 20-25 kişilik bir laboratuar gibi düşünüp de yaptık ama şu koşulları düşünerek yapmadık. (A4)

Moreover, in the context analysis, the participants should made decisions about their projects with respect to context analysis. A3 also described their decisions according to context analysis and stated that they had chosen technical requirements of instructional material parallel to the technical capacity of public schools.

It is seen that the participants conducted context analysis properly in their instructional design process. In their reports, they also described the physical conditions and technical needs for the application of instructional material clearly.

According to the findings, the participants conducted context analysis properly. However, NIDs needed guidance about how they conduct content analysis. Normally, instructional designers conduct context analysis according to the authentic learning environment of their target group.

Writing Objectives

Defining the objectives of the instructional material is an important activity in the analysis phase. The participants were asked to define their objectives in terms of behavior, criteria and conditions. 3 of the participants mentioned that they determine and wrote the objectives in the analysis phase. A1 and A5 stated that they had written objectives as it was provided in curriculum. On the other hand, A2 mentioned about the necessity to include criteria and condition in objectives. A5 explained his knowledge about writing objectives as follows:

I did not know how objectives are written. There are things in writing objectives. There should be criteria, a restriction. In what conditions does this objective occur? And also there are objective verbs. We did not know them clearly. When we take them [to get feedback], they said they are not okay. At the beginning we did not know how writing objectives. (A5)

Kazanımın nasıl yazılacağını bilmiyordum. İşte kazanım yazarken çeşitli şeyler var. İşte bir kriter olması lazım, bir sınırlandırma olması lazım. Ne şartlarda oluyor bu kazanım? Bide bir şu kazanım fiilleri var. Onları biz çok iyi bilmiyorduk. Direk [geri bildirim almak için]götürünce bunlar olmaz dediler. Baştan kazanım yazmayı bilmiyorduk. (A5)

On the other hand, the project reports of the participants revealed that they had problems in writing objectives. In their report, they did not provide criteria or conditions in their objectives. For example, A1, A3 and A5 reported their objectives as:

- Defining the features of circles and sketching a model of circle
- Computing the areas which circle separates on plane
- Determining the relationship between circle and line
- Computing central angle and environmental angle of circle or disc
- Determining the relationship between center angle and environmental angle which are seen same arc.(from project report of A1, A3, and A5)

According to the project reports and interview results, the participants had problems in writing objectives. They had problems in writing objectives that included criteria, behavior and condition. They also had a lack of information about verbs that can be used in objective writing.

According to the findings, the participants needed detailed guidance about how an objective is written, what should be included in an objective and what type of words can be used in objective writings. The results showed that they had a lack of information related to these issues. Hence, the EPSS should cover these topics.

4.2.1.2 Design and Development

Design and Development phases are critical in instructional design process. It is required from NIDs to transfer the results of the analysis phase to the design of instructional material and develop an instructional material in the guidance of the design report. In this phase, NIDs were asked to design major components of their instructional material like motivation component, feedback components and assessment items. They were also asked to organize their content, visually design their instructional material and form a storyboard of their instructional material.

According to the results; the participants refer to *assessment items, motivation, feedback* and *visual design* processes and they also made comments about *development tool* in these phases. All of these phrases were considered as codes for the design and development themes.

Assessment Items

In the design and development phase, novice instructional designers were asked to determine their assessment items and their grading policy for these items. Multiple choice, fill in the blanks, matching, long essay and short essay were the types that participants talked about. Multiple choices was the most selected assessment item type by participants. Matching and fill in the blanks items followed. None of the participants preferred essay type assessment in their instructional material.

The participants stated that they had prepared assessment items by considering their objectives. For example, A1 explained how she prepared assessment items as follows:

Firstly, we tried to write our questions according to our objectives. We write them by considering objectives. Generally, we take some of them from source [textbook]. We tried to produce some of them by themselves. (A1)

Soruları öncelikle kazanımlarımıza göre yazmaya çalıştık. Kazanımları dikkate alaraktan yazdık. Genelde bazılarını kaynaktan [ders kitabı] aldık. Bazılarını işte kendimiz soru üretmeye çalıştık. (A1)

In project reports, none of the participants provided detailed information about assessment items. Instead there were general descriptions for them. Also, none of the participants mentioned about grading policy and they also did not provide any information about this in their project report.

According to the results, the participants had problems in providing all of their assessment items and form their grading policy. They needed to be informed about how to write assessment items and form a grading policy for them.

Motivation

In the design phase, NIDs were asked to use ARCS (Attention, Relevance, Confidence, and Satisfaction) motivation model and decide about the motivation elements of their instructional material. They had to decide and describe motivation elements for each part (lesson, assessment and game) of their instructional material. Although they had learned this model in their course, in the interviews they did not provide explicit information about how they decided to provide motivation in their instructional material. Moreover, A1 clearly stated that she did not use the suggested model. However, in their project report, she underlined each step of the model and claimed that they used the model in deciding about the motivational elements.

According to the interview results, the participants either did not mention designing motivational elements or roughly made some decisions about motivations. For example,

A5 shortly described the motivational elements of their instructional material but did not give any details. He stated that,

In terms of motivation, because it is an interactive material, our motivational elements generally sounds, visuals, and also the most obvious one is game. (A5)

Motivasyon açısından da, hani zaten interaktif bir materyal olduğu için, bizim ki motivasyon elementleri genelde sesler, görseller, bide işte en barizi oyun. (A5)

Moreover, the participants provided similar descriptions in their reports about the motivational elements and they only named what they were going to plan as motivational components without any detail. Explanations in reports also lacked of concrete examples. This showed that although participants had completed the design phase, they did not decide clearly on what they were going to use to motivate their target group.

To sum up, according to the results NIDs had problems about how to design motivational elements of their instructional material. They needed to be guided about how to employ a motivation model, what type of motivational elements could be used and how to report them.

Feedback

In the design phase, novice instructional designers had do decide about how they would give feedback to their target group. In providing feedback, the participants generally used the same strategy and provided feedback by saying "wrong answer" or "correct answer" type of expressions –either in text or/and sound formats. Some of the participants mentioned providing right answers of questions when a user of instructional material gave wrong answers. According to the results, it was seen that the participants decided on what to provide as a feedback according to their personal choice. None of the participants made any reference to an educational theory or a model or the needs of target group with respect to their development level while explaining their feedback choices. For example, A3 explained their feedback policy as follows:

We can provide solution of question as an extra. We did not provide the solution of question. We had just warned them. This is right and this is wrong. [Feedbacks] were in that form. We only missed giving solutions in tests. (A3)

Ekstradan sorunun çözümü verilebilirdi. Biz sorunun çözümünü vermedik. Sadece şey yaptık. Uyardık. Doğru bu yanlış bu. [Geri dönütler] bu şekildeydi. Tek eksiğimiz sadece sorunun çözümünü vermemekti testlerde. (A3)

Moreover, in project reports, the participants explained how they are going to provide feedback by giving examples. They reported how they provide feedback:

In the test section, questions are multiple choices. If students choose the correct answer, an applause voice will be heard. However, if the students choose the wrong ones, a caution balloon will appear as "Try again!" After all questions are answered, there will be a score table which displays the number of correct and wrong choices (from project report of A1, A3, and A5)

According to the results, NID's feedback policy was not grounded on an educational perspective. They gave feedback according to their senses. Hence, they need to learn when and how they should provide feedback. They also need to see examples of giving feedbacks across the different target groups.

Visual Design

In their instructional material project, novice instructional designers also had to make the visual design of their instructional materials. According to the interview results, all of the participants made comments about visual design. One of the participants explained about the perceived importance of visual design in his words as follows:

I think this [visual design] was the most difficult part. Visual part. It does not grab someone's attention, if it is not visually [appealing] but it was a good instructional material. Although its content is very reach, an empty page will be seen. (A2)

Bence en zor kısmı buydu [görsel tasarımdı]. Görsel kısım. Ne kadar iyi yaparsak yapalım görsel olmadıktan sonra hani öğrencinin dikkatini çekmeyecek. Boş bir sayfa gelecek içindeki içeriği ne kadar zengin olursa olsun. (A2) Moreover, in visual design how NIDs decide visual elements and appearance of instructional material was also an important issue. One of the participants stated his method to decide visual design in the following lines;

Firstly, I examine old ones [previous projects of course]. What they had done. Then, I draw a sketch. What can I do in the beginning, what will be where. We already know what is expected from us such as test, game parts because we decided our topic before. There were definite headlines. I tried to prepare an optimum draft sketch. I prepared one then prepared another one. As a matter of fact we add one of them to our project report. Then, I draw that sketch in computer, in graphical environment. We thought [our topic] was circle and disc. We tried to use more round and circle things. (A3)

Önce eskileri [dersin önce ki projelerini] inceledim. Ne yapmışlar. Sonra taslak çizdim. ... İlk başlarken nasıl yapabilirim, ne nerde olacak falan. Konuyu zaten seçtiğimiz için bizden ne istendiğini bildiğimiz için. Ne isteniyor mesela test isteniyor, oyun bölümü isteniyor. Belli başlıklar vardı. Buna göre optimize bir tane şey hazırlamaya çalıştım. Taslak- skech çizimi. Bir tane hazırladım, bir tane daha hazırladım. Hatta bir tanesini güzel olanı rapora koymuştuk nasıl bir şey olur diye. Onu sonra çizdim ben internette, bilgisayarda daha doğrusu grafik ortamda. ... Düşündük [konumuz] çember daire. Daha böyle çember yuvarlaklı şeyler kullanmaya çalıştık (A3)

In this quotation, the participants decided on what to include in visual design according to their personal ideas about what seem appealing and also consider the topic of instructional material.

Moreover, the participants mentioned different elements related to visual design. In table 4.1, the number of participants who mentioned the related visual design elements and frequency of references are presented.

As shown in Table 4.1, all of the participants mentioned color in visual design of instructional material. According to the results the participants gave importance to colors that they used in their instructional material and the color of a material was an important element in effectiveness of the instruction. A2 describes how they decided about colors in their material as follows:

Well, the most important visual element is color. Our friend A3 was more active in flash. He made more. He picked the color. Asked us whether it was appropriate or not. We selected this [color] because it was appealing to us. (A2)

Hani, en önemli görsel renk. Renge aslında hani A3 arkadaşımız daha çok flashda o daha çok şey[aktif] oldu. Hani o daha çok yaptı. O renge baktı. Hani söyledi uygun mu sizce. Bizim de gözümüze hoş geldiği için onu seçtik. (A2)

Visual design element	# of participants	# of references
Color	5	8
Alignment	4	4
Consistency	3	3
Readability/font	3	3

Table 4.1 Visual design elements that were mentioned in interviews

Alignment in the pages of instructional material was also carefully decided by the participants. They stated that they used empty spaces effectively and tried to use proper amount of visuals and texts in each page of their material. Moreover, consistency in visual design was also implied by the participants in the interviews. They stated that they checked consistency in their instructional material to provide familiarity and to prevent distractions. Furthermore, the participants stated that they considered readability of the text and used proper fonts. Also, one of them mentioned about using bold or normal text according to the importance of the instructional massage.

Although, the participants claimed that they considered visual design principles, their submitted instructional material had problems in visual design. For example, Figure 4.1 is an example page from A1, A3 and A5's group project. In the figure one can observe the alignment problems and lack of empty spaces. To sum up, according to the results, NIDs have knowledge about the importance of visual design and they also know visual design elements like color, alignment consistency and etc. Although they have

knowledge about these, they need to be guided in how to apply visual design rules in instructional materials.



Figure 4.1 A page from instructional material that was designed by A1, A3 and A5

Development Tool

In design and development phase, the tool that was chosen to develop instructional material was also important on the quality of participants' instructional material. A predetermined development tool, which is Adobe Flash Professional, was assigned to novice instructional designers for their project. NIDs had to learn this tool and complete their instructional design project simultaneously. Three of the participants stated problems about their incompetency in development tool and how it affected their project. One of them explained this as follows:

In fact, while deciding [feedback and motivation elements]; it is limited with our imagination. We can decide while we are saying it would better if we do this, or that. However, when flash coding knowledge is involved in, we could have problems. (A5)

Aslında [geri dönüt ve motivasyon öğelerini]belirlerken hani hayal gücüyle sınırlı. Belirleyebiliyoruz hani şunu yapsak daha iyi olur, bunu yapsak daha iyi olur derken de. Ama flash bilgisi kod filan girince içine biraz zorlanabiliyoruz yani. (A5)

Time management problems were also related with their competency in the tool. One of the participants stated that:

Yes we could not use. [Motivational elements that] we imagined because we do not know the program in detail. We might do if we worked on it too much but our time was diminished. (A1)

Evet, kullanamadık Hayal ettiğimiz [motivasyon öğelerini]. Programı çok fazla ayrıntılı bilmediğimizden dolayı. Hani onun üzerinde belki çok uğraşsak yapabilirdik ama vaktimiz de daralmıştı. (A1)

According to the results, NIDs need to learn how to develop their instructional material with a development tool. They also should be informed about what they can do with the knowledge they will learn during the lecture. In this way, the gap between the desired instructional material and the produced one can be closed.

4.2.1.3 Evaluation

Evaluation phase is the final step in instructional design process. NIDs were asked to evaluate their instructional material in this step by considering content accuracy, instructional quality, visual quality, usability and appropriateness of objectives. NIDs were asked to collect data and use different sources in data collection to evaluate their instructional material. *Instructional quality, content accuracy, formative evaluation, visual quality, usability* and *revisions* are the emerged codes in the interviews.

Instructional Quality

NIDs were asked to evaluate instructional quality of their instructional material in their projects and write their findings. In the interviews, 4 of the participants made statements about instructional quality. Although; some of the participants thought that they have evaluated this issue, some of them thought that it could not be decided without a real

implementation of instructional material that they designed and developed. For example A1 explained in her own words how she decided about instructional quality as follows:

How did we evaluate instructional quality? Firstly we let students use our instructional material. We made our decisions by observing them. Whether they learned or not? Is it effective or not? We decided by observing them. We asked questions like this topic is effective for you or not. We collect answers. With this way, we decided that it is appropriate so we have prepared an effective material. (A1)

Instructional quality i nasıl ölçtük? Öğrencilere kullandırdık bir kere. Onları işte gözlemleyerekten karar verdik hani. Öğreniyorlar mı öğrenmiyorlar mı diye. Nasıl etkili oldu mu? Olmadı mı? Onları gözlemleyerekten karar verdik. Sorular sorduk işte bu konu sizin için etkili miydi değil miydi diye sorular soraraktan, cevaplarımızı alaraktan. Uygundur. Demek ki etkili bir materyal hazırlamışız diye o şekilde karar verdik. (A1)

On the other hand, A2 and A4 thought that evaluating instructional quality of their instructional material was not a realistic request because they did not have the chance to make an authentic implementation. Moreover, A4 stated that evaluation process should be done by an expert.

Additionally, the participants explained how they decided about instructional quality of their instructional material in their project report. In their report, they stated that they decided about instructional quality according to the feedbacks of SME and teacher. They explained that:

For instructional quality of our material X gave us some feedbacks. We emphasized that we used the math curriculum of MEB. X checked the lecture notes and the overall project and he said that our project was suitable the math curriculum and according to him it was enough in terms of instructional quality. He added that we could achieve or master our objectives with this material. Prof. Dr. Y also gave feedback about this issue. According to her to increase the quality of our instruction we could do extra activities and give extra examples besides the math curriculum. She recommended some examples and activities to us to use in our project (from evaluation report of A1, A3, and A5).

This comment, therefore, shows that NIDs evaluate instructional quality of their material according to the ideas of SMEs and teachers.

To sum up, NIDs need to learn strategies about how to decide about their materials instructional quality before, during and after implementation. Moreover, they should check each part of their instructional materials in terms of instructional quality.

Content Accuracy

NIDs were also asked to evaluate appropriateness of their content to the target group. Three of the participants stated that they had checked content accuracy of their instructional material. The participants either checked the curriculum to decide about content accuracy or asked an SME to evaluate their content. In their project report, the participants also explained how they ensured content accuracy of their project. For example, in the following lines A2 and A4 stated that they checked content accuracy with a prospective math teacher.

In order to evaluate the content of the material some questions were asked to Z who is a student of elementary math education in METU in our interview. Questions were about this instructional material is appropriate for 7th grade students, whether there are some missing points. Moreover, whether, subtopics are enough or hard for 7th grade students (from A2 and A4's evaluation report).

According to this comment, participants decided about content accuracy with respect to just one prospective teacher's ideas. However, they had to check content accuracy by taking other stakeholders' ideas.

To sum up, NIDs need to know with whom they should evaluate content accuracy of their instructional material and how they should do it.

Formative Evaluation

In their instructional material development project, NIDs were asked to do formative evaluation during the design and development phases. Three of the participants stated that they conducted formative evaluation during their projects. Asking a SME or a teacher was a common way to get feedback for formative evaluation. One of the participants stated that:

We had problems while we were deciding content. Firstly, we looked at the Ministry of Education's curriculum and arranged everything. At the end we visited Y for formative evaluation. She said there might be some problems. We wish to go at the beginning. (A5)

İçeriğe karar verirken biraz sorun yaşadık. Eee önce biz MEB'in curriculumundan bakıp her şeyi ayarladık. En son işte formative evaluation almaya gidince Y hocamızın yanına, o biraz sorunlu olabilir dedi. Keşke başta gitseydik. (A5)

In formative evaluation process, NIDs generally contacted with students, teacher or SMEs and asked them to evaluate their instructional material. However, due to the time management problems, they visited those people after they completed their project. A5's regret was an example of this. This shows that there was a problem in planning their project. Hence, NIDs need guidance about how to conduct formative evaluation during their instructional material development project.

Visual Quality

NIDs were expected to evaluate the visual quality of their instructional materials. The participants stated what they do to evaluate visual quality in interviews and their reports but they did not give details. For example, A5 underlined sources in visual quality as peer evaluation results and feedbacks from project assistants in the interview. Similarly A5 and his group explained evaluation of visual quality in project report as follows:

Visual quality is another important issue for our project. We took feedback about the visual quality of our material from different people including subject matter expert, students from target group and classmates. First of all we mentioned the peer evaluation. We did peer-evaluation with a group in our class for two times (from evaluation report of A1, A3, and A5).

However, none of the participants gave details in visual quality evaluation like whether they asked alignment, readability and etc.

According to the results, NIDs need to be guided about how they can evaluate visual quality of their instructional material. They should be guided about who they can contact and what to ask them to evaluate the visual quality of their instructional materials.

Usability

In their instructional material development project the NIDs were also expected to evaluate the usability of their materials. Four of the participants stated that they had conducted a usability test. One of them explained their usability test process as:

We got help of our friends. For their evaluation. How they are using. First, we tried to get feedback from them. From friends who take this course. Then, make students use our [instructional material] by going to school. Whether they have difficulty or not [in using our instructional material]? Do they reach pages that they want instantly via the buttons? (A1)

Usability için falan arkadaşlarımızdan yardım aldık. Değerlendirmeleri için işte. Nasıl kullanıyorlar. Öncelikle onlardan feedback almaya çalıştık. Kendi işte bu dersi alan diğer grup arkadaşlarımızdan. Sonra usability için okula gidip öğrencilere kullandırdık. [Öğretim materyalimizi kullanmakta] bir zorlanıyorlar mı, zorlanmıyorlar mı? İstedikleri yere hemen gidebiliyorlar mı butonlarla? (A1)

In usability tests, the participants had to observe a student who uses material and also had to ask questions after the test. Although the participants did not give details about usability test process in the interviews, they had written about this process in detail in their report. For example, in the report they gave details about participants of their usability test and their methods as:

We choose 8th grade students because they have already learnt circle and disc. 7th grade students have not learnt yet so we think that they have some difficulties because of lack of knowledge about the concept. We had them to use the material. We told them the project firstly and we observed them and took note while they were using the material. (from evaluation report of A1, A3, and A5).

Moreover, in their report they provided the results of the usability test.

To sum up, although NIDs have a general perspective about usability testing, it can be useful to inform them about how to conduct a usability test. The participants stated that they conducted usability tests but did not give details about how they interpret results. Guiding about interpretations of a result can be helpful for NIDs.

Revisions

In the assigned project, one of the requirements was to make revisions with respect to evaluation results. 4 of the participants stated that they had made revisions in their projects. According to the results, revisions were made with respect to peers, students and SMEs suggestions. For example A4 emphasized the revisions that they made in their project as:

For example, one of the critics, our lecture part formed texts mostly. Then we tried to support this with a small animation and then with little visuals. In other words, maybe we could not do hundred percent but at least we edited most of them according to feedbacks. Both in evaluation and in lecture part. (A4)

Mesela değerlendirmelerden bir tanesi bizim konu anlatımı kısmının çok fazla hani yazılardan oluşuyordu ilk başka. ... Daha sonra onu ufak bir animasyonla, sonra küçük görsellerle desteklemeye çalıştık. Yani belki yüzde yüz yapamadık ama en azından büyük çoğunluğunu o aldığımız geri bildirimlere göre düzelttik. Hem değerlendirmede hem de konu anlatımı içerik kısmında. (A4)

Similarly in the project reports, the participants underlined that they made revisions according to the evaluation results and they gave more details in reports. For example, A4 and A2 give many details in their project reports in their report under different headings. For example, they explained the revisions that they made in lecture part as:

According to feedbacks that we get during the summative evaluation stage, we added some additional page and animations to support the information presented as textual. Also, we added some details to the information. Finally, we rearranged the sentences as Y have suggested. We rewrote some of them by using a mathematics course book for seventh grade that approved by the Ministry of National Education as a guide. (from evaluation report of A2 and A4)

According to the results, NIDs made revisions in their project according to the feedbacks of SME and other sources. Revisions are important to improve quality of instructional material. Hence, their importance should be underlined and NIDs can be informed how they can collect data to make revisions in their instructional material development project.

4.2.1.4 Group Work

NIDs had to work as a group in instructional material design process. Hence, in this process working as a group also affects NIDs project and instructional design experiences. *Time management* and *division of labor* were the codes that emerged under this theme.

Time Management

Time management is an important issue in projects. In this project NIDs had limited time and had to make analysis, design, development, implementation, and evaluation phases in this time period. They also had to write analysis, design, and evaluation reports and develop a working multimedia instructional material with development tool. Hence, time management was very important for NIDs. 4 of the 5 participants stated that they did not have enough time. Those participants implied that there should be more time allocated for this project. For example one of the participants stated that

Actually, I can say that we worked well as a group. Because, this project requires too much time. We could make better of it, if we had more time. Because, if you spend more time in design phase, instructional material would be better in relation to time. (A4)

Aslında grup olarak iyi çalıştık diyebilirim. Yani çünkü çak fazla vakit isteyen bir proje bu. Ama daha fazla vaktimiz olsaydı bence daha iyisini de yapardık. Çünkü design süreci bence ne kadar çok vakit harcadık o kadar çok iyi. (A4)

One of the participants stated that they worked according to their plan and there were not a time management problem. Moreover, in their project reports, NIDs were asked to write their time schedule related the project. However, students wrote about ideal cases in this part, instead of the reality. As stated in the methodology chapter, the participants had 10 weeks to complete their project and it could be enough for their project. However, as a participant observer, the researcher observed that the participants tended to work on their project when they were close to due dates. That was the real cause of time problems. According to the findings, NIDs need to develop their time management skills and plan their time to complete their projects in given time.

Division of labor

NIDs worked as groups in their projects. The groups were randomly assigned in analysis, design and development phases of this study. NIDs generally had their own ways to share the workload. In the interviews, the participants talked about how they share the workload of their project. According to the interviews, the participants divided the project reports into parts and assigned those parts to group members. On the other hand in instructional material development part, the member of the group who has experience or familiarity with the development tool develop the instructional material and other members helped them in preparing content and helping design process. One of the participants explained division of labor in their project as

We share topics about the parts of analysis report. Every one wrote their parts. (A5)

Konu paylaşımı yaptık biz analiz raporundaki bölümler hakkında. Herkes kendi bölümünü yazdı (A5)

Moreover, NIDs were asked to present division of labor in their reports by preparing a "Timeline and Practical planning" part. NIDs present tasks that they completed and who completed tasks in their project reports. However, as a participant observer, the researcher observed that these parts did not reflect all of the division of labor strategy of the groups.

To sum up, according to the findings, NIDs needs to be guided about how to make division of the labor to complete their project in given time.

4.2.1.5 Data Collection in Instructional Design Process

In their projects, NIDs were asked to collect data to do analysis, design and evaluation phases. The quality of data that they collected also affects the quality of their instructional material design project reports and materials. According to the results *interview, observation, peer evaluation and feedback of facilitator* were the codes which

describe the methods that NIDs used to collect data for their project. Also *teachers / SMEs and students* were the most frequently mentioned data sources in the interviews and reports. Four of the participants stated that they had conducted interviews to collect data. Also A1, A3, A5 and A2 and A4 stated in their reports that they had conducted interviews for data collection. One of the participants explained that as,

In interview, we thought about which steps should we evaluate and get feedback and then prepared questions according to that, we made interview according to that. (A1)

Interview de hani hangi aşamalarını değerlendirmemiz, hangi aşamalar üzerinde feedback almamız gerektiğini bir düşünüp, ona göre sorular hazırlayıp, interviewi ona göre yaptık. (A1)

Another data collection method of NIDs was *observation*. 4 of the participants stated that they had made observations for their project. According to the results, NIDs made observations during usability tests of their instructional material. Beside this, they had used their general experiences and observations about target groups. None of them mentioned about a planned observation to understand the authentic environment of class and the natural situation of students and the teacher in class.

Moreover, the participants stated that they had considered *peer evaluation* results for revisions. The participants also stated that they used their own group members and other class-mates opinions about their instructional material to revise their material. One of the participants said:

When I come and look screen from distance. How was it [instructional material]? We see our mistakes. In the parts that we did not recognize, we called friends and get feedback [about our instructional material]. (A3)

Gelip baktığımda uzaktan bakıyorum ekrana. Nasıl bir şey [eğitsel materyal] çıkmış. Hataları görüyoruz. Görmediğimiz yerlerde işte arkadaşları çağırıp [eğitsel materyalimiz hakkında] feedback alıyorum onlardan. (A3)

In addition to these, NIDs contacted a project assistant through their projects. The assistants were supposed to provide feedbacks to NIDs. Three of the participants stated

that they used feedbacks of the assistants as a source of data for their revisions. The participants also underlined that they had used feedbacks of the assistants for their project in project reports.

Formative evaluation was made each week during the design and development stages with project facilitator. We improved some modules of our material according to the feedback provided the facilitator. (From evaluation report of A2 and A4)

Besides the peer evaluation our facilitator gave some feedbacks about our material. She saw first and second prototype of our material and she said there was no big problem in terms of visual quality. (From evaluation report of A1, A3, and A5).

According to the results, NIDs contacted *teachers / SMEs* and *students* to collect data. All of the participants stated that they had contacted teachers / SMEs during the instructional design process. For example, one of the participants explained this in his words as follows:

We went to SME. [We said that] we made such a material. [We asked] whether this gains were appropriate or not. Can student understand that or do these videos appropriate? She said not and we removed them. (A2)

Safure hocaya gittik. Hocam işte biz böyle böyle materyal yaptık [dedik]. Bu kazanımlar uygun mudur yeterli midir [diye sorduk]. İşte öğrenci bunu anlar mı veya şu videolar uygun mu? Değil dedi mesela çıkardık. (A2)

Moreover, one of the participants provided an example about how and why they contacted students in his word as follows:

We also showed [our instructional material] to the students. In dormitory territory there was a child whose son of director of dormitory or child of one of his relatives. We did with him. We asked questions like: Which part you did not like, why you get bored here and take feedbacks, made revisions, tried to make better things. (A3)

Öğrencilere gösterdik hatta biz. Yurtlar bölgesinde bir tane yurt müdürünün çocuğu var sanırım bir akrabasının çocuğu. Onla yaptık. Dedik hadi burasının neresi hoşuna gitmedi? Burada neden sıkıldın gibi feedbackleri alıp değiştirip daha güzel şeyler yapmaya çalıştık. (A3) To sum up, interview, observation, peer evaluation and feedback of facilitator were the methods that NIDs used to collect data for their project. They contact teachers / SMEs and students to collect data. However, they needed to be guided about how to prepare interview questions, how to make observation and also how to interpret the results.

4.2.2 Expectations of NIDs from Electronic Support Systems

Expectations of NIDs from Electronic Support System that is designed to support them during instructional system design were very important in this research because EPSS was designed according to these expectations. Hence, the researcher also asked the participating NIDs about their needs and expectations during instructional system design in interview 1. According to the results *components*, *interaction* and *benefits of EPSS* were the themes that emerged from data.

4.2.2.1 Components of EPSS

According to the results, such an EPSS should have five main components. These components were *tutorials, examples, resources, templates* and *tools*. These components are the codes of this theme. The participants provided detailed description about these components. These components were explained in detailed in the following parts.

Tutorials

During the interviews, all of the participants required tutorials related to different steps of the instructional system design process. In general, tutorials related to how to apply the steps of systematic instructional design are: analysis, design, development, implementation and evaluation.

According to interview results, first, the participants expected to have tutorial related to ADDIE model and instructional design process. Participants thought that they have a lack of information about this topic and if there would be a tutorial about this topic in the EPSS, it would be helpful for them. One of the participants explained this in her words as follows:

Step by step, in other words at analysis, design, development and all phases without effecting my creativity, this is very important for me it should not obstacle me, bit by bit I mean only the basics should be given to me. However, I should build material. (A4)

Aşama aşama yani analiz, design, development tüm aşamalarda benim yaratıcılığımı engellemeden, bu çok önemli benim için hani bana engel olmadan, ufak ufak yani sadece temeli vermeli bana. Ama onun üzerine ben yani ben inşa etmeliyim materyali.(A4)

Second, as it is seen in Table 4.2, the method of collecting data, how to write reports and APA style were other topics that the participants suggested EPSS should include.

In relation to the analysis phase, firstly, the participants expected EPSS to include tutorial about target group. They also expected this tutorial to include characteristics and developmental level of their target group.

We thought that if there were more information about students for example 7^{th} grade students and their development level, how they learn the topic, it would be more useful for us. For example, do something we do motivate them or not? Then I think if we presented them in detail, it would be better. (A1)

Öğrenciler hakkında daha çok bilginin mesela 7. Sınıftaki öğrenciler bunların gelişim düzeyleri konuyu nasıl öğrendikleri- daha çok bilgi olsaydı daha çok işimize yarardı diye düşündük biz. Mesela yaptığımız bir şeyi onlar için onları motive mi ediyor etmiyor mu? Ondan sonra bunları daha ayrıntılı görebilseydik daha güzel olurdu diye düşünüyorum. (A1)

Secondly, organizing content was also mentioned by the participants as a possible topic in tutorials. One of them suggested this topic in his words as follows:

In analysis phase, in organizing content. It [EPSS] can be helpful for us in how we limit content or what will be the extent of the content.

Analiz aşamasında, Konu sınırlandırmasında mesela. [EPSS] Konuyu nasıl sınırlandıracağımız veya ne gibi boyutlarda olacağı konusunda bize yardımcı olabilir .(A5)

In the design phase, the participants suggested topics that should be included in the tutorial part of EPSS such as visual design, development tool, feedback, instructional

approach, storyboard, and assessment item development. Firstly, visual design was the most referenced topic that should be in tutorials. A5 suggested this topic by saying

Visual design. We know that but there may be a detailed document about design guidelines, principles. (A5)

Görsel tasarım. Bu tasarım ilkelerini, tasarım prensiplerini, biz biliyoruz da onu daha ayrıntılı bir şekilde anlatan bir doküman olabilir. (A5)

Secondly, development tool was also suggested as a topic in tutorial part. NIDs experienced problems in learning development tool and using it in their project. A3 explained these problems in his words and due to the problems in learning development tool, A3 also suggested that this topic should be included in EPSS. He stated that

Especially related to coding part of flash, not much presented to us in lectures. It presented superficially. Because assistants also do not know [it]. It happens like that we know what to do but do not know how to do it. Through the middle of the term, we started to feel panic because we do not know how to do it. Still we did not learn it. We just know how to go when clicked to a button. We felt panic because not much presented about coding. However, we know what to do. Well what we are going to do and how we are going to do it. Just there were problems about how to do it... flash, yes especially about coding part of flash, there should be source. (A3)

Derslerde özellikle flash kod kısmında çok fazla şey gösterilmedi bize sunulmadı. Sadece yüzeysel geçildi. Çünkü asistanlarda bilmiyor. ... Hani ne yapacağımızı biliyoruz ama nasıl yapacağımızı bilmiyoruz. Böyle bir şey oldu. Dönemin ortasına doğru bir panik olmaya başladık. Çünkü nasıl yapacağımızı bilmiyoruz. Hala öğrenmedik. Sadece işte butona basıldığında nasıl gidileceğini biliyoruz. Kod tabanında çok fazla bir şey gösterilmediği için bir panik oldu ama ne yapacağımızı biliyorduk. Hani ne çıkaracağız, nasıl yapacağız. Sadece nasıl yapacağız kısmında sorun vardı... Flash evet flashın kod bölümüne yönelik kaynak özellikle olmalı. (A3)

Thirdly, the participants suggested that feedback should be included in tutorials. They also stated that how to give feedback properly in instructional materials should be included in tutorial part of EPSS. Additionally, instructional approach, storyboard

design, and how to design and organize assessment items topics were mentioned by the participants in topics that should be covered in tutorials.

In summary, NIDs expected to have tutorials in various topics in EPSS. The list of tutorial topics that NIDs were expected from EPSS is summarized in Table 4.2. According to the results, NIDs need tutorials about the topics that are presented in Table 4.2.

Related	Topics	#	f
Phases			
general	instructional design-ADDIE model	3	6
	method of collecting data	2	3
	how to write reports	1	2
	APA style	1	1
analysis	target group	3	7
	organizing content	2	3
design	visual design	5	8
	development tool	3	6
	feedback	3	3
	instructional approach	2	4
	storyboard	1	1
	assessment items	1	1

Table 4.2 Tutorial topics that expected from EPSS

Examples

According to the results, all of the participants thought that there should be examples in the EPSS. They thought that examples could improve their performance. For example A4 stated that

It can show small examples. At least, I get it and I can produce more original things by using my creativity. (A4)

Küçük örnekler gösterebilir. Ki en azından kafamda otursun ve ben kendi yaratıcılığımı kullanıp ortaya daha orijinal şeyler çıksın. (A4)

The results indicated that the participants suggested examples that were related to different topics. Topic, number of participant that suggested them and frequency of reference is presented in Table 4. 3.

Table 4.3 Suggested example topics

Example of	#	f
Interview items	3	5
Project and project reports	3	5
Activity examples	2	2
Objective writing	1	1
Educational game	1	1

As seen in the table, the participants expected EPSS to provide examples about interview items. One of the participants stated that

For example, we experience difficulty while preparing interview. Saying what we should ask. For example, there can be sample questions. (A5)

Mesela interview yapılırken biz mesela zorlandık. Ne sorsak acaba diye. Mesela o örnek sorular olabilir. (A5)

Another issue that was suggested by the participants was that there should be a project and project reports examples in the EPSS. 3 of the participants stated that they expect sample projects and project reports in EPSS. One of the participants explained this as follows: There can be a finished [project]. For example, it can tell how to write each step and then can present an example. We did these things in this step like we wrote and told. We did these. I think it will be better in this form. (A1)

Bitmiş bir şey [proje] olabilirdi aslında. Mesela anlatıp anlatıp her bir aşamayı şöyle yazacağız..., sonrada kendi bir örneği gösterse işte. Şu aşamada biz şunları yaptık işte yazdığımız söylediğimiz gibi. Bunları yaptık. Bu şekilde olursa güzel olurdu gibi düşündüm. (A1)

Moreover, they also stated that there should be activity examples in EPSS. A1 explained the necessity in her words as follows:

While preparing content, there are not more examples from daily life. We tried to get particularly these from text books by ourselves. Let's find an example from daily life. Then, support these examples with activities. Let these examples be related with each other such as how we get circle and disc. For example, from what -rectangle, square- we end up circle and disc. In short, if such activities were more, it would be more helpful for us. We tried to reach them but we could not be very successful. (A1)

İçeriğin oluşturulmasında mesela çok günlük hayattan örnekler çok verilmiyor. Kitaplarda özellikle bunları kendimiz çıkarmaya çalıştık. Hani günlük hayattan bir örnek bulalım. Sonra işte bu verdiğimiz örnekleri etkinliklerle destekleyelim. Bu etkinlikler şey olsun mesela birbiriyle ilişkili olsun ne bileyim çember daireyi nasıl elde ediyoruz. İşte dikdörtgenden kareden neden elde ederekten bu çember ve daireye ulaşıyoruz. Yani böyle etkinlikler daha fazla olsa daha çok işimize yarardı. Bunları kendimiz çıkarmaya çalıştık mesela pek de başarılı olamadık. (A1)

The participants also mentioned that examples in objective writing and educational games could be beneficial for NIDs in EPSS.

To sum up, NIDs suggested that there should be examples about interview questions, instructional material design projects and project reports, activity examples, how to write objectives and educational games.

Resources

A source that is related to instructional design process or related topics and not developed by researcher is named as "resource". The participants mentioned about

resources as a necessary component. Firstly, they suggested that resources which are related to characteristics of learners from different levels should be provided in EPSS as a resource. According to the results, the current curriculum should also be included in resource part. One of the participants suggested that there should be resources about motivation in EPSS. She said that

Which colors motivate students more? Which ones do not? To use an animation or a cartoon for a 7th grade student whether motivate him/her or not? If there was something, a resource that includes these, it will be more pleasing for us. (A1)

Hangi renkler öğrencileri daha çok motive eder? Hangileri etmez. 7. Sınıftaki bir öğrenci için bir animasyon kullanmak, bir karikatür kullanmak, işte onu motive eder ya da demotive eder. Falan diye bunları yazan bir şeyler olsa bir kaynak olsa idi daha çok hoşumuza giderdi. (A1)

Finally, one of the participants stated that there should be resources about Turkish educational system in the resource part. He stated that

In our department, how can I say? While reading books, attending educational psychology course, we worked on American educational system. We know how it is in Turkey but how it is in more psychological perspective? We do not know it clearly. (A5)

... Bizim okulda Nasıl söylesem. Kitapları okurken, eğitim psikolojisi alırken Amerika'daki eğitim sistemi üzerinden gidiyoruz. Türkiye'dekini biz biliyoruz ama daha psikolojik açıdan nasıl acaba? Onu çok iyi bilemiyoruz biz. (A5)

To sum up, NIDs suggested that resources about characteristic of learners, current curriculum, motivation and Turkish educational system should be included in EPSS.

Tools

According to the results, the participants suggested that there should be some tools in EPSS. For example one of these tools was an online survey tool. A participant explained this tool as follows:

For example, there can be online software. Like a questionnaire. We will write questions there and this software could make evaluation at the end. It will be ready and we just write questions there and people will [write] there I agree, I disagree. (A5)

Mesela online olarak gönderebileceğimiz mesela bir şey var yazılım olabilir... Anket gibi. Biz oraya sorusunu yazacağız onun sonunda değerlendirme yapabilecek bir yazılım olabilir mesela... Hazır olacak sadece böyle sorusunu yazacağız oraya insanlar oraya katılıyorum, katılmıyorum [yazacak]. (A5)

Moreover, they also suggested forum and chat tools to be included in EPSS for users.

According to the results, online survey tool and chat tool suggested by NIDs to be included in EPSS. They thought that EPSS will be more beneficial if it include these tools.

Templates

According to the results, one of the components that were stated was templates. Templates are described as empty forms that NIDs can fill and use as an interview, parts of instructional material and storyboard for their project. One of the participants stated that

Maybe small templates, especially in design phase it can show templates and I can [select] from them. Actually, I can have opportunity to this. I must able to choose from there. (A4)

Belki küçük taslaklar özellikle design kısmı için taslaklar gösterip, bunlardan [seçebilmeliyim]. Hani ona da imkanım olmalı. Oradan da seçebilmeliyim. (A4)

Another one suggested templates in his words as follows:

In each step like motivation, feedback; let's say a certain template of these; a general template would be more beneficial. (A2)

Her aşamada, motivation olsun feedback olsun; bunların sabit bir şablonu diyeyim artık; genel bir şablon olsa daha yararlı olur bence. (A2)

According to the results, NIDs suggested that templates that can be used during project can be beneficial for them. Hence, it should be included in the design of EPSS.

4.2.2.2 Features of EPSS

In the interviews, the participants were also asked about their perceptions and expectations about possible features of EPSS. According to the results *interaction*, *multiuser group study, role of EPSS, and ease of use* were the emerged codes. They

made comments about how interaction with the system should be and with whom they wanted to interact in the system. Detailed explanations about these codes are provided in the following lines.

Interaction

NIDs interact with different people during their instructional material design and development project. They contact learners, teachers, subject matter experts to collect data during analysis, design and evaluation phases of their project. The participants stated that if a system could provide interaction with those people, it would be helpful for their project. For example one of the participants stated in her words that interaction with a SME would be great in EPSS:

After we finished this [instructional material], if a facilitator evaluated this and give feedback to us one by one in each steps, it would be very good. (A1)

Sonra biz bunu [öğretim materyali] bitirdikten sonra bir facilitator karşıdan bunu değerlendirip bize feedback verse her aşamada ayrı ayrı. Çok güzel olurdu. (A1)

Moreover, one of the participants stated in his words that EPSS should give chance to interact with learners to get feedbacks from them during instructional material design and development process. He explained his ideas as follows:

It should give testing opportunity. On one side you may form a student network and on the other side the instructional material. At this step you can show students. At the beginning, in analysis phase I will do such things. Is it ok for you? How will you consider this? Can you understand this? Interactively. It would be great (A2)

Ya nebiliyim test şansı vermesi gerekiyor. Bir tarafta öğrencilerin olduğu bir ağ kurardın bir tarafta işte kendi hazırladığın şey[öğretim materyali]. Öğrencilere gösterirdin o aşamada. İlk başta, analiz aşamasında ben böyle böyle bişi yapacam. Size uyar mı tarzında. Hani bunu nasıl görürsünüz. Anlayabilir misiniz ... Karşılıklı interaction şeklinde. O güzel olurdu. (A2)

On the other hand, another participant underlined the difficulty of finding people from target group to test their product and EPSS could provide solution to this problem by providing interactivity opportunity.

As I said we had problem to find students in small ages, in finding 7th grade students. Actually, if it [EPSS] could provide this, it would be very beneficial. (A4)

Dediğim gibi biz işte küçük öğrenci bulmakta zorlandık, 7. Sınıf öğrencisi bulmakta. Hani bunu [EPSS] sağlayabilirse aslında çok faydalı olabilir.(A4)

To sum up, according to the results, the participants suggested that EPSS should provide interactivity and they should have a chance to contact people who might provide feedback for their instructional material.

Multiuser Group Study

The participants of this study completed their instructional materials in groups. Hence, all of the participants underlined that EPSS system should support group studies. They suggested that there should be a system in which they login with their user accounts and in this system they worked on a project. They suggested that this system should provide opportunity for all group members to make changes on a project and to be viewed by others. One of the participants explained this in her words as follows:

For instance, I think that if we did project as a group there, it would be more appropriate. For example, we write something. For example, another member of our project added something for report or said it was not proper and deleted it and write more properly. .. It would be very good. (A1)

Mesela projeyi biz orda grup olarak orada yapsak daha uygun olur diye düşünüyorum. Hani bir şey yazıyoruz. Mesela... Rapor için grubumuzdaki başka bir arkadaş bir şey eklese ya da bu uygun değildir dese silse tekrardan daha düzgün bir biçimde yazsa... Çok güzel olurdu. (A1)

According to the results, they wanted to work on their project together in EPSS. They wanted to view and edit work of others throughout the system.

Role of EPSS

The participants also made comments about what the role of EPSS should be. The results showed that they required an EPSS that facilitate their study by providing feedbacks and suggestions. 4 of the participants stated their ideas about this issue. For

example, A2 explained his expectations about the role of the system in his words as follows:

First, it should wait from me. I should say the program that I am going to do like this. It should say to me that these are proper according to my sources but if you do this it can be better. It gives me feedback. Then I will ask again whether this is OK or not. If it is not, it will respond in the same way. (A2)

Önce benden beklemeli. ... Ben böyle böyle yapacam demeliyim programa. Program demeli ki bana evet bunlar bunlar doğru evet uyuyor benim kaynaklarıma uyuyor. Ama şunları şunları yapsan daha iyi olur. Bana geri dönüt verir. Ben sonra bir daha sorarım bu olmuş mu. Olmamışsa tekrar karşılık verir aynı şekilde. (A2)

In the quotation above, the participants suggested an intelligent system which can provide instant feedbacks according to inputs. Moreover, A5 states that system could provide suggestions about proper decisions about their projects.

In short, according to the results NIDs expected an EPSS that guides them through their instructional system design projects. They also suggested that EPSS should provide feedbacks according to their actions in the process.

Ease of Use

The last code that is related to features of EPSS was *ease of use*. The participants suggested that EPSS should have an easy interface and visual design of this EPSS should aim to enhance ease of use. Two of the participants underlined this issue. One of them explained this as follows:

It could be a system in which access to important things are easy. For example, usability may be more important than visuality. It could be this kind of system. The interface can be designed like this. (A3)

... önemli şeylere kolay ulaşılabileceği, hani biraz daha çok görselliğe önem verilmeyip daha çok kullanım kolaylığına önem verilebilir. Böyle bir sistem olabilir. Böyle bir ara yüz çıkartılabilirdi.(A3)

According to results, EPSS should be easy to use. The design of the EPSS should consider usability more than visual quality.

4.2.2.3 Possible benefits of EPSS

The participants also mentioned about possible benefits of EPSS. *Information* and *sharing* were the emerged codes according to the findings.

Information

During the instructional material development process, NIDs need many resources and information to build up their material. EPSS can provide some of the information that they need. A5 explained their needs and possible benefit of EPSS with respect to information in his words as follows:

We have difficulty to find sources. There are not enough sources for these. Let me put this in this way. There were many sources but there is not any source that is useful for us... I think that it [EPSS] will be very useful because it is directly designed for us. (A5)

Kaynak bulmakta da zorlanıyoruz. hani bunlarla ilgili çok fazla kaynak yok. Ya da şöyle diyim. ya da çok fazla kaynaklar var ama hani bizim işimize yarayan yok... Bu[EPSS] direk bize yönelik bir şey olduğu için çok işe yarayacağını düşünüyorum ben. (A5)

Sharing

Sharing ideas about instructional materials of NIDs may help them improve their material and enhance their knowledge about instructional design process. The participants suggested that EPSS could provide opportunity to view others projects and make comments on them. In fact, NIDs were encouraged to view and evaluate each other's projects while they were designing. According to the results, the participants suggested that EPSS could provide this in its system and it could be useful in sharing ideas of other peers. One of the participants stated this in his words as follows:

For example, I can see another group's project. If I see a failure, I can get involved there. I should be. (A2)

Atıyorum ben farklı bir grubun şeyini görebilirim. Bakarım ki burada bir yanlışlık var bende oraya müdahil olabilirim. Olmalıyım. (A2)
4.2.3 Summary of the Analysis Phase

After completing the analysis phase, the results were reviewed and the needs of NIDs were determined according to these results. The needs of NIDs that were decided according to participants instructional design experience are summarized in Table 4.4.

T 11	4 4	NTTD	1	1.			• .	1	1 .	•
Table	<u>4</u> <u>4</u>	NII)c	needs	according	to.	their	instru	ctional	deston	experience
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Phases	Steps	Need of NIDs
Analysis	Need Analysis	Data collection
	Learner Analysis	Data collection Learners characteristics
	Content Analysis	Content organization
	Writing Objectives	How to write objectives
Design	Assessment Items	Grading policy
	Motivation	Motivation model How to design motivation elements Concrete examples about motivation
	Feedback	How and when provide feedback Feedbacks according to different age groups
	Visual Design	How to apply visual design rules Alignment Using Empty Spaces
	Development Tool	Information about development tool
Evaluation	Visual Quality	How to evaluate visual quality
	Instructional Quality	How to evaluate instructional quality
	Content Accuracy	How to evaluate content accuracy
	Formative Evaluation	How to conduct and report formative evaluation
	Usability	How to conduct usability test
General	Time Management	Time management problems
	Division Of Labor	Division of labor problems

Moreover, the participants described their expectations and suggestions about EPSS. These are summarized in Table 4.5.

Expected/Suggested Components	Detail of Component
Tutorial	Instructional Design-ADDIE Model
	Method Of Collecting Data
	How To Write Reports
	APA Style
	Target Group
	Organizing Content
	Visual Design
	Development Tool
	Feedback
	Instructional Approach
	Storyboard
	Assessment Items
Example	Interview
	Activity Examples
	Objective Writing
	Educational Game
	Data Collection
Resources	Characteristics Of Students
	Current Curriculum
	Motivation
	Turkish Educational System
Tool	Online Survey Tool
	Chat
	Forum
Template	Interview
	Storyboard
	Parts Of Instructional Material

Table 4.5 Participants expectation and suggestion from EPSS

4.2.4 Prototype 1

According to the results that were summarized in Table 4.4 and Table 4.5, a figurative model of EPSS was designed by the researcher. These results showed that EPSS should have 5 components and these were tutorials, examples, resources, tools and templates. Moreover, according to the results EPSS should have a user interface, provide an interactive environment and support group study. This model is represented in Figure 4.2.



Figure 4.2 Model of EPSS according to the findings of the Analysis Phase.

As it is presented in figure 4.2, there should be a user interface component that NIDs interact with the system and a database in which data about NIDs and their project is stored beside suggested components like tutorials, examples, resources, tools and templates. After that, prototype 1 was developed with respect to this model and the results of the Analysis Phase of this study. Prototype 1 was a website and was designed to support novice instructional designers during instructional system design. Prototype 1 was developer.

In prototype 1, when users enter the website, a login page appears. In this page, there is also an explanation about the aim of the website.



Figure 4.3 Prototype 1, Login page

In prototype 1, steps of ADDIE model was provided as main links that were provided under the banner. Links were named as steps of ADDIE model. When users click on the Analysis link, a main page of this phase opens like presented in Figure 4.4. After NIDs login the prototype 1, or click on the Analysis link that was provided under banner main page of analysis step opens. In this page, which is presented in Figure 4.4, the purpose of the analysis step is defined and what NIDs should do to complete this step is explained in text.



Figure 4.4 Prototype 1, Analysis main page

As it is seen in Figure 4.4, the steps of Analysis phase are listed on the left side as links. This page design also provides an opportunity to see all of the phases in one page. Each link that is listed on the left side of the page consists of planned, step by step questions to which an instructional designer should find answers during all phases. When NIDs start the analysis by clicking the link "Ihtiyaç Analizi", they start to do Need Analysis. As it is seen Figure 4.5, NIDs start to plan need analysis by answering the questions that were provided on the website. These questions were designed to provide all questions that an instructional designer should ask during need analysis. As it is seen in Figure 4.5, there are also links at the top right side of the page. This links are designed to provide components of EPSS that were suggested by NIDs. These components are "Eğitim" (Tutorial), "Araçlar" (Tools), "Şablonlar" (Templates), "Örnekler", (Examples) and "Kaynaklar" (Resources). The Contents of these links change with respect to the related steps. In other words, in need analysis, the content of these links are different than that of the learner analysis part.



Figure 4.5 Prototype 1, Need Analysis

When NIDs complete all of the questions in all steps of the analysis part, they can obtain a draft report about this phase by clicking the link "Rapor Oluştur". When they click this link, a page opens as presented in Figure 4.6. NIDs can see all of the answers that they gave to the questions in different steps of the analysis phase on the screen and they can also print out this draft report by clicking the "Rapor Oluştur" button that is provided at the top of page.

ØĞRET Öğretim Tasarımı Destek Sistemi
ANALİZ DİZAYN GELİŞTİRME UYGULAMA DEĞERLENDİRME SÖZLÜK
Analiz Basamakları Eğitim Araçlar Şablonlar Örnekler Kaynaklar İhtiyaç Analizi Rapor Oluştur Hedef Kitle Analizi İhtiyaç Analizi İcerik Analizi İhtiyaç Analizi Ortam Analizi I.Kimlerin ihtiyacını belirlemen gerekiyor? Cevap: 2. Yukarıda seçtiğin kişilerin özelliklerini ve sayısını tanımla(ör: 3 adet 6. sınıf öğrencisi ya da 1 öğretmen gibi) Cevap: 3. İhtiyaç belirlemek için hangi yöntemleri kullanacaksın? Cevap: 3. İhtiyaç analizi için kullanacağınız anket, görüşme formu vb. araçların hazırlandı. Görüşme yapmaya gidecekler belirlendi ve randevu alındı Anket ve görüşme sonuçlarının nasıl analiz edileceği kararlaştırıldı. 4. Öğrencilerin seçtiğiniz konu ile ilgili ihtiyaçları ne düzeydedir?Bu konu hakkında daha önce bilgileri var m?Varsa hangi seviyede?
Cevap: 5. Öğretmenlerin seçmiş olduğunuz konu ile ilgili ihtiyaçları nelerdir? Cevap:
o. Seçmiş olduğunuz konu ile liğili bir oğretim sistemi tasarımına neden ihtiyaç vardır? Cevap: iz/rapor.aspx

Figure 4.6 Prototype 1, Report page

Similar to the analysis phase, the design phase also has the same properties. When NIDs click the "DİZAYN" link, the page that is related to design steps opens. In this step, Defining material, main components of material, instructional approach, storyboard, visual design, learning object, distribution and create report are the links of design phase. As in the analysis phase, when NIDs click these links there are step by step questions for them and by answering these questions they complete these steps. similar to the Analysis phase, there is also "Eğitim" (Tutorial), "Araçlar" (Tools), "Şablonlar" (Templates), "Örnekler", (Examples) and "Kaynaklar" (Resources) components to assist them. Similar to the analysis phase, NIDs can create a draft design report by using the "Rapor Oluştur" link. A page from the design part is presented in Figure 4.7.



Figure 4.7 Prototype 1, Design Phase

In prototype 1, the development and implementation phases were not active. Although these parts were not active in prototype 1, this did not cause a problem because they did not have to prepare reports for these steps. Moreover, in prototype one there is one link that is named as "Değerlendirme" for the evaluation phase. As seen in the Figure 4.8, there are 5 sub-links in this part. These links are "Değerlendirme Yöntemleri" (Methods for Evaluation), "Ara Değerlendirme" (Formative Evaluation), "Son Değerlendirme" (Summative Evaluation), "Düzeltmeler" (Revisions) and "Rapor Oluştur" (Create Report). Similar to the other parts, each step in evaluation part includes questions about these steps. NIDs completed each step by answering the questions. After that, they can create a draft report by selecting the "Rapor Oluştur" link.



Figure 4.8 Prototype 1, Evaluation Phase

4.3 Phase II: Design & Development

As stated in Chapter 3, in the design and development phase, NIDs are students who were registered to Multimedia Design and Development course. In this course students were asked to use Prototype 1 during instructional system design. After completing their instructional design project and submit their final project reports, 8 of the students who were enrolled in this course volunteered to attend the interviews. The Participants' interviews, project reports and instructional materials were analyzed and used as data sources for this part. In this part, the participants are named as D1, D2, D3, D4, D5, D6, D7 and D8. The Results of this part summarized in 3 main parts. Results about characteristics of NIDs, Evaluation of NIDs related to prototype 1 and expectation and suggestions of NIDs from EPSS.

4.3.1 Characteristics of NIDs

According to the interviews, the characteristics of participants emerged as a theme. Under the theme, *experience* and *IDM perceptions* are found as the codes.

Firstly, according to the results, NIDs design and develop paper-based material, website, flash material, video and 3D learning environment. However, their perceptions about their *experience* are different. Their perceived levels of experience in instructional design are summarized in Table 4. 6.

Participant	Perceived level of
	experience
D1	Good
D2	Intermediate
D3	Intermediate
D4	Intermediate
D5	Good
D6	Novice
D7	Intermediate
D8	Novice

Table 4.6 Perceived Levels of Experience of the Participants

Although; two of the participants thought that they are good at instructional design, 6 of the participants thought that they have a lot to learn about instructional design. For example D6 explain his level in instructional design in his words as follows:

I can say at the beginning level because I am recently learning this. I can say at the beginning level because except unprofessionally developed materials that developed for courses, I did not developed material for either commercial or business purposes. (D6)

Daha başlangıç seviyesinde diyebilirim çünkü daha yeni yeni öğrendiğim bir şey. Yani çok amatör olarak geliştirdiğimiz ders için materyaller dışında hiç bir şekilde ticari amaçlı olsun, ya da bir iş amaçlı olsun bir materyal geliştirmediğim için daha başlangıç seviyesi diyebilirim. (D6)

Besides, according to the results, NIDs thought that an instructional design model should be used while designing an instructional material. All of the participants stated that an instructional model should be used in instructional material design. One of the participants underlined the importance of using instructional design model in his words as follows:

Absolutely [IDM] it is needed because [Instructional design] is something that should be done step by step. If we did not use such a model, the thing that we have to do first will be extent to middle or end. The material that we going to made may be an improper one. There will be waste of time. For that reason we certainly use a model. (D3)

[Öğretim tasarımı modeli] kesinlikle gerekiyor çünkü basamak basamak yapılması gereken bir şey [instructional design]. Eğer böyle bir model kullanmazsak en başta yapmamız gereken şey ortaya, sona sarkacak. Yapacağımız materyal çok sağlıklı bir şey olmayabilir. Zaman kaybımız olur. Onun için kesinlikle bir model kullanmak gerekiyor. (D3)

While explaining the reason of using an instructional design model, 4 of the participants stated that instructional design model provide guidance during instructional material design process. 2 of them stated that IDM is beneficial for the process.

According to the results, although the participants had taken same courses and done similar projects, they have different perceptions about their levels of expertise but all of them thought that using an IDM during instructional material design was essential.

4.3.2 Evaluation of NIDs' Related to Prototype 1

The participants who had used prototype 1 in their instructional material projects were asked to evaluate prototype 1 in interview 2. Under the evaluation theme; *EPSS usage, visual quality, content quality, and benefits of EPSS* emerged as codes.

4.3.2.1 EPSS usage

According to the findings all of the participants stated that they have used the prototype one during instructional material design. In prototype 1, each project group worked on a project. Due to this, NIDs typically prefer to share the parts of the steps and fill their part in the prototype. Although they fill their part in the prototype, NIDs stated that they scanned all of the prototype and read explanations and related parts. For example, one of the participants stated that:

In analysis phase of 323 [course], I had used in analysis and design phases. I know, I have looked at before. In other words, I went through in other reports, I have used. (D6)

Analiz aşamasında bu 323 [dersinde] de analiz ve dizayn aşamasında kullanmıştım. Daha önce de bakmıştım biliyorum. Yani diğer raporlarda göz atmıştım, kullandım. (D6)

Another participant explained how he used prototype in his words as follows:

I did not fill [inside of the phases of prototype]. I just looked at evaluation part. You know, what type of questions can be prepared? I think there were example questions...Therefore; I did not frequently use that part in assessment step. I just looked at questions (D2).

[Prototipteki aşamaların]içini doldurmadım. Değerlendirmeye bakmıştım sadece. Hani nasıl sorular hazırlanılabilir? Orada örnek sorular vardı sanırım... Onun için assesment kısmında pek kullanmadım orayı. Sorulara bakıp geçmiştim. (D2)

According to the results, NIDs also used the prototype for taking draft reports. For example D2 stated that:

For example we wrote those things one by one as if they were subheadings of the reports. We form a report. (D2)

Mesela oradakileri işte sanki raporun alt başlıkları gibi düşünerek hepsine tek tek yazdık. Rapor oluşturduk. (D2)

In conclusion, the results showed that all of the participants had used the prototype 1 during their instructional material development projects. As the participants claimed, although they did not fill all of the parts in the prototype, they scanned all parts of the prototype 1.

4.3.2.2 Visual quality

In the interviews, the participants made comments about the visual quality of prototype 1. The opinions of the participants about the visual quality of the prototype 1 were different from each other. Five of the participants had positive views about the visual quality of the prototype 1 and they thought that an EPSS with this purpose should be clear and simple. A participant stated her views about visual quality as follows:

It was like a form which is for filling. It was clear and plain. There is no need for something [visual elements]. It can make the website difficult to load. My internet speed is good but it is slow in other places, dormitories. I think that with regards to internet access being a plain website is more important. It was good [with respect to visual quality]. (D5)

Doldurulacak bir form seklindeydi. Açık ve netti aslında. Öyle şeye [görsel öğeler] gerek yoktu. Ağırlaştırır çünkü siteyi. Benim internetimin hızı iyi ama başka bir yerdeki, yurtlardaki internet daha yavaş. İnternete erişim açısından sade olması daha önemli bence. Yani [görsel açıdan] güzeldi. (D5)

On the other hand two of the participants stated negative opinions about the visual quality of the prototype. One of the participants expressed that the site included mostly texts and it was not good for visual quality. The other one said:

The website [prototype 1] is not attractive. For example, I entered the epds.gen.tr [prototype 1] at the beginning [and] I said something like are we going to use this... It is good in functionally but visually it is bad in navigation. At the beginning I did not see anything. I did not scan; search the content of the website. As I said, it did not attract me visually. (D7)

Çok çekici değil site [prototip 1]. Mesela ben ilk başta girdim epds.gen.tr ye [ve] buraya mı yapacağız gibisinden bir şey söyledim... İşlevsel olarak iyi ama yönlendirme açısından, görsel olarak kötü. Başta hiç bir şey göremedim. Hani az çok araştırmadım, bakmadım siteni içeriğine. İşte benim dediğim gibi görsellik olarak ilk başta çekmedi beni. (D7)

To sum up, according to the participants the visual quality of the prototype 1 is good except two of the participants. The participants who had positive views about the visual quality of the prototype 1 favored the plain and simple interface of it. However, three of

the participants consider the simple and plain interface of the prototype as unattractive and also problematic with respect to navigation.

4.3.2.3 Content Quality

According to the results of the interview there were evaluations about the content quality of the prototype 1. 4 participants made comments about the content quality of it. Three of the participants made positive comments about the content quality of the prototype except one of them. He stated that

It will be better if something that lead us forward because there is just question and it is expected from us to write down report there. There is no explanation about this. (D7)

Bizi böyle ileriye sevk edecek bir şeyler olsa daha iyi olur çünkü sadece soru var ve altına rapor yazmamız bekleniyor. Onunla ilgili hiçbir açıklama falan bir şey yok yani. (D7)

Although this participant complained about the lack of explanations about how to answer questions, other three participants made positive comments about the content quality of the prototype 1.

I think that there is not a missing part about teaching the model (ADDIE). Besides, process steps, analysis, design, development and what should be done under analysis phase and short explanations about these are in the system. (D4)

Modelin (ADDIE) öğrenilmesi açısından pek bir eksik yok diye düşünüyorum. Zaten işlem basamakları, analiz, design, development ve analiz aşamasının altına neler yapılacağı ve bunların da kısa açıklamaları var zaten sistemde.(D4)

According to the results, besides the explanations about the steps of ADDIE model, they need explanations about how to answer questions that EPSS system asked to make NIDs complete the steps of ADDIE model. The participants believed that the lack of these explanations was considered to be a fault in the content quality. However, some participants commented that short explanations that were provided in system were proper.

4.3.2.4 Benefits of EPSS

In the interviews, the participants commented on the benefits of prototype 1 according to their point of view. According to the results, 7 participants made references 24 times to the perceived benefits of the prototype 1. Table 4.7 summarizes the benefits that participants mentioned about EPSS and which participants referred to this benefit.

Table 4.7 Benefits of prototype1 of EPSS

Benefits of prototype 1	Participants who stated
Instructional	D2, D3, D6, D8
Guiding	D3, D5, D8
Language	D3, D6, D7
Save time	D3, D4
Make report writing easier	D6, D8
Motivating	D8

As it is presented in the table above, four of the participants stated that prototype 1 was instructional. They stated that users of this site could learn the ADDIE process while using prototype 1. One of them explained his ideas in his words as follows:

For example learner analysis, in other words target group analysis, it emerged from somewhere on the side and by clicking we wrote it. It was well placed. There were text boxes there. [One could say] I did those and those. For example, parent was written there, one who has seen it at the right side understand that I should consider parent too. I like very much this aspect too. At the same time it provides learning. (D2)

Mesela learner analiz, yani hedef kitle analizi, yandan bir yerden çıkıyor yani oradan tıklaya tıklaya şey yapıyoruz yani yazıyoruz. Orası iyi olmuş. Text boxlar var orda da. Tıklayıp a şunlarla yaptım, şunlarla yaptım [denilebilir]. Mesela orada veli yazıyor, sağ tarafta orda veliyi gören birisi a veli ile de yapmalıymışım diye anlıyor yani. O yönünü de çok beğendim. Aynı zamanda öğrenmemizi sağlıyor. (D2)

Moreover, three of the participants underlined that prototype1 provided guidance to them during instructional material design process. One of the participants stated that There were missing parts in development part. For example; there were questions like are there any exit button, guidance, feedback sounds. There were questions like whether we used audio. They were stimulating for us. We remembered that we had to use them. We add in this way. (D5)

... development kısmında eksikliklerimiz vardı. Mesela çıkış butonu, yönlendirme, yönlendirme sesleri var mı gibi sorular vardı. Ses kullandınız mı diye sorular vardı. Hani onlar uyarıcı oldu bize. Onları kullanmamız gerekiyor demek ki diye hatırladık. O şekilde eklemeler yaptık. (D5)

Beside guidance, three participants stressed that they had some problems in understanding the terms related to ADDIE model and Turkish version of the prototype 1 enabled them to understand meanings of these terms. For example D3 stated that *"Because it [prototype 1] is Turkish, it provide great benefit in the steps that we do not understand. ([Prototip 1 in] Türkçe olması anlamadığımız yerlerde bize çok fayda sağlıyor.)".*

The participants also mention saving time as a benefit of prototype 1. According to the results, two of the participants emphasized that in the interviews.

Prototype 1 saved much of our time in the writing process of design report of first project. Normally under the each part we thought about what we suppose to write, we had to spend half an hour for this and then we had to write there in 1-2 hours. It quite slowed down us. However, we entered the system, we wrote next to explanations immediately and it relieved us quietly. It bought quite time to us. (D4)

İlk projedeki design raporunu yazarken [prototip 1] çok fazla vakit kazandırdı. Normalde her kısmın altına böyle ne yazacağız, ne yazsak ki diye düşünürken hani yarım saat ona vakit harcayıp sonra 1-2 saatte orayı yazmamız gerekiyordu. O da baya bizi yavaşlatıyordu. Ama sisteme girdik, hemen orada açıklamanın karşısına yazdık ve rapor alınca bizi baya rahatlattı. Baya bir vakit kazandırdı bize. (D4)

Another benefit of prototype 1 that was mentioned by the participants was making report writing easier. Prototype 1 provided draft report for NIDs. It developed draft reports by organizing answers that NIDs gave to the questions that provided under steps of ADDIE model. For example one of the participants stated that It made report writing easier... because we formed our report by just writing there. When we said it formed report by its linkers... I can say that we tried lesser. (D8)

[rapor yazımını] kolaylaştırdı yani... çünkü yani direk olarak oraya yazıp oluşturduk. Dediğimizde daha böyle şeyle linkırlarıyla falan oluşturdu... Daha az uğraştık diyebilirim. (D8)

According to the results, the last benefit of EPSS was being motivating. D8 underlined that

Other one is completely a manual system... It is completely a manual system, in other words you are going to write it from top to bottom. In this [prototype 1] at least while you are writing even if you do not know anything, you wait something as a result and waiting for it. The thing [report] that you obtain when you clicked pleased you.

Öteki tamamen manüel bir sistem... tamamı manüel bir sistem yukarıdan aşağı yazacaksın yani. Bunda [prototip 1 de] en azından böyle yazarken yani hiç bilmiyorsanız bile sonuçta bir şeyler bekliyorsunuz yazıyorsunuz. Tıklayıp aldığınız şey [rapor] hoşunuza gidiyor.

To sum up, the participants considered prototype 1 to be beneficial because it is instructional, facilitating, provide Turkish version of the terms, time saver, and make things easier and motivating. These findings also showed that NIDs need a system that provides these options.

4.3.3 Expectation and Suggestions of NIDs

After using prototype 1 in their instructional material development project, NIDs made comments of their expectations from the prototype 1. According to the results, these expectations were categorized under the codes *content and features*. All of the participants stated expectations and suggestions related to prototype 1.

4.3.3.1 Content

According to the results there were sub-codes under the content codes. These sub-codes were tutorial, example, report, template and resources. Each sub-code is explained in detail below.

Tutorial

According to the results, NIDs expected that some topics should be included in prototype 1 as tutorials. 5 of the participants stated that there should be tutorials in EPSS. Topics that were suggested by NIDs were steps of ADDIE model, instructional approach, motivation, pedagogy, development tool and how to give reference.

For example one of the participants stated that

... As I said some terms were used there like formative evaluation, summative evaluation, first analysis etc. We do not understand them clearly. Because of this reason, there can be step by step explanations of them; it can be supported by video materials... (D7)

... Dediğim gibi terimsel ifadeler kullanılmış ya hani işte ilk değerlendirme son değerlendirme ilk analiz falan. Biz onları çok anlamıyoruz. O bakımından onlarında aşama aşama açıklaması olsa, işte dediğim gibi işte video materyalleriyle desteklense ...(D7)

Beside step by step explanations of ADDIE model, instructional approach was also suggested as a topic of tutorials. D5 stated that

[Instructional approach] remains abstract... if we tell what it is exactly fit; applying it is not difficult because we know what we are going to do. (D5)

[eğitsel yaklaşım] soyut kalıyor... Anlatsak hani tam anlamıyla neye denk geldiğini anlatsak uygulamak çok zor değil ne yapacağımızı bildiğimiz için. (D5)

Four of the participants stated that tutorials should be presented as videos in the EPSS. They suggested that this could motivate users. D3 explained this in his words as follows:

Actually I felt that if there is a video it can get better. After for a length of time, you are constantly thinking and reading because it is all text. After one point one get bored. One does not want to read. At this point one can use this video. Something can be done by listening to this video. One gets bored at one point because it is continuous text. (D3)

Ben aslında bir video olsa daha iyi olur diye hissettim. Çünkü sürekli text olduğu için belli bir süreden sonra sürekli düşünüyorsun, okuyorsun. Artık bir yerde sıkılıyor insan. Okuyası gelmiyor. O aşamada bu videoyu kullanabilir. O videoyu dinleyerekte bir şey olabilir. Çünkü sürekli text olduğu için sıkılıyor insan bir yerden sonra. (D3) To sum up, according to the results the participants suggested that there should be tutorials in EPSS that cover each step of ADDIE model, instructional approach, motivation, pedagogy, development tool and how to give reference. Moreover these tutorials would be better if they were included in the EPSS in video formats.

Examples

According to the results, 6 of the participants mentioned examples as an essential component of the EPSS. There were 26 references to examples in the data. The participants most frequently stated that they need a sample report in the system. 4 of them stated that they want to see example reports in EPSS. One of the participants stated this expectation in his words as follows:

In this process we know how to write report more or less but having a sample in front of us can be better for us. (D7)

Bu süreçlerde de dediğim gibi raporu az çok yazmayı biliyoruz ama yinede önümüzde bir örnek olması bizim için daha iyi olabilirdi. (D7)

According to the results, NIDs also suggested that different kinds of instructional materials could be included in the EPSS as examples. They also suggested that storyboard examples, effective and ineffective instructional material examples, visual design examples and how to give reference examples. They thought that examples of these issues could make EPSS a better tool for novice instructional designers.

Reports

In prototype 1, NIDs could get a print out of their draft reports. In the interviews the participants made suggestions and emphasize their expectations about getting reports from the EPSS. According to the results, one of the participants suggested that a dynamic report editor would be better in the EPSS. He explained his thought as follows:

It will create a Word document. Write your interview here. It will create it dynamically. If I ticked teacher, it will create related to [him/her]. I will write under it. If I see it as a whole report and dynamic format... at the beginning it should ask everything. Then there should

be something in the site like creating a template in Word. Then I write there one by one. (D2)

Böyle bir word sayfası oluşturacak. Öğrenci ile görüştüklerini şuraya yaz. Kendisi dinamik oluşturacak. İşte teacheri da işaretledi isem onunla [ilgili] da oluşturacak. Ben altına yazacağım. Böyle dinamik tamamen bir rapor halinde görebilirsem... İlk başta her şeyi sorsun. Sonra hani bir word dokümanına template oluşturuyormuş gibi sitede öyle bir şey olsun. Ondan sonra ben yazayım oraya tek tek. (D2)

As the participant stated in the quotation, he described an EPSS in which report editor shaped according to selections that user made. Beside this one of the participants suggested co-writing ability in his words as follows:

There could be something like while one of the members writing the report, other member could continue writing. (D1)

Böyle bir şey olabilirdi hocam hani birimiz yazarken diğerimiz devam ettirebiliriz gibi bir şey olabilirdi (D1)

Moreover, the participants suggested that there should be some changes related to the report format. For example D1 stated that format of the report that prototype 1 generated should be improved. Also, D5 suggested that there should be lines between report parts in the final report.

In prototype 1 the generated report was in a draft report format and included all answers, and NIDS give the questions that were organized under the related headlines. However, one of the participants suggested that it should be in paragraphs. He explained this in his words as follows:

...when we get the final print out, as I said, it comes to us as questions and answers. I wish that it can be transformed into paragraphs. Because when I take the final version, I have to write something on it. It becomes a work twice. (D3)

...en son çıktıyı aldığımızda dediğim gibi soru-cevap şeklinde geliyor bize. Yani bunun bir paragrafa dönüştürme şansı olsa. Çünkü son halini aldığımda ben yine tekrar bunun üzerinden bişiler yazmam gerekiyor. İki defa iş oluyor. (D3) To sum up, according to the results NIDs expectations and suggestions from the reports were dynamic report editor, ability to co-edit reports with project members and expectations related to format of the report.

Resources

According to the results, the participants suggest that there should be resources in the EPSS. One of the participants explained this in his words as follows:

Mostly, it may present scientific resources. If there is not copy write issues, pdf documents can be added to the system. Student may learn things that he/she wants to learn or improve in detail... and these e-books can be added to the system (D4)

Daha çok bilimsel kaynaklar sunabilir. Eğer copy write hakkı yoksa direk pdf ler sisteme atılıp, öğrenci hani kendini geliştirmek ya da öğrenmek istediği şeyleri detaylıca öğrenebilir. ... Ve o elektronik kitaplar sisteme atılabilir. (D4)

Beside e-books, three of the participants suggested that there can be hyperlinks that direct the user to resources could be beneficial for NIDs who use the EPSS.

Under instructional approach part that in analysis or design there can be links for resources. Resources related to that topic can be available that related to topic. ... Because while I am searching instructional approach, I write it to Google. Hundreds of nonsense results occur in front of me and I spent too much time in the library to find this. Searching it takes too much time of me. However, if there are resources (it could be a book of Reigeluth or a paper that was written by him and related to topic) related to instructional approach in this system [EPSS], it will be better. (D4)

Analiz ya da designdaki instructional approachun altına oradaki linkler ya da kaynaklar için bir link verilebilir. Orda o konu ile ilgili kaynaklara ulaşılabilir. ... Çünkü ben instructional approachu araştırırken google'a yazıyorum. Saçma sapan yüzlerce sonuç geliyor karşıma, kütüphane de baya bir vakit harcıyorum onu bulmak için. Çok fazla vaktimi alıyor benim onu araştırmam. Ama işte bu sistemde [EPDS] eğer kaynaklar bu instructional approach ile ilgili (2 tane 3 tane bu Reigeluth un bir kitabı olabilir ya da onun yazdığı konu ile ilgili bir makale olabilir) onlar olsa o zaman daha iyi olur. (D4) Moreover, the participants stated that they expect resources related to development tool. There of the participants stated that there should be resources that present information related to development tool as modules. For example,

For example there, in the related website was not anything related to it [development tool]. There are peoples who are familiar to Flash or not. If there were documents, introductory videos like adding buttons, it might be good. (D7)

Orada herhangi bir şey yoktu mesela onunla[development tool] ilgili sitede. Flash a eli yatkın olan var olmayan var. ...Hani onunla da ilgili böyle hani dokümanlar olsaydı belki ne bileyim tanıtıcı videolar buton ekleme falan o tarz bir şey olsaydı belki güzel olabilirdi.(D7)

To sum up, NID's suggested that prototype 1 would be better if there were resources. They suggested that these resources could be e-books or hyperlinks that lead to e-books or other relevant documents. Also they suggested that there could be resources related to development tool, in this case flash.

4.3.3.2 Features

According to the results of the interviews, NIDs stated that adding some features to prototype 1 could make the system more effective. These features were tools and functions.

Tools

One of these suggestions that were expected to be added to prototype 1 was related to tools. The first tool that participants suggested was forum. Among the participants four of them made comments about adding forum to prototype 1. 3 of the participants stated there a forum could make prototype 1 better but one of the participants stated that adding a forum tool to prototype 1 was not a good idea. One of the proponents of forum tool stated that

Beyond this there can be a forum. For example in the system (forum) I login and write something. Another one login and write something. Something may occur with discussion. Also moderator can give feedback there. At least, he can [write] suggestions. So, there may be forum. (D8) Bunun dışında şey olabilir mesela forumda olabilir. Mesela bu sistemin içerisinde (forum) ben girer bir şey yazarım. Öteki girer bir şey yazar. Yani tartışmayla bir şeylerde ortaya çıkabilir. Sayfa yöneticisi de ek olarak oraya bir şeyler feedback falan verebilir. En kötü ihtimal öneri falan [yazabilir]. Yani forum olabilir. (D8)

However, another participant opposed to this idea by stating:

Nobody would write there. Because, how could I say, there is not too much unity. People want to do individually. They do not want to share what they want to do. For this reason, I think there is no need [to forum].

Kimse yazmazdı zaten oraya. Çünkü nasıl söyleyeyim birlik beraberlik yok çok fazla. İnsanlar biraz daha kendileri bireysel yapmak istiyorlar. Yapmak istediklerini paylaşmak istemiyorlar. O yüzden bence [foruma]hiç gerek yok bence (D7)

In addition to that, D8 suggested that chat tool can be added to the system to provide immediate feedback. D3 also suggested that a database that includes questionnaires that were used by other users of the EPSS could be beneficial for other users. He stated that

Each one that used here [EPSS] can upload own questionnaire if one desire and [indicate] the related topic and appropriate model for it. These are collected in that pool, database in time. Other users can find questionnaires there. (D3)

Her burayı[EPDS] kullanan isterse kendi anketini upload edebilir ve hangi konuyla ilgili olduğunu hangi modele uygun olduğunu[belirtir].Bunlar o havuzda, databasede zamanla biriktirilir. Diğer gelenler orda anketler bulabilir.(D3)

In short, according to the results NIDs suggested that forum, chat and a questionnaire database could be added to EPSS system to make the system more affective.

Functions

According to the results, NIDs stated that if some functions were added to the prototype 1, it would be more effective. The First function that the participants stated was the language of the system. The Language of the prototype 1 was Turkish. According to the results, 7 of the participants made comments about the language of the EPSS and they suggested that EPSS should support both English and Turkish languages.

The Second function that they mentioned in the interviews was interactivity. According to the results, the participants suggested that EPSS would be better if it provides interactive environment by providing feedbacks. For example one of the participants stated that

If in the feedback part system can make an evaluation, at that time there will be no need to instructor to read the report... The most ideal case, if the system give feedback to reports that were written by, it would be excellent. (D4)

Eğer feedback kısmında da yazdığımız rapora sistem bir şey, değerlendirme yapabilirse o zaman bu rapor okumasında hocaya gerek kalmaz... En ideali bizim yazdığımız raporlara feedback verebilirse sistem, mükemmel olur o zaman. (D4)

According to the results, the third function that NIDs stated was supporting multiuser group study in EPSS. 3 of the participants suggested that if each group member had the ability to work on group projects in the system it would be better. D4 explained in his word this issue as follows:

If it is going to support group work, this should have multiuser login option. Users have to work at the same time. (D4)

Grup çalışmasını eğer destekleyecekse zaten hani bunun çoklu bir giriş sistemi gibi bir şey olması lazım. Aynı anda çalışması lazım kişilerin. (D4)

The last function suggested by a participant was the ability to monitor one's progress in the EPSS. He explained his suggestion as follows:

Let me put it in this way, for example I start to write my report. It is not clear when it is going to end. I come to a step, I am writing but where I am now, in which step? How many are there after this? There can also be information related to this. (D3)

Şöyle diyeyim mesela raporu yazmaya başlıyorum. Ne zaman bitecek belli değil. ... Geldim geldim bir aşamaya yazıyorum ama şu an neredeyim, hangi aşamadayım? Daha bundan sonra ne kadar var? Bu konuda bir bilgilendirme olabilir. (D3)

To sum up, according to the results NIDs suggested that adding some function to prototype 1 could make it better. These functions were supporting both English and

Turkish, interactivity and supporting multiuser. Moreover, one of them also suggested that user should have chance to monitor in what step he is and how many steps are there to complete the model.

4.3.4 Summary of Phase II: Design & Development

Findings of Phase II showed that most of the participants of this study thought that they were not experienced in instructional design and they need to learn and practice to gain experience. Moreover, all of the participants stated that it was necessary to use IDMs during instructional material design process.

According to the findings, all of the participants had used prototype one during their instructional material design and development process and they made some evaluation related to it. These evaluations are summarized in Table 4.8.

Evaluated aspect	Views about aspect	# of participants
Visual quality	Clear and simple	5
	Include texts mostly	1
	Bad navigation	1
	Unspectacular	1
Content Quality	No missing part related to ADDIE	3
	No explanation about how to answer	1
	questions	
Benefits of Prototype		7
1		
	Instructional	4
	Guiding	3
	Easy to understand	3
	Save time	2
	Make report writing easier	2
	Motivating	1

Table 4.8 Evaluation of Prototype 1 Summary

Moreover, according to the results, the participants made suggestions to improve prototype 1 and also expressed their expectations from prototype 1. These suggestions and expectations are summarized in Table 4.9.

Table 4.9 Summar	y of suggestions	and expectations	of NIDs
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Expectations/Suggestions of NIDS	Details
Content	
• Tutorial	Steps of ADDIE model
	Instructional Approach
	Motivation
	Pedagogy
	Development Tool
	Giving Reference
• Example	Reports
	Storyboard
	Good-Bad Instructional Materials
	Visual Design
• Report	Dynamic Report Editor
	Co-writing
	Improved Format
• Resources	E-books
	Hyperlinks
	Development Tool Documents
Features	
• Tools	Forum
	Chat
	Questionnaire Database
• Functions	Turkish & English versions
	Interactivity (providing feedbacks)
	Multiuser support
	Presenting in which step one is and what is left

4.4 Answer to Research Question 1

According to the findings of both Analysis and Design & Development phases, RQ1 is answered in this section. First research question of this study is "What are the key elements of an EPSS that is designed to support novice instructional designers during instructional system design and development?" The findings showed that key elements of this EPSS are tutorials, examples, resources, tools, wizard, user interface, database and help. Details of these elements are presented in Table 4.10.

Components	Detail of Component (Phase 1)	Detail of Component (Phase 2)
Tutorials	Instructional Design-ADDIE Model	Steps Of ADDIE Model
	Method Of Collecting Data	Instructional Approach
	How To Write Reports	Motivation
	APA Style	Pedagogy
	Target Group	Development Tool
	Organizing Content	Giving Reference
	Visual Design	
	Development Tool	
	Feedback	
	Instructional Approach	
	Storyboard	
	Assessment Items	
Examples	Interview	Reports
	Activity Examples	Storyboard
	Objective Writing	Good-Bad Instructional Materials
	Educational Game	Visual Design
	Data Collection	
Resources	Characteristics Of Students	E-Books
	Current Curriculum	Hyperlinks
	Motivation	Development Tool Documents
	Turkish Educational System	

Table 4.10 Key elements of an EPSS that is designed to support NIDs

Table 4.10 (continued)

Online Survey Tool	Forum
Chat	Chat
Forum	Questionnaire Database
Interview template	
Storyboard	
Templates of Parts Of Instructional	
Material	
Dynamic Report Editor	
Co-writing ability in report	
Improved Format of report	
	Online Survey Tool Chat Forum Interview template Storyboard Templates of Parts Of Instructional Material Dynamic Report Editor Co-writing ability in report Improved Format of report

As observed from Table 4.10 NIDs firstly needs tutorials related to topics that are listed in the Table. According to the results, it is understood that NIDs need information about some topics during instructional material design and development process. If they have the chance to reach these topics in EPSS, it will be an informative process. Moreover, they will not need to search information about these topics and thus, save time. They also suggested that these tutorials should be brief, to the point and in video format if it is possible. Secondly, there should be examples about listed items in the EPSS. NIDs stated that if there were these examples, EPSS would be more effective. Thirdly, there should be resources related to the items listed in Table 4.10. NIDs stated that they needed these sources or it would be better if EPSS included these resources. Fourthly, there should be tools like forum, chat, online survey tool and questionnaire database to make NIDs work easier. Moreover, NIDs suggested that templates of interview, storyboard and instructional material parts should be provided in EPSS. They stated that they need these templates and these templates could increase their success in instructional material development projects. A report tool should be in EPSS and this part should have dynamic report editor, co-writing option and have an improved format. Result showed that NIDS thought that with these tools EPSS could be more beneficial.

According to results main elements that an EPSS should include to support NIDs during instructional system design and development are presented as Figure 4.9.



Figure 4.9 Key elements of EPSS

As it is seen in Figure 4.9, there should be a user interface that NIDs interact with EPSS and this interface should be clear and simple as favored by NIDs that participated in Phase II. Moreover there should be a database that store users' login information and entries in the system. There should also be a wizard to guide NIDs during instructional system design and lead them to choose relevant elements (tutorials, tools, examples, and resources) according to their needs. Finally, help component needed to support users when they need help related to use of EPSS.

4.5 Prototype II

After completing Phase II, the researcher answered RQ1 and finalized the study about determining the key elements of an EPSS that is designed to support novice instructional designers during instructional system design and development process. According to the findings of first phase and evaluations and expectations of NIDs who used prototype 1,

i.e. results of Phase 2, prototype 2 was developed by the researcher and a software company. Prototype 2 is presented in three headings.

4.5.1 Interface

In prototype 2, the researcher aimed to provide a plain and simple interface as the results indicated. Interface of the prototype 2 is presented in Figure 4. 10. In the interface of prototype 2, there are 5 main parts. In the first part, the main links related to website are presented. The links are Main page, My Project, Forum and Help that were placed in the left side and Turkish, Projects, Administrator Panel, Template and user parts that were placed to right side.



Figure 4.10 Interface of Prototype 2

Roles of these links are

- Main Page: Opening the main page of Prototype 2
- My Project: Users view their project and create/edit their entries in the parts of their project.

- Forum: As it was suggested by NIDs, users can share their ideas by clicking this link in a closed forum of the users of this site.
- Help: This button provides help to users related to main part of the website.
- Turkish: This link provides language option. According to the results prototype 2 designed in two languages (Turkish and English) and users can change system language here.
- Projects: This link is only provided for the Administrator of the site; i.e. the researcher to let her monitor the projects of NIDs.
- Administrator Panel: This panel is also only active for the researcher and by using this link, the researcher assigned users of the website to their group projects as members.
- Template: This link is also for the Administrator of the website and it allowed her to change/edit content of the prototype 2.
- User: this link enables users to change their login information and log out from the website.

In the second part of the interface, there is a menu on the left side which is related to the project of the user. In this part, Project Management, Analysis, Design, Development, Implementation and Evaluation are provided as links, and using these links, the NIDs can complete these steps by clicking them and doing what is required. There is also a second part named as Tools and there are links for some tools that students can use during instructional system design. These tools are storyboard, survey and tutorials.

In the third part, which is represented in Figure 4.10, there are sub-links of the related project links. These links are provided as tabs. The Names of these tabs changed with respect to choices of the NIDs. If a user clicks the analysis link from the left menu, sub-links that are presented in this part becomes sub-steps of this phase. By this design, the researcher aimed to represent phases and those phases sub steps on a page.

In the fourth part, there are side tabs. The content of these tabs changed according to which tab is selected from part 3. In Figure 4.10 "Aim of This Phase" part is selected in

the Tabs which are in part 3. According to this selection in part 4 there are two side tabs which are "Explanation" and "Video". In the first one there is brief information about Analysis phase and in the video tab there is a video that describes this phase.

Finally, in the fifth part, the content of the selected tab is presented. There is also a Help button in this area. The Content of this button changed for each tab and the aim of this button is to present an explanation, template or/and example related to active tab.

4.5.2 Content

The content of the prototype 2 is organized to provide an understanding of the ADDIE model and complete the phases of it in the same time. Due to this, there is not a complete tutorial about the model but information about the phases and steps of these phases are presented briefly in related parts. Example parts of the content of prototype 2 can be seen in Appendix E. In this part main pages and example parts of the web prototype 2 are presented.

4.5.2.1 Project Management

Project management part was designed to help NIDs to organize their project. There are 5 tabs in Project Management part of the prototype 2. These parts are Project Details, Project Group, Process Schedule, Create Report and Overview of the Project. First, in the Project Details tab there is an explanation about this tab which reads "In this stage, you will define your group members and create a project plan. We suggest that before starting the project make project plan. Until completing the project, you can manage your project by using "Project Management". Let's start to plan your project by entering general information about your project." After reading this explanation, users can enter title, brief description and start and finish dates of their project. This page is presented in figure 4.11.

	My Project Forum Help		Türkçe	Projeler 🔻	Yönetim Paneli	Şablon	feray 👻
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Analysis	In this stage, you will define your group me	mbers and create a project plan.	We suggest that before starting to proj	ect make projec	plan. Until completin	ng the project	, you
Design	can manage your project by using Project	management . Let's start to plan	your project by entening general mion	auon about you	i pioject		
Development	Project Name						
Implementation	Proje						
Evaluation	Project Definition						
	EPSS project						
Tools							
Storyboard							
Survey							
Tutorial							
	Project Start Date						
	03/15/2013						
	Project Finish Date						
	06/11/2013						

Figure 4.11 Project Management: Project Details

After this tab there is a tab related to project group members. In design and development phase of this research, the researcher assigned NIDs to their project after they signed in the prototype 2. As it is represented in Figure 4.12, the list of group member, their e-mail and user names are listed under this tab.

In the Process Schedule part users can assign tasks to group members and monitor whether they completed this task or not. Besides, prototype 2 enables them to organize their tasks according to the phases of ADDIE model. As it is shown in Figure 4.13, there is a right side tab list and users can choose the ADDIE model phases to assign tasks related to each phase.

In the create report tab users can create a draft report that shows the planning and timeline of each phases during their project. It is showed in Figure 4.14.

ÖĞRET Home	My Project Forum Help		Türkçe	Projeler 🔻 Yönetir	n Paneli Şablon	feray 👻
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Implementation	kursat		kursat@metu.edu.tr		kursat	
Evaluation	kurtulus		kurtulus@linden-tech.com		kurtulus	
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Figure 4.12 Project Management: Project Group

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Analysis	• A	O Add New Task						Analysis Process Schedule
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Development Implementation Evaluation	10	2013-03-21					×	leader and the Decision Online to
Evaluation	42 2015-04-16		2015-04-24	2015-04-24 feray	learner analysis		×	Implementation Process Schedul
Storyboard Survey Tutorial								

Figure 4.13 Project Management: Process Schedule

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Project Management											
Analysis	Proje Raporu										
Design	Поје Каро										
Development	Üye İsim ve Ma	ailleri									
Implementation	Ömer Faruk İslim - islim@metu	edu.tr									
Evaluation	erkan - ekaratas@linden-tech.c feray - uferay@metu.edu.tr	om									
Fools	kursat - kursat@metu.edu.tr	com									
Storyboard	ecem - ecem@linden-tech.com										
Survey	Analiz İcin Haz	urlanan Plan ve Zai	man Cizelgesi								
Tutorial			nan çızcığca								
	Start	Finish	Group Member	Task Definition							
	2013-03-21	2013-03-25		içerik analizi							
	2013-03-21	2013-03-26		context analizi							
	2015-04-16	2015-04-24	feray	learner analysis							
	Tasarlama İçin	Hazırlanan Plan ve	e Zaman Çizelgesi								
				Tests Dedisibles							
	Start	Finish	Group Member	Task Definition							

Figure 4.14 Project Management: Create Report

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Figure 4.15 Project Management: Overview of the Project

Finally, in the project management part, there is a tab named as "Overview of the Project" and in this part, students can monitor their position in completing their project. According to the results one of the participants suggested that and the researcher adds this feature in prototype 2. As it is shown in Figure 4.15, users can monitor graphically how many tasks they have completed and how many more there are by using this tab.

4.5.2.2 Analysis

The aim of this part is to provide brief information about Analysis phase of ADDIE model and enable NIDs to complete this step in instructional system design as properly as they can. To provide this, in this part as it is represented in Figure 4.16 there were 9 tabs under Analysis link.



Figure 4.16 Analysis – Aim of this phase

As it is stated before, a detailed content of the website is provided in Appendix E. First, the aim of the Analysis phase is explained in prototype 2 under the tab named as "Aim of this phase". In this tab main steps of Analysis phase in ADDIE model are explained and what one is going to do while completing Analysis part is listed. This part also has a
Help button to provide further information if NIDs needed. There are two options in the Help button; explanation (see Figure 4.17) and sample (see Figure 4.18).



Figure 4.17 Analysis – Explanation



Figure 4.18 Analysis – Example

The second tab is "Developing Instrument tab in which NIDs are asked to decide what instruments they are going to use in collecting data and who, when and how they apply their instruments by 4 questions. As it is seen in Figure 4.19, there is also Help buttons in each questions and the content of this button chanced according to the question. By clicking help button NIDs get extra explanation and example answers for the related questions.

The third tab is Need Analysis and in this tab there are 3 questions that NIDs should answer to complete the need analysis of the project. There are also help buttons for all questions that provide explanations for what questions are means and what they are asking. There are also example answers for those questions under help buttons' example links. (see Figure 4.20)

At the fourth tab, NIDs are asked to complete 6 questions to make goal analysis for their instructional material project. In these questions also help button given to provide further assistance when needed.

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Analysis	Create Report								
Design	Question 1	Help 🕶							
Development	Question 2	How do you collect you	r data in the ana	Ilysis phase?					
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Figure 4.19 Analysis – Developing Instruments

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Figure 4.20 Analysis – Need Analysis

The fifth tab is the target group analysis tab and NIDS are asked 8 questions to make the target group analysis. There are questions such as "Who is your target group? (age, gender, grade level, etc.)" or "How do theorists define this age group's developmental level, and the way they learn?" that NIDs should answer to make a complete learner analysis and there are also help buttons for these question to provide assistance when they need.

The sixth tab is related to content of instructional material that users are going to develop and the seventh tab is related to the context analysis of the project. Each tab includes questions for NIDs to proceed step by step in Analysis phase and complete analysis of instructional system design project. In the eighth tab, the researcher provided a questionnaire tool to NIDs in prototype 2. As NIDs suggested in the interviews, the researcher added this option to prototype 2. Although it is under the analysis tab, NIDs can also reach this tool by clicking Survey link in the left menu. With this tool, NIDs can create questionnaires and publish them in the internet. They can also reach results of their questionnaires.



Figure 4.21 Analysis – Questionnaire

The final tab of the Analysis phase is "Create Report" tab. As it is stated while answering RQ1, report is one of the key elements of an EPSS that is designed to support novice instructional designers during instructional system design and development. This element is included in prototype 2 as "Create Report" tabs under each phases of ADDIE model. In this tab as it is seen in Figure 4. 22, there are 4 main parts. In the first part, users select in which part of the Analysis report they are going to work on. In the second part, the answers given by the users to the questions of selected part of the analysis report (Goal analysis in Figure 4.22) are presented. In the third part, by using the editor in this part users can edit related part of the report. In the fourth part users can click help button to get help about how to use report "Create Report" tab to monitor, edit and print out their report. Moreover they can use "Create Template Report" button to take a template report of selected part of the report which is selected in part 1. On the other hand users who want to save a copy of the analysis report that they completed in the system by clicking "create report" button in this part.

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Figure 4.22 Analysis – Create Report

All of the phases that are provided to complete instructional system design and listed in the left menu have a "Create Report" tabs and all of these tabs has same interface as in Figure 4.22. However, their content is changing according to which phase the user is working on.

4.5.2.3 Design

Design part of the prototype 2 is designed to support NIDs during the processing design phase of their instructional material design project and also create a design report. There were 9 tabs under the Design part and each was designed according to ADDIE model. The design part is presented in Figure 4.23. The first tab is "Aim of this phase" under which the purpose of the design phase is explained and a brief video is presented about the Design phase of ADDIE model. Then, second tab is "Learning Components" and under this tab there are questions to lead the user to design *pre-instructional activities*, decide how they *present their content and examples*, decide how they provide *learner participation*, determine what their *assessment* strategy will be and what the *follow-through activities will be*.



Figure 4.23 Design

The third tab is designed to support NIDs to create the storyboard of their instructional design and they are asked to use the storyboard tool that is also another the tab of design phase. NIDs can design their storyboard with content by using this tool as it is seen in Figure 4.24.



Figure 4.24 Design - Storyboard

The fifth tab of this phase is designed to support the learners while they are designing assessment instruments of their instructional material. NIDs create a matrix and determine mastery levels of their objectives first and then prepare and enter their assessment items to the system by using this tab.

Also, in the sixth tab NIDs are asked to enter their entire content in an organized format. After that they were asked to report which instructional approaches they used in instructional system design and how they applied it to their instructional material. Then, they were asked to decide how they distribute their instructional material. There is also a "Create Report" tab in this phase and its features are the same with the "Create Report" tab of the analysis phase but its content is the design report of NIDs.

4.5.2.4 Development & Implementation

In prototype 2 development and Implementation parts were designed but not used by NID, because they processed these phases but did not write a development or an implementation report for their projects. Hence, the researcher designed these parts just for guidance. These parts are in the same format with the previous ones. For example, in the development phase there are 4 tabs (see Figure 4. 25). The first tab is "Aim of this phase" part in which brief information about the development phase is presented. There is also a short video about the development phase of ADDIE model. The second tab is "Running Sample" tab in which users are asked to develop a running sample of their instructional material. The third tab is "Formative Evaluation" in which users are asked to evaluate their running sample of instructional material. The final tab is "Create Report" tab that enables users to edit and to form their development report if they prefer.

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My Project	Aim of this phase	Running Sample Formative Evaluation	Create Report						
Project Management									
Analysis	Explanation	Development phase based on analysis and you decided in analysis and design phases.	design phases. Aim of this phase is	s designing your instru	ctional material acc	ording to in	ormation	and ideas	that
Design	Video	In this phase							
Development		 We will review our storyboard. We will decide with which tool we will develop our material. We will develop our instructional material's draft with respect to our storyboard and content. We will test our demo. We will test excessary changes on tested demo version 							
Implementation									
Evaluation									
6. We will make usability test. 7. We will revise our instructional material according to usability test results and finalize development									
Storyboard		8. We will develop a user manual. Let's start development phase with "Running Sample" tab.							
Survey									
Tutorial									

Figure 4.25 Development Phase

In the implementation phase, as it is presented in Figure 4.26, there are 6 tabs. The first tab is "Training Instructor". In this tab, if NIDs instructional material implementation requires training for the instructor, the steps of this topic are provided in this tab. Similarly in the second tab there are information and questions about preparing learners before implementation. In the third tab, there are questions related to preparing learning environment. Then, there is the implementation tab in which some questions are asked to the users about implementation process of their instructional material. At last, there is a "Create Report" tab which is quite similar to "Create Report" tabs of other phases.



Figure 4.26 Implementation Phase

To sum up, Development and Implementation phases are given in prototype 1 to provide guidance for users. During the implementation of prototype 2, the participants were not asked to prepare development or implementation report during their projects. However they developed their instructional material and implemented this material if they had opportunity and conditions that required for implementation. Therefore, these parts were also added to prototype 2.

4.5.2.5 Evaluation

The evaluation phase is designed to support NIDs while they develop evaluation strategies for their instructional material and report the results of their evaluation. In this phase there are 6 tabs. Similar to the other phases, the first tab is "Aim of this phase" tab in which the researcher provides brief information about the evaluation phase of ADDIE model. There are also detailed explanations and a video that describes evaluation phase of ADDIE model in prototype 2 and users can reach these parts if they click help button in this tab (see Figure 4.27.



Figure 4.27 Evaluation Phase – Aim of this phase

The Second tab is related to Formative Evaluation. Although formative evaluation is the type of evaluation that is administered during all processes of the ADDIE model, formative evaluation is provided both in the Development phase and the Evaluation

phase. In the implementation of prototype 2, NIDs were asked to report their formative evaluation process and results in their Evaluation Report which was submitted at the end of their project. Hence, to test formative evaluation part and to support users, the researcher placed this tab here. As it is presented in Figure 4.28, there are 4 sub links under this tab which are "Explanation" – detailed explanation of formative evaluation, "Planning" – questions to support users to plan formative evaluation, "Implementation" – questions that users have to respond as yes before starting formative evaluation, and "Interpreting" – Questions aiding users to interpret their formative evaluation findings.



Figure 4.28 Evaluation Phase – Formative Evaluation

The third tab is "Methods of Summative Evaluation". This tab includes questions to guide users to decide with whom, when and where they conduct summative evaluation. Then in the fourth tab which is "Summative Evaluation Results", the users are guided to report their summative evaluation results that are related to content accuracy,

instructional quality, visual quality, usability, and appropriateness of objectives (see Figure 4.29).



Figure 4.29 Evaluation Phase – Formative Evaluation

The Fifth tab is related to revisions. In this tab users are asked to report if there is any revisions that they decided according to the results of their formative and summative evaluations. The Last tab is "Create Report" similar to the other phases. By using this tab, users can produce their draft and final reports according to their answers and entries that they enter prototype 2 in evaluation phase. As it is seen in Figure 4.30, users can edit the draft report that system created by using editor.

In short, in Evaluation phase is designed to prototype 2 provides brief information about the general steps of the evaluation phase of ADDIE model and to support users while they are conducting formative and summative evaluation and reporting the results of their evaluations and revisions.

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Figure 4.30 Evaluation Phase – Create Report

4.6 Phase III: Evaluation

As stated in Chapter 3, in the design and development phase NIDs are students who were registered to Instructional Design course. In this course, the students were asked to use Prototype 2 during instructional system design and Prototype 2 was used as one of the tools of the course. After completing their instructional design project and submit their final project reports, 10 of the 23 students who enrolled in this course volunteered to attend the interviews. The Participants' interviews, project reports and instructional materials were analyzed and used as data sources for this part. In this part, the participants were named as E1, E2, E3, E4, E5, E6, E7, E8, E9 and E10. The Results of this part are summarized in 3 main parts. The Results about characteristics of NIDs, Evaluation of NIDs related to prototype 2 and expectation of NIDs from EPSS.

4.6.1 Characteristics of NIDs

According to the results, the characteristics of NIDs emerged as a theme for the evaluation phase of this study. Experience and IDM perception are the codes under this theme.

4.6.1.1 Experience

The Participants of this study had enrolled in different courses in their department before taking the Instructional Design course in which prototype 2 was used during the course. For example, according to their course schedule they had taken the Design and Use of Instructional Material course before the Instructional Design course. In this course, they had prepared some basic instructional materials despite that fact that these 3 of the participants stated that they did not prepare an instructional material before. On the other hand, 7 of the participants stated that they have prepared instructional materials before in the Design and Use of Instructional Material course.

In the curriculum of the participants, the Instructional Design course was the second course in which they had to prepare an instructional material by using an instructional model and it was the first course that applies ADDIE steps and preparing Analysis, Design and Evaluation reports for their instructional design projects. Hence, their experience included 2 instructional materials. Although they have experienced development of a few instructional materials, their perceptions about their level in instructional material design varied. While 6 of the participants stated that they consider their levels as medium, two of them stated that their levels were good and one of them stated that he was in novice level. For example E10 states her level as follows:

In everything, I mean either related to design or content, I consider [myself] in medium level. (E10)

Her şeyde, yani design olsun, içerik açısından olsun [kendimi] orta seviyede görüyorum. (E10)

Moreover, the participants also made statements about their experiences in Instructional Design course and how they apply ADDIE model while they design and develop their

instructional material. 7 of the participants stated that they applied the analysis phase of ADDIE model. One of the participants summarized what she did during analysis phase as follows:

In analysis report, first we made need analysis. Then, I think we made content [analysis]. Our target group was already obvious. Next, I think we made context [analysis]. Then we write objectives like media, performance, and gain. When we look at collecting data, we collected most of the data in need analysis. Then, we collect more data in learner analysis. The data that we collected in need analysis already specified content analysis. (E8)

Analiz raporunda önce need analiz yaptık. Sonra işte content [analiz] yaptık sanırım. Zaten target grubumuz belliydi. Onları analiz ettik işte learner analiz yaptık. Sonra context [analizi] yaptık sanırım. Sonra objektifler işte media, performance, kazanım bunları yazdık hani. En çok hani need analizde veri topladık veri toplamaya baktığımızda. Sonra learner analizde çok veri topladık. Need analizden aldığımız veri zaten sonra content analizi belirledi. (E8)

In the interviews, all of the participants describe the analysis phase of their project without any details. However in their project report, they describe the analysis phase in more detail. In the analysis reports, they explained their goals for the instruction, objectives, need analysis, learner analysis, context analysis and content analysis in details. The Participants' analysis reports included more details about the analysis phase than they stated in interviews. Even the summary part of this report includes more details. For example,

In this report we tried to state information about our project. We work with target group who take Basic Math 126 Course. We gave them a questionnaire to gather information about their attitudes toward this course. By this questionnaire we realize that majority of group have experience because of their background and of course there are also another reasons like material deficiency. Also, we found that most of this group likes to learn visually. Therefore, we decided to prepare materials that consist of lecture notes starting from basic steps, examples with solutions, quizzes and exercises on electronic environment for them to study out of lectures. Our aim is to take away their fear towards to math especially to differentiation because if they are not frightened they can be better at math. We think that if we started with the easiest steps, we can make them believe that they can success. It is also important as teaching topic to evaluate learners' knowledge after lecture before exams. For this purpose, we decided to make quizzes that will be performed in recitation hours. Briefly, with the whole arrangement in this project we purpose to facilitate learning of Differentiation topic. (Summary part of E6's group in analysis report)

Moreover 5 of the participants stated their experiences were related the design phase of their project. They stated that they designed their instructional material according to the results of the analysis phase. Moreover, they stated that they tried to design motivating instructional materials and use feedbacks to improve their design. One of them explained design process as follows:

In the design phase, after completing analysis, firstly, we already know that we are going to make a flash material so we decided how we are going to do it. For example, how can we make design to draw more attention? How can we make course more entertaining? We tried how can we make a abstract lecture more concrete. We set our visuals according to it. (E7)

Sonra analiz aşamasını tamamladıktan sonra designda bu sefer, ilk önce flash materyal oluşturacağımızı zaten biliyorduk, onun üzerine nasıl yapacağımıza karar verdik. İşte designi nasıl yaparsak öğrencilerin dikkatini daha fazla çekebiliriz? Nasıl dersi daha eğlenceli hale getirebiliriz? Soyut bir dersi nasıl daha somut hale getirebiliriz diye çabaladık. Görselimizi ona göre ayarladık. (E7)

Similar to the analysis phase, the design reports of the participants were more detailed and they explained their learning components, assessment instruments, instructional approach and content. They also prepared storyboard of their instructional material.

During the interviews the participants also described how they evaluated their instructional material. Formative evaluation and revisions were the issues that were emphasized by the participants when they were explaining their evaluation process. Moreover, they mentioned that they had applied a usability test to evaluate their instructional material. One of the participants explained what her group and she did during evaluation process in her words as follows:

In evaluation we have prepared a usability test related to visual design. We prepared questions about satisfaction of students and effectiveness [of instructional material] and asked them to students. We made observations while students were using our material. Were

they having problems? We measured their responses etc. and we measured their responses and behaviors. (E4)

Değerlendirme de bir usebility test hazırladık visual designla ilgili vs. Satisfactionları işte öğrencinin, [öğretim materyalinin]effectivenessi ile alakalı vs sorular hazırladık bunları öğrencilere yönelttik. Aynı zamanda observation yaptık öğrenci materyali kullanırken. Nerde takılıyor? Tepkilerini ölçtük vs. tepki ve davranışlarını falan ölçtük. (E4)

To sum up, according to the results, although they had some background related to instructional design NIDs had different perceptions related to their levels in instructional design. They also talked about their experiences in using the ADDIE model in an instructional material design project. Although they did not elaborate how they applied ADDIE in design and development of their project during interviews, they reported their experience in detail in their project reports.

4.6.1.2 IDM Perception

During the interviews which were conducted after the evaluation phase, all of the participants expressed their ideas about whether an IDM should be used during instructional design or not. 9 of them stated that an IDM had to be used during instructional design. One of the participants explained why an IDM should be used in instructional system design as follows:

Because, things that you are going to do be more systematic. Due to before prepare what you are going to do and you can see necessary revisions before implementation and revise them, it becomes more beneficial in design phase. Contents become ready. Links become ready. Template becomes ready. It only remains to adapt them. Hence, [IDM] is a good think, necessary. (E2)

Çünkü yapacağın şeyler daha düzenli oluyor. Ne yapacağını önceden hazırladığın ve gerekli yerleri uygulamaya geçmeden görüp değiştirebildiğin için dizayn, tasarım aşamasına geçtiğiniz zaman daha faydalı oluyor. İçerikler hazır oluyor. Linkler hazır oluyor. Templete hazır oluyor. Bunları sadece uyarlamak kalıyor. O yüzden [IDM] bence güzel bir şey, gerekli.(E2) Besides, one of the participants (E1) thinks that IDM can be used in an instructional design process and it could provide a planned ID process. However, he thought that experts might not use an IDM. He thinks that they did not need to use an IDM.

In short, NIDs thought that using an IDM in an instructional design process is necessary and it provides a structured process to instructional designers.

4.6.2 Evaluation of NIDs Related to Prototype 2

According to the results evaluation emerges as one of the themes. Usage, visual quality, content quality and perceived usefulness are the codes of this theme.

4.6.2.1 Usage

According to the results of interviews, all of the participants stated that they had used prototype 2 while they were developing their instructional material by using ADDIE model. To monitor their usage of prototype 2, the students were asked to add their reports that they produced in prototype 2 in their analysis, design and development reports. Moreover the researcher monitored their entries that they saved during their project. According to these results, how participants used prototype in terms of answering questions in prototype 2 is summarized in Table 4.11.

According to the results that are presented in Table 4.11, there were 9 main parts in the Analysis report and the number of parts that the participants completed in prototype 2 is summarized in the Analysis column. the Mean of the analysis phase was 5.6. In the design report, there were 7 main parts and 4.3 was the mean of the participants in completing these parts. Moreover, the Evaluation reports included 5 main parts and 2.4 was the mean on this report. Moreover, 8 of the participants stated that they did not use "project management" part of the prototype 2. Only 2 of the participants stated that they had used this part. The Participants who did not use "project management" explained their reason as they did not need to use this part to manage their project because they had the chance to see each other face to face.

Participant	Analysis (0 nart)	Dosign (7 parts)	Evaluation (5
i ai ticipant	Analysis (3 part)	Design (7 parts)	parts)
E1	5	4	0
E2	7	6	4
E3	6	5	0
E4	4	5	5
E5	4	3	2
E6	7	4	4
E7	6	5	0
E8	8	5	5
E9	2	0	0
E10	7	6	4
Mean	5.6	4.3	2.4

Table 4.11 EPSS usage of participa	ints
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For example E10 explained her reasons for not using this part as follows:

I consider more appropriate to manage our project by communicating our group members instead of doing project management there. I think it is more efficient in this way. You were adding tasks. You were assigning some time for this task. Instead of doing this I was calling Alper and I was saying for example, when you are convenient? If I write there a date, Alper may not do it. We manage our project mostly communicating each other. (E10)

Proje yönetimi kısmını orada kullanmaktansa arkadaşlarımla iletişime geçerek kendi aramızda yapmayı daha uygun gördüm. Öyle daha verimli olduğunu düşünüyorum. Mesela hani proje yönetimi kısmında kişiyi ekliyordum. Görevini ekliyordun. Ona görev için belli bir zaman veriyordun. Ben onu yapmaktansa arkadaşımı, Alperi arıyordum mesela diyordum ki ne zaman müsaitsin? Ben oraya bir tarih yazsam, Alper yapamayabilirdi. Daha çok kendi aramızda iletişimde kalarak proje yönetimi yaptık. (E10)

To sum up, all of the participants used prototype 2 according to their statements. On the other hand the reports and online entries of the participants to prototype 2 showed that

not all of the parts of prototype 2 were completed by them. However, this issue did not considered as participants did not see that parts. It only showed that they did not complete these parts and wrote their report parts. Finally, most of the participants (8 of them) did not need to use project management part of prototype 2.

4.6.2.2 Visual Quality

Another result that emerged from the interviews is that the, participants' ideas about visual quality of prototype 2 were positive. All of the participants stated that they consider visual appearance of prototype 2 as simple, plain and user friendly. Some of the participants also underlined that visual appearance of prototype 2 was appropriate for university students. For example E10 stated his ideas about visual quality of prototype 2 as follows:

Interface of Prototype 2, due to we are going to use it, is simple, easy and include things that appropriate for our age. One could say that it is not flashy. Hence, interface is quite good because we are going to prepare an instructional material. It should not distract attention, and it is appropriate for its purpose. (E10)

Prototip 2' nin arayüzü, bizim kullanacağımız açısından basit, kolay ve bizim yaşımıza hitap eden şeyler vardı. Janjanlı değil belki de öyle denebilir. Bu yüzden arayüzü bence gayet bir öğretim materyali tasarlayacağımıza göre iyiydi. Dikkat dağıtmaması gerekiyordu ve bence amacına uygundu. (E10)

Moreover, 4 of the participants also stated that interface of prototype 2 was userfriendly. For example E9 stated that

I think it is useful. In other words it does not exhaust one. You do not need things like where should I look to do this or where to click etc. When you look at the main concept, due to they are all in the same page directly, it helps a lot. (E9)

Bence çok kullanışlı. Yani yormuyor insanı. Acaba şunu yapmak için nereye bakmalıyım, nereye tıklamalıyım vs. gibi şeylere ihtiyaç duymuyorsunuz. Direk olarak zaten ana şeye baktığınız zaman, concepte, direk olarak hepsi aynı sayfada olduğu için çok yardımcı oluyor. (E9) Additionally, 4 of the participants underlined that they would design a similar prototype in terms of interface if they were asked to design prototype 2 for the same purposes. However, one of the participants, E7, stated that she would use more attractive visual elements to make the interface more attractive.

In short, visual appearance of prototype 2 was evaluated positively by participants. They considered the interface of prototype 2 as simple, plain and useful. Hence, some of them stated they would have chosen to design a similar interface if they had been asked to do.

4.6.2.3 Content Quality

During the interviews, the participants also evaluated the content of prototype 2. While evaluating the content of prototype 2 participants made comments about the questions that were placed in prototype 2, content of help button, reports and forum.

Questions were the main content of prototype 2 as mentioned in the part where prototype 2 was explained in details. According to the results 8 of the participants made statements about questions in prototype 2. 7 of the participants stated that the content of the questions were clear and easy to understand. For example E7 described questions of prototype 2 in her words as follows:

I think the language [that used in questions] was simple. It was really good because a language those students can easily understand was used in questions. (E7)

Bence [sorularda] kullanılan dil basit. [Sorular] öğrencinin rahatlıkla anlayabileceği bir dil kullanıldığı için bence gayet güzeldi. (E7)

One of the participant stated that she had problems in understanding the questions:

I like questions of Prototype 2 because it helped as but there were some questions that we really had difficulty to understand them. This problem is not due to questions were in English or Turkish or unclarity of questions. It is because of not understanding what questions were asking. Maybe, it was due to we were doing this for the first time. Beside this there were no problems in questions. (E10)

Prototip 2 nin sorularını bize yardımcı olması açısından seviyorum ama bazı soruları vardı ki anlamakta gerçekten güçlük çektik. Hani bu sorunun Türkçe ya da İngilizce olmasından kaynaklı değildi. Ya da açık olmamasından kaynaklı değildi. Ne istiyor onu anlamamızdan kaynaklı idi. Belki de bunu ilk defa yapıyor olmamızdan da kaynaklıydı belki. Onun dışında sorularda bir sorun yoktu.(E10)

In this quotation, the problem was not due to the quality of the content, but the experience of the user. Hence, according to the results, the content quality of questions in prototype was considered to be simple and clear by the participants in general.

The content of the help button was also considered to be good, clear and beneficial by the participants. In prototype 2, there were explanations, examples and/or videos according to the requirements of the questions under the help buttons. 8 of the participants evaluated the content of these help buttons and they all stated positive evaluations. For example E1 stated that:

Yes, there [help buttons] were very good and served our purpose a lot. Explanations or examples were quite enough. Everybody could transfer the example that saw there to their project easily. (E1)

Evet, orası[yardım butonları] çok iyi bizim işimize çok yaradı. Açıklamalar olsun, örnekler olsun gayet yeterli idi. Her kişi oradaki gördüğü örneği kendi projesine rahatlıkla aktarabilir.(E1)

Moreover, 7 of the participants stated their ideas about the "create report" parts of prototype 2. Those participants stated that these "create report" parts of prototype 2 were good and useful. For example E9 explain his ideas about report part as follows:

How did I find create report part? It left nothing to us. While we are filling questions that are in ogret (prototype 2), during report preparation we do not need to do extra things to take print out of it. We directly print out it in required format, it saved the report and presented us in the format that we are asked to do. In other words, it is quite good.(E9)

Rapor oluşturma kısmını nasıl buldum? Bize hiç bir şey bırakmıyor. Biz zaten adım adım doldururken öğretin(prototype 2) bize sunduğu soruları, rapor hazırlarken bunun çıktısını alma konusunda bize extra bir şey yapma gereksinimi kalmıyor. Direk basıyoruz istediği formatta, bizden hangi formatta isteniyorsa, direk o şekilde kaydediyor, bize sunuyor. Gayet iyi yani.(E9) Lastly, there was the forum part in prototype 2 and as seen from the logs of the forum, none of the participants had used or shared any message there. During the interviews, the researcher asked the participants why they did not use the forum part. 8 of the participants stated they did not need a forum platform to share information or ask something to others. Other reasons for not using the forum part can be listed as; using other platforms, not needing to ask questions and the unpopularity of the forum part. For example, when asked why they did not use the forum part, E10 replied:

Actually, I do not find forum part as necessity. If we want to communicate, we have friends, assistants and teacher in our department. Beside there is a group on facebook that is formed by 2nd grades. There is also BÖTE current. If we want to ask a question, we certainly find a way in social network. Hence, I did not consider forum as a necessity. (E10)

Forumu çok gerekli bulmuyorum açıkcası. Eğer iletişim kurmak istersek bölüme gelip iletişime geçebileceğimiz sizin gibi asistanlarımız, hocamız var. Bide 2. Sınıfların facebookta kendi kurdukları bir grubu var. Onun dışında BÖTE güncel filan var. Soru sormak istersek elbet bir kanal buluyoruz sosyal ağda. Forumu çok gerekli bulmadım o yüzden. (E10)

In short, the content quality of prototype 2 was considered to be good in general. According to the results, the participants evaluated the content quality of the questions as simple and easy to understand. Moreover, the content of the help button (examples, explanations and videos) was considered to be good, beneficial and clear by the participants. Also, they stated that the "create report" parts were good and useful for them. However, they did not evaluate the forum part because none of them used this part as they said they did not need to.

4.6.2.4 Perceived Usefulness

According to the results all of the participants stated that prototype 2 was useful for them during instructional material design. They stated that prototype 2 affected their performance positively and helped them during their instructional material design project. For example, E9 underlined his perceptions about usefulness of prototype 2 in his words as follows:

For instance, if I thought to prepare a Project without using there (prototype 2), I think that I would have difficulties in which steps should I fallow and how should I prepare. However, when I used Project part of ogret (prototype 2) I saw that it always prepared me for the next step. Hence, I followed a specific line about what should I do. If it had not been in this way, probably proceeding to next step would have take more time. I think that probably I had experienced many problems.

Mesela ben orayı (prototip 2) kullanmadan bir proje tasarlamayı, hazırlamayı düşünse idim, Hangi adımları takip etmeliyim, ne şekilde hazırlamalıyım, onlarda çok zorluk çekeceğimi düşünüyorum. Fakat öğrette (prototip 2) proje kısmını kullandığım zaman şunu gördüm: beni hep bir sonraki adıma hazırladı. Ne yapmam gerektiği konusunda belli bir çizgide seyrettim bende. Eğer öyle olmasaydı büyük ihtimalle bir sonraki adıma geçiş çok uzardı. Baya bir sıkıntı yaşardım diye düşünüyorum.

7 of the participants also emphasized that prototype 2 should be used by novice instructional designers in instructional design projects. They underlined that it would help them. For example one of the participants explained how and why prototype 2 would be useful for novice instructional designers in her words as follows:

For example, if one does not know ADDIE model, it [prototype 2] actually present ADDIE model there in the videos, one could learn it by doing. If one complete every steps of [prototype 2], one will understand ADDIE model and also will do it. (E8)

Mesela, ADDIE yi bilmese, yani orada zaten [prototip 2]ADDIE yi anlatıyor videolarda, oradan onu yaparken öğrenebilir. Eğer [prototip 2 nin] her aşamasını yaparsa zaten ADDIE yi anlamış olur, ADDIE yi yapmış oluyor. (E8)

Also 7 of the participants stated that they would like to use prototype 2 in another instructional design project. They thought that prototype 2 would help them during instructional design. For example E9 states that

As far as I understood ogret [prototype 2]tries to help us with ADDIE model. If there were a Project that I could achieve with ADDIE model, I certainly and surely use ogret [prototype 2]. (E9)

Anladığım kadarı ile öğret[prototip 2] daha çok ADDIE modeli üzerinden bize yardımcı olmaya çalışıyor. Eğer ki ADDIE modeli ile üstesinden gelebileceğim bir proje olursa muhakkak ve muhakkak öğreti[prototip 2] kullanırım.(E9)

Moreover, according to the results, 7 of the participants stated that prototype 2 was good and there was not any part that they suggested to be excluded from prototype 2.

In short, according to the results NIDs thought that Prototype 2 was useful for their instructional design project. Moreover, prototype 2 was considered to be a guide in this process. Also, NIDs stated that using prototype 2 affected their performance positively during instructional design project and they would like to use prototype 2 for another instructional design projects.

4.6.3 Suggestions

Although most of the participants made positive evaluations about prototype 2, they also made some suggestions and state their expectations to improve it. Suggestions is one of the themes of this study. Content related and format related are the codes under this theme.

4.6.3.1 Content Related

Firstly, 4 of the participants suggested that there should be example reports in prototype 2. They have suggested that there should be example analysis, design, and evaluation reports of past projects for NIDs. For example one of the participants stated that

There should be one example. At least how an analysis report is or how an evaluation report is? There should be a report which was written before. (E6)

Bir tane örnek olmalı. En azından, 1 analiz raporu nasıl olur ve ya bir evaluation raporu nasıl olur? Daha önceden yazılmış bir rapor [olmalı].(E6)

Secondly, the participants suggested that there should be more explanations and examples for the questions in the help buttons of prototype 2. 4 of the participants stated that there were some questions which did not have explanations or examples in their help buttons and that these parts should be completed.

More examples can be added because in some parts there are no examples. In help buttons in some parts it is missing. There can be some problems there and it could be missing. We say that there could be more examples. (E4)

Daha fazla örnek konulabilir bazı kısımlarda örnek yok çünkü. yardım kısmında bazı yerlerde eksik. Oralarda bazen sorunlar olabiliyor eksik kalabiliyor. Diyoruz daha fazla örnek olabilir.(E4)

Thirdly, 4 of the participants stated that there should be more videos in prototype 2. The content of these videos suggested as explanatory videos or videos that serve as examples. For example E2 explains his ideas about video as follows:

There can be more videos because there are a lot of difference between video and text. I am saying from my side, vide is too beneficial for me. For example, I can say that if I read a text 10 times but watch the video one time, it is same thing for me. Hence, in terms of this it is helpful any way. In my opinion, it would be great if there is video. (E2)

Video konulabilir daha fazla çünkü yazı ve video arasında çok fazla fark var. Video ben kendi açımdan söylüyorum benim için çok faydalı. Mesela yazıyı on defa okusam videoyu bir defa izlesem aynı şey diyebilirim benim için. O yüzden o yönden faydalı zaten. Video olsa bence daha güzel olur. (E2)

Moreover, 3 of the participants suggested that there should also be some explanation about how questions could be answered under help buttons. One of the participants (E5) stated that there were similar questions in prototype 2 and it was boring to answer them. He suggested that similar questions should be deleted. Besides this, E7 suggested that there could be example instructional design projects in prototype 2 for NIDs.

To sum up, the participants suggested that adding example reports, adding more examples and explanations to help buttons, adding videos, adding explanations about how questions could be answered, deleting similar questions and adding sample projects could be done to improve content of prototype 2.

4.6.3.2 Format Related

During the interviews, some of the participants also made suggestions about the format of prototype 2. Firstly, 3 of the participants made suggestions about the visual design of

prototype 2. They suggested a more colorful and enjoyable design. One of them also suggested that menu buttons of prototype 2 might be organized differently to improve navigation. Secondly, two of the participants made criticism about language changing style of prototype 2. For example one of them stated that:

This Turkish – English [change] returns to beginning. This is a very problematic thing. This should be fixed as soon as possible. I think it should be first thing if something will be solved. (E4)

Bu Türkçe İngilizce olayı[değişiminde] başa dönüyor. O çok sıkıntılı bir şey. O bir an önce halledilmeli bence. Bence ilk halledilmesi gereken bir şey varsa o olmalı. (E4)

Thirdly, one of the participants (E8) underlined that the report editor that was placed in the "create report" tabs of each phase should be improved and it should provide options to add pictures or tables to their reports. E8 also stated that she wanted to add pictures or files to some questions in prototype 2 and format of prototype 2 did not let her.

In short; providing more colorful and enjoyable design, providing a better language change format and improving report editor for adding picture or tables were suggestions of participants to make prototype 2 better for NIDs.

4.6.4 Summary of Phase III: Evaluation

Findings of Phase III showed that although all of the participants completed the same courses in instructional design up to the application course of design phase and design and develop some project assignments their perceived levels as an instructional designer were different. 6 of the participants consider themselves to be at a medium level. On the other hand 2 of them thought that they were at a good level and one of them thought that he was in a novice level.

According to the findings, 9 of the participants thought that IDMs should be used during instructional design process. However, one of the participants thought that IDM should be used by instructional designers but if one is an expert, one may not use IDM during instructional design process.

In addition to this, all of the participants had used prototype 2 during their instructional material design and development process. However, most of the participants did not use project management part of prototype 2 because they did not need to use that part. After participants used prototype 2, they made some evaluations and comments about prototype 2. These evaluations are summarized in Table 4.12.

Evaluated aspect	Views about aspect	# of participants
Visual quality	Clear	10
	Simple	10
	User friendly	10
	"I would design similarly"	4
Content Quality	Questions clear and easy to	7
	understand	
	Content of help button good,	8
	clear, beneficial	
	reports were good and useful	7
	No need to forum	8
Perceived usefulness		
	useful	10
	Positively affect my performance	10
	Help in instructional design	10
	process	
	Should be used by novices	7
	Want to use in another project	7

Table 4.12 Evaluation of Prototype 2 Summary

Moreover, the participants also made suggestions to improve prototype 2 and expressed their expectations from prototype 2. These suggestions and expectations are summarized in Table 4.13.

Expectations/Suggestions of	Details		
NIDS			
Content			
• Help button	More explanations		
	More examples		
	All questions should have help button		
• Reports	Example report		
	How questions should be answered		
• example	Row questions should be answered		
	Reports		
	projects		
• video			
Format	Colorful and entertaining design		
	Easy navigation		
	Instant language change option		
	Picture or/and table adding option		

Table 4.13 Summary of suggestions and expectations of NIDs related to prototype 2

4.7 Answer to Research Question 2

The second research question of this study was "How do novice instructional designers view the value of the designed EPSS to improve their performance on instructional system design and development?" According to the results of the evaluation phase of this study, NIDs described designed EPSS' visual design as clear, simple and user friendly. They also considered the content quality of designed EPSS as clear and easy to understand. Moreover; examples, explanations and videos that placed in help buttons in designed EPSS evaluated as clear and beneficial for users. In the light of these comments NIDs found the designed EPSS valuable for them. According to the findings of the evaluation phase, NIDs views related to the designed EPSS (prototype 2) was positive. As it is explained in Perceived Usefulness heading, it was seen that NIDs thought that the designed EPSS positively affected their performance in instructional system design and development. Moreover, they thought that designed EPSS as a useful tool.

Additionally, NIDs underlined that they would like to use the designed EPSS in their future projects. Furthermore, according to the results NIDs thought that the designed EPSS should be used by novice instructional designers because they thought that it would help them in the instructional design process.

4.8 Summary

The findings showed that key elements of this EPSS are tutorials, examples, resources, tools, wizard, user interface, database and help. According to the results, NIDs need information about some topics (details are presented in Table 4.10) during instructional material design and development process. If they have the chance to reach these topics in EPSS, it will be an informative process. Moreover, they will not need to search information about these topics and thus, save time. They also suggested that these tutorials should be brief, to the point and in video format if it is possible. Second, there should be examples in the EPSS. NIDs stated that if there were examples, EPSS would be more effective. Third, there should be resources related to characteristics of students,

current curriculum, motivation, development tool and Turkish educational system. NIDs stated that they needed these sources or it would be better if EPSS included these resources. Fourthly, there should be tools like forum, chat, online survey tool and questionnaire database to make NIDs work easier. Moreover, NIDs suggested that templates of interview, storyboard and instructional material parts should be provided in EPSS. They stated that they need these templates and these templates could increase their success in instructional material development projects. A report tool should be in EPSS and this part should have dynamic report editor, co-writing option and have an improved format. Result showed that NIDS thought that with these tools EPSS could be more beneficial. According to results main elements that an EPSS should include to support NIDs during instructional system design and development are presented as Figure 4.9. As it is seen in Figure 4.9, there should be a user interface that NIDs interact with EPSS and this interface should be clear and simple as favored by NIDs that participated in Phase II. Moreover there should be a database that store users' login information and entries in the system. There should also be a wizard to guide NIDs during instructional system design and lead them to choose relevant elements (tutorials, tools, examples, and resources) according to their needs. Finally, help component needed to support users when they need help related to use of EPSS.

The second research question of this study was "How do novice instructional designers view the value of the designed EPSS to improve their performance on instructional system design and development?" According to the results of the evaluation phase of this study, NIDs described designed EPSS' visual design as clear, simple and user friendly. They also considered the content quality of designed EPSS as clear and easy to understand. Moreover; examples, explanations and videos that placed in help buttons in designed EPSS evaluated as clear and beneficial for users. In the light of these comments NIDs found the designed EPSS valuable for them. According to the findings of the evaluation phase, NIDs views related to the designed EPSS (prototype 2) was positive. As it is explained in Perceived Usefulness heading, it was seen that NIDs thought that the designed EPSS positively affected their performance in instructional

system design and development. Moreover, they thought that designed EPSS helped them during instructional design process. NIDs also labeled designed EPSS as a useful tool.

Additionally, NIDs underlined that they would like to use the designed EPSS in their future projects. Furthermore, according to the results NIDs thought that the designed EPSS should be used by novice instructional designers because they thought that it would help them in the instructional design process.

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter includes brief restatement of results of this study and discussion of these results with related studies in the literature. First, answer of the first RQ is summarized and key elements of EPSS are discussed with the related studies. Then, findings related to perceptions of NIDs related to effect of the EPSS on their performance summarized and discussed with similar and opponent studies from the extant literature. Then, suggestions and implications for researchers and practitioners are stated. This chapter concludes with suggestions of researcher that are related to future studies.

5.1 Key elements of EPSS

This study was conducted to develop an electronic performance support system for novice instructional designers for instructional system design. The first RQ of this study is "What are the key elements of an EPSS that is designed to support novice instructional designers during instructional system design and development?" and analysis and design phases of this study were conducted to determine key components of intended EPSS. According to the results of this study, an EPSS that is designed to support novice instructional designers should have 8 key components. These are:

- tutorials,
- examples,
- resources,

- tools,
- wizard,
- user interface,
- database,
- and help.

According to findings of this study, these components are necessary for an EPSS that designed to support NIDs. Relationship between these components is presented in Figure 5.1.



Figure 5.1 Key Components of EPSS

Before explaining key elements of EPSS, results of this study revealed that in general *content of the EPSS should be clear and easy to understand (Design Principle)*. According to results, NIDs stated that content of designed EPSS ensured this attribute. In other words, NIDs perceived content of the EPSS as clear and easy to understand.

5.1.1 Tutorials

In this design and development study, an EPSS for novice instructional designers was designed, developed and implemented to support them during instructional system design process. The target group of this EPSS was novice instructional designers and they did not have both theoretical and practical knowledge about instructional design. To improve their knowledge about instructional design, a small-sized, key to the point tutorials were included in the EPSS. Tutorials were also required by novice instructional designers according to results. According to Gerry (2002), EPSS should include *knowledge* component to provide information about the *content, rules* and *relationships* related the area that EPSS provide support. The result of this study also showed that EPSS users also need *knowledge* component to improve performance on instructional system design.

Moreover, Chang (2004)'s study also supports our results. He underlined in his study that an EPSS should have 6 main components and one of them is *a learning/training support facility*. He explained this component as a system that offers personalized and self-based learning related to topic that performance support offered (Chang, 2004). Tutorials were also provided in the EPSS, which was designed for this study, for this purpose.

The topics of tutorials that were needed by novice instructional designers consisted of various topics related to instructional design. These topics were, particularly, information about each steps of instructional design model, methods of collecting data, visual design, content organization, storyboarding, developing assessment items, feedback, motivation, instructional approach, material development tools, reporting instructional design and development process and APA style.

According to the result of the Analysis Phase of this study, suggested topics for tutorials were used to decide topics of tutorial component of the EPSS. Moreover, the results showed that novice instructional designers required brief and to the point tutorials instead of long texts. Also, video was the mostly suggested type for tutorials. As Gery

(1991) explains the main purpose of EPSS systems are "to provide whatever is necessary to generate performance and learning at the moment of need" (Gery, 1991, p.34). As it is understood from the definition, EPSS are the support tools that used during completing a task. Hence, tutorials that an EPSS should be brief and to the point as this study's results revealed.

To sum up, *EPSS should include tutorials to support users and they should be brief and to the point tutorials, not long texts (Design Principle).*

5.1.2 Examples

According to the findings of this study, examples were one of the components that should be included in EPSS. Examples that are related to objective writing, data collection process, interview preparation, storyboard design, instructional activities, project reports, educational games, visual design and good/bad instructional materials were the suggested example topics in this study. Moreover, the participants also underlined that there should be examples about how to complete the EPSS's tasks, in our study' case how to answer questions.

In the literature, examples were not defined as one of the components of EPSS. However, according to the suggestions and stated needs of novice instructional designers in this study, examples should be one of the components of the EPSS. Stated examples were not the types of examples that explain information but examples that describes how to conduct tasks that NIDs were asked to complete. For example, writing objectives is one of the tasks in instructional design process. According to Molenda, Pershing and Reigeluth, the objectives should be *performance objectives* and these objectives should (1) set up precise teacher and learner purposes, (2) offer a definite reference point for evaluation, and (3) facilitate the choice of the instructional techniques (1996). Hence, writing objectives requires knowledge and skills to fulfill this task and seeing an example of how to complete this task instead of long explanation about how to write performance objectives can be more beneficial then tutorials. Moreover, according to the adult learning theory, adults only keep the information that they need in their mind and
an EPSS that offers information about explicit work areas would be an important performance intervention (Nguyen, 2005). Therefore, examples can provide practical knowledge about how to complete tasks in instructional system design.

In conclusion, according to the results of this study, example is one of the components of an EPSS that designed to support NIDs. Hence, EPSS designers should *include examples about how to complete tasks to support users (Design Principle).*

5.1.3 Resources

According to the results of this study, another component that the EPSS should include was resources. Different than tutorials, resources include all the sources that users need when they are completing their task. For example in our case, NIDs stated that they need detailed information about learning theories, psychological development level and needs of target group, content of the instruction that they going to use in their design and etc. Resources are different than tutorials because the purpose of the tutorials is to teach performance related knowledge while NIDs complete their task. On the other hand, resources provide information that is needed for completing tasks but it should not necessarily be learned to become an expert on the performance and also provide detailed knowledgebase about the related topic. Resources are also presented to NIDs as auxiliary documents and they review them if they think they need to review them.

The literature also supports this finding of the current study. For example Chang (2004) explains in his study that an EPSS should have *a data/information system* which provides needed information to complete task. Different than *learning/training support* component that he describes in his study, this component includes detailed information about tasks and may be organized according to sub-tasks (Chang, 2004). Moreover, in his study Hannafin (2000) also underlines that EPSS should include a *resources* component and the component that is described in his study contain fundamental information that is required to the complete tasks.

In the literature type of resources are defined as *static:* "a fixed recording of ideas, facts and beliefs at a specific point in time (e.g., textbooks, magazines)" and *dynamic:*

"undergo frequent, sometimes continual change (web-pages)" resources (Hannafin, 2000). The findings of this study also support literature. They show that these resources should be in a digital format. According to the results of this study NIDs suggested that e-book or hyperlink systems should be used for resources. According to Hannafin's descriptions, e-books are a form of *static* resources and hyperlink systems are an example *dynamic* type of resources.

To sum up, EPSSs that are designed for NIDs should *include resources that served as knowledge database related to tasks that performance support system used. These resources should be in digital format. Fixed resources (e-books and etc.) and dynamic resources should be included in resources component (Design Principle).*

5.1.4 Tools

EPSSs are support systems that aim to support users while they are completing tasks for their job. Different kind of tools may be needed to complete tasks. For example, an EPSS that aims to support teachers may include a spreadsheet to organize and calculate student's grades, a communication tool to communicate with parents and students and etc. The findings of this study show that tools are one of the key components of EPSSs. Questionnaire design tool, report tool, templates and forum are the needed tools that NIDs requires to complete their tasks. These tools are added in the EPSS.

First, in this study novice instructional designers form many questionnaires to collect data in the different phases of instructional system design process. A questionnaire design tool was included to support their data collection tasks. Second, a report design editor is provided to support NIDs to develop their project reports across phases of instructional design. Third, a forum was included in the system to support communication of NIDs in the related issues about the instructional system design. Findings of this study also showed that NIDs need various templates to complete instructional system design tasks. Templates are the prepared documents or software that include general items and users filled the empty spaces of templates according to their cases. Templates should be specifically designed according to tasks that EPSS aimed to

support. Hence, they are a type of specific tool for performance support. For example, a report template include common parts of reports like headings, format and users filled their specific data into these reports to produce required reports. Results showed that NIDs suggested that there should be storyboard, interview and instructional material templates in the EPSS.

Similar to findings of this study in the relevant literature, tools are also considered to be one of the components of EPSSs (Gerry, 2002; Hannafin, 2002; Chang, 2004). For example, Gery (2002) states that tools are one of the components of EPSSs and the software that are designed to support tasks are tools in the EPSS. Similarly, Chang describes tools as a main component of EPSS but he labels them as *productivity software* (2004).

The findings of this study also show that NIDs need communication tool. Forum tool was included the EPSS system for communication purposes. Gery defines communication tools as another component of EPSS (2002). Similar to this study, Hannafin categorizes communication tools under tools component and he also mentions processing and manipulation tools (2000). Report tool and questionnaire design tool can be categorized under processing tools according to Hannafin's categorization. On the other hand, Chang does not mention about communication tool as an important component of EPSSs (2004).

Although forum component was one of the needed tools according the results of analysis and design phase, results of evaluation phase showed that NIDs did not use forum tool in the EPSS. One of the reasons for this result was the presence of other popular communication tools like social media. Another reason for this result was the presence of face-to-face communication opportunity. In the phases of this study, NIDs had chance to communicate with each other in lectures and weekly project meeting. Hence, they may not need to communicate via the forum.

To sum up, tools are another key component of EPSSs. Relevant tools should be included in EPSS to support users' performance. There should be tools for producing

needed materials for tasks, reporting to processes, communication and other specific tools according to tasks (Design Principle).

5.1.5 Wizard

According to the results of this study, NIDs need a system that guides them through the instructional system design process. Especially, the results of the analysis phase of the study show that there is a need for an intelligent system which can provide instant feedbacks according to the inputs. Hence, the results suggest that there should be a wizard component in EPSS that provides instant guidance to users.

Similarly, in the literature Hannafin suggests that EPSSs should include *scaffold* component (2000). He explains that as the role of this component is to "act as assistants in the process, guiding users as they engage learning and/or performance activities" (Hannafin, 2000, p. 9). Moreover, according to Çağıltay (2006) EPSSs can provide scaffolding and these types of scaffolding that EPSS can provide are conceptual, metacognitive, procedural and strategic scaffolding. Hence, an EPSS can provide scaffolding for novice instructional designers. Chang also underlines the scaffolding strength of EPSS's in other words and state that *an advisory system* is one of the main components of EPSSs and it provides support while users solve problems, make decisions, judge situations and provide solutions and make analysis (Chang, 2004).

Supporting NIDs during the instructional system design process and acting as an advisor to them can improve their performance. The Advising capability of an EPSS is one of the strengths of it to improve the performance of a user. As Gery (1995) suggests, observing and advising is one of the important attributes of successful EPSSs. How to support NIDs during instructional system design by wizards and how much support this advisory system (wizard) should provide was not clearly described in the literature. However, this advisory system is described as scaffolding components of EPSSs in literature. Therefore their density of use can be decided according to the needs and characteristics of users. In this study, a help button strategy is used to provide support to NIDs. This strategy can be named as a basic guidance option. The Content of this help option changed according to the task that NIDs should complete in that step and provide brief information, example and/or video to NIDs. According to the results of this study, NIDs evaluated this option of the EPSS as clear and easy to understand. They also underlined that this option was beneficial for them in instructional system design. *Wizard should be clear and easy to understand (Design Principle).*

To conclude, a wizard that provides scaffolding for novice instructional designers is one of the key components of EPSS. In other words, *wizard or assistants that provide advice and scaffolding to users should be included in EPSS (Design Principle)*.

5.1.6 User Interface

User interface is also one of the important components of EPSS. According to the results of this study novice instructional designers suggested clear and easy user interface design and as the evaluations of prototype 1 and prototype 2 shows, they favored plain and simple interface design. All of the participants of the evaluation phase of this study stated that the design of the EPSS was clear and simple. They also underlined that they found the design of the EPSS user friendly. In the literature, user interface of an EPSS is not discussed widely.

Regarding the user interface, Chang (2004) states that *an end-user interface* as one of the components of EPSS and he underlined that it should provide access to all necessary components and knowledge and allow users to easily navigate through components. These rules are similar to the findings of this study. According to the results *ease of use is* one of the issues that should be considered in visual design.

Besides this, in the literature, supporting alternative views in interface to guide users who demand different type of support and consistency were also suggested for user interface (Gery, 2002). Although NIDs did not mention consistency in the interviews, the consistency issue was considered in the design process of prototype 1 and prototype 2. Because of the consistent design of prototypes, NIDs evaluated prototypes as *easy to use*. In contrast to Gery's suggestion, prototype 1 and prototype 2 did not offer alternative views for users who have different expertise levels. However, this issue was

not a need in this research because all of the users were novice users. Therefore, if an EPSS is designed with the purpose of supporting instructional designers who have different expertise levels, a dynamic interface design may be formed to support various users.

To sum up, user interface is one of the key components of EPSS. User interface should be designed simple and clear. It should support consistency. Design of the EPSS should be a user friendly design (Design Principle).

5.1.7 Database

According to the results of this study, there should be a database in EPSS. Although NIDs did not directly underline the importance of a database, needs of NIDs require a database system for EPSS. For example, the results showed that NIDs suggest a closed system that stores their login information. Also, they suggest that EPSS system should store their entries in the system. To provide these features, a database should be used in EPSS. This result is parallel to those that exist in the literature. For example, in the definition of EPSS one of the features of EPSS is defined as storing personal or commercial knowledge (Raybould, 1997). To store this knowledge, a database is needed in the system.

Similar to the results of this study, Gerry (2002) suggest that *data* is one of the important components of EPSSs and this component contains executive and exterior data. Moreover, Chang underlines that an EPSS should have *a data/information base* to provide entrance and navigation options through information that required for doing the job (2004).

An EPSS should include a knowledgebase to provide the required information to perform the intended tasks. Moreover, as mentioned above, an EPSS should provide advisory systems to support and scaffold users. Hence, these supports can be provided by pre-determined story lines. Also, EPSS provide an individual help and to provide an individual help, users have to login to this system. Therefore, a database should be included in EPSSs.

To sum up, providing an individualized support, keeping track of performance and providing an active knowledgebase database should be components of an EPSS. *One of the key components of an EPSS is a database that store personal login information, performance track and relevant knowledgebase (Design Principle).*

5.1.8 Help

EPSSs are complex systems that include many components. A user who uses the system for the first time can face problems while using it. Although NIDs did not clearly suggest a help component in EPSS, they may have problems in using EPSS. Hence, providing help about how to use EPSS for different purposes and what to do when problems occur is a reasonable action. Moreover, in the literature, the help component was suggested as one of the main components of EPSSs. For example Chang suggest that an *online help/reference* should be included in EPSS to offer support to users by means of "inquiry-based explanations, demonstrations, advice, reference and alternatives for using the software" (2004, p.345). Therefore, the researcher decided to add help as a component. To sum up, *help is one of the main components of EPSS; EPSS designers should provide support about how to use EPSS software (Design Principle).*

5.2 Designed EPSS and Performance of NIDs

The second research question of this study is "How do novice instructional designers view the value of the designed EPSS to improve their performance on instructional system design and development?" To answer this research question, the needs of NIDs during instructional system design process was analyzed in the analysis phase and prototype 1 was developed. After that, NIDs used prototype 1 in instructional system design projects and according to their evaluations and suggestions, revisions were made on prototype 1 and prototype 2 was developed. Then, NIDs used prototype 2 during instructional system design and evaluated this EPSS. Hence, this question was answered by the perceptions of NIDs.

5.2.1 Positive Effect on Performance

According to the findings of this study, EPSS is seen as a valuable support for NIDs with respect to their perceptions. NIDs found EPSS useful in instructional system design and stated that the EPSS that they used affect their performance positively and help them in learning instructional system design. The results also showed that NIDs wanted to use this EPSS in the feature instructional design projects. In the literature, there are many studies that use EPSS for learning improvements. For example, according to Kert, Uz and Gecü's study, utilization of EPSS improved decision making skills of users in computer ethics and ethical decision (2014). Moreover, the results of the CASCADE project also support the findings of this research. In their project, the researchers aimed to support Dutch curriculum developers by developing an EPSS and their study revealed that EPSS can positively affect the performance of curriculum developers (McKenney et al., 2002). CASCADE-SEA study results also support the result of this study. In that study the researchers find out that EPSS that was developed to support teachers in curriculum material development improved teachers' skills and they generally produced better materials with EPSS (Mckenney & van den Akker, 2005). Similarly, in a study that aimed to facilitate learning qualitative research methodology with an EPSS, the results showed that performance of users who utilized EPSS was higher than non-users (van Schaik et al., 2002). Moreover, another study in which teacher designers were supported by an EPSS in instructional scenario development showed that using EPSS contributed knowledge growth of designer's (Wang et al., 2007).

Although, there are studies that support that EPSS has positive effects on performance of users, there are also studies that underlined that there is no significant difference in learning when an EPSS is used. For example, in a similar study, preservice teachers' knowledge about technology integration was supported by an EPSS and the results of the study showed that there was not a significant difference in learning improvement but preservice teachers have positive attitudes to EPSS use for this purpose (Kalota & Hung, 2013). Also, another study showed that EPSS use has no significant effect on knowledge but significant effect on student's confidence in their knowledge (Barker et al., 2007).

However, these opposing results do not completely contrast with the results of this study because this study is not an experimental one and these studies showed positive attitudes to EPSS use and significant increase in student's confidence level. Hence, the results of this study do not present significant performance improvement of novice instructional designers but present NIDs positive perceptions about the effect of EPSS on their instructional design performance.

One of the other indicators that NIDs have positive perceptions about the EPSS and its effect on their performance was their desire to reuse the EPSS in future projects. Most of the participants stated that they want to use the EPSS in other instructional design projects.

To sum up, according to the perceptions of NIDs, EPSS use in instructional system design has positive effects on their performance and helps them in learning instructional system design process.

5.2.2 EPSS and Novice Instructional Designers

According to the results of this study, NIDs stated that using EPSS is beneficial for novice instructional designers in instructional system design. In the literature, studies showed that expert and novice instructional designers have different approaches in solving instructional design problems (Perez, Johnson & Emery, 1995; Rowland, 1992). To provide qualified solutions to instructional design problems, novices need support and guidance. According to the results of an explanatory study, novices can improve their problem-solving skills and can solve these problems like experts with explicit guidance (Ertmer et al., 2009). There are also similar studies that underline the importance of appropriate guidance and support novice instructional designers in reaching the performance of experts in instructional design (Ge, Chen, & Davis, 2005; Verstegen et al., 2008). The EPSS that was developed in this study was designed to provide this support and the results showed that it can provide this support to NIDs. The Perceptions of NIDs re also parallel to this idea and the results showed that they believe the EPSS can be beneficial for novice instructional designers. In conclusion, EPSS can

be beneficial for novice instructional designers to perform expert like performances in instructional system design. They can have a chance to learn the instructional design principles while they are designing solutions to instructional design problems by this EPSS.

5.2.3 How to Use EPSS in Instructional Design Process

In this study, first prototype was used as an auxiliary material for the students. They did not have to use this prototype but it was suggested to them and teacher of the course and the researcher frequently remind them the features of EPSS that might help them during instructional design process. However, second prototype was one of the main tools of the instructional design process and students had to use them and compose their project reports by using this system. They had to complete the steps in the designed EPSS and they had to provide a print out version of it with their project reports. Moreover, during the instructional system design process, participants complete their project as groups. 1st prototype was not appropriate for group use but the second one includes this feature. Results of this study showed that NIDs prefer to use the EPSS as a group and worked on their project as a group in the system.

Result of this study also showed that NIDs experienced time management and division of labor problems during instructional design process. In the EPSS there is project management part and this part designed to facilitate NIDs in time management and division of labor. It also provides information about how much work that they complete and how much of work is left. Therefore, project management part should be used affectively during instructional system design process. This part should be used even though instructional design project was not a group project. In this case, user can make to do list for his project and monitor his performance.

If this EPSS used in an instructional design project by a novice instructional designer, all of the steps of the EPSS should be completed by the user. Users can use help button, if they need any help while they are completing tasks. If this EPSS will be used by NIDs during an instructional system course according to experience and observation of the researcher, in ideal case, firstly, EPSS should be a main tool of the instructional design process. Instructor should present an example use of related part in the lecture. For example, in analysis phase, instructor should answer the provided questions of need analysis as an example. After that novice instructional designers use the EPSS and answer asked questions according to their project purposes. Secondly, providing feedback is an important issue in teaching instructional design. Instructor can use the forum tool in the EPSS and provide feedbacks to users. By using forum, instructor can provide general or private feedbacks. He can also communicate with students with forum tool. There is also e- mail and other social media tools to communicate with students but communicate students with in the EPSS system may be more beneficial for them.

5.3 Conclusion

The purpose of this study was to design and develop an EPSS to support NIDs in instructional system design process. To reveal the key elements of such an EPSS was also the purpose of this study. For this purpose, 2 EPSS prototypes were designed and used by novice instructional designers while they were developing instructional materials for various purposes. One of the RQs of this study was "What are the key elements of an EPSS that is designed to support novice instructional designers during instructional system design and development?" and study results showed that tutorials, examples, resources, tools, wizard, user interface, database and help are the main components of an EPSS that designed to support NIDs.

The Second research question was "How do novice instructional designers view the value of the designed EPSS to improve their performance on instructional system design and development?" The Results showed that NIDs perceived the EPSS to be beneficial for them and they also claimed that it improved their performance in instructional system design. These findings are also supported by the existing literature.

5.4 Implications and Suggestions for Researchers and Practitioners

The purpose of this study was to design and develop an electronic performance support system to support novice instructional designers design the instructional design process. During this study, the researcher designed and developed an EPSS to support NIDs in instructional system design. The Results of this study showed that there are 8 key components that an EPSS should include to provide support to NIDs. Moreover, due to the methodology of this study, the results not only answered the research questions but also revealed some design principles for the researcher and the practitioners who are planning to design and develop an EPSS. These design principles are suggestions of the researcher to the researchers and practitioners who are planning to design and develop EPSS for NIDs. It is believed that these principles have potential to be guidelines for designers who are planning to design an EPSS and design principles that are related to these components are listed in Table 5.1. The Design principles that are provided in Table 5.1 are ensured according to the findings of the 3 main phases of this study. Besides this, as the designer of the EPSS system, the researcher suggests that:

- EPSS design is a group work and requires a long-term study. Hence, a qualified group that includes instructional designers, SMEs, software developers, visual design experts and other related people should work on these projects.
- EPSS are systems that are designed to provide individualized support to users. Hence, the needs of target group should be analyzed extensively before designing EPSS.
- EPSS systems should include tutorials, examples and resources as main components. To design and develop these components, IDs should work with SMEs and these components should be designed according to the needs of target group.
- Tools are one of the other components of EPSS. To develop proper tools IDs should work with SMEs, target group and software developers to design efficient tools.

- To design a wizard system, extensive software development skills are needed.
- There should be iterative cycles to revise the EPSS designs and improve the quality of EPSS.

	Design Principles	
Component	For All EPSS	EPSS For Instructional Design
Tutorials	Include tutorials to support users.	Include tutorials about instructional
		design model/s, methods of collecting
		data, visual design, content
		organization, assesment items and
		relevant topics related to instructional
		design.
	Tutorials should be brief and to the	Tutorials should be brief and to the
	point tutorials not long texts.	point tutorials not long texts.
Examples	Include examples about how to	Include examples about how to
	complete tasks.	complete instructional design tasks.
Resources	Include resources that served as	Include resources related to current
	knowledge database related to tasks	curriculum, motivation,
	that performance support system used.	characteristics of students and etc.
	Resources should be in digital format.	Resources should be in digital format.
	Fixed resources (e-books and etc.)	Fixed resources (e-books and etc.)
	and dynamic resources should be	and dynamic resources should be
	included.	included.
Tools	Relevant tools should be included in	Forum, online survey tool,
	EPSS to support users' performance.	questionnaire databases, interview
		template, storyboards and template
		instructional materials should be
		included.

Table 5.1 Components and Design Principles of EPSS

Table 5.1 (continued)

	There should be tools to produce	
	needed materials for tasks, to report	
	processes, to communicate and other	
	specific tools according to tasks.	
Wizards	Wizard or assistants that provides	Wizard or assistants that provides
	advice and scaffolding to users should	advice and scaffolding on
	be included in EPSS.	instructional design should be
		included in EPSS.
	Wizard should be clear and easy to	Wizard should be clear and easy to
	understand.	understand.
User	User interface should be designed	User interface should be designed
Interface	simple and clear.	simple and clear.
	User Interface should support	User Interface should support
	consistency.	consistency.
	Design of the EPSS should be a user	Design of the EPSS should be a user
	friendly design.	friendly design.
Database	There should be a database that store	There should be a database that store
	personnel login information,	personnel login information,
	performance track and relevant	performance track and instructional
	knowledgebase.	design tutorials and resources.
Help	Include help to provide support about	Include help to provide support about
	how to use EPSS software.	how to use EPSS software.
General	Content of the EPSS should be clear	Content of the EPSS should be clear
	and easy to understand.	and easy to understand.

5.5 Suggestions for Future Studies

This is a design and development research study that was conducted in a qualitative perspective. Therefore, the results of this study cannot be generalized. However, in future studies, the effect of the EPSS that is designed in this research can be measured with experimental studies. Moreover, although the results of this study provide some

practical guidelines for people who want to design an EPSS, there are limited studies in the literature that provide practical guidelines for EPSS design. Hence, other design and development research studies that are carried out to design EPSSs for different target groups and contexts will revise and improve the practical design principles for EPSS design.

This study was a dissertation study and therefore the researcher had a limited time to complete it. For this reason, there was no chance to test the design principles and make improvements about them. Testing and improving these principles can be the purpose of future studies. Also, EPSS components should also be tested in different studies.

Moreover, I believe that using EPSS in education is one of the efficient ways of providing individualized, self-paced and self-directed learning. It also provides them with a chance to learn how to apply knowledge to related tasks. However, there are not enough studies about how to design an EPSS, how to apply an EPSS and different significant examples of EPSS utilization. Hence, studies related to EPSS design should be enhanced.

Finally, design and development research studies have the potential to provide practical examples in instructional design. They extend not only the knowledgebase but also the practical information. Therefore I suggest that there should be more design based research studies about EPSS design and other topics in our field.

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APPENDIX A

INTERVIEW QUESTIONS OF THE INTERVIEW 1

Merhaba,

Her şeyden önce görüşmeyi kabul ettiğiniz için teşekkür ederim. Bu araştırmanın amacı, deneyimsiz öğretim tasarımcıların bir tasarım modeli kullanarak öğretim tasarımı yapmasını sağlayacak bir elektronik performans destek sistemi oluşturmaktır. Bu görüşme sorularına verdiğiniz cevaplar doğrultusunda bu sistem geliştirilecektir.

Açıklamalarınız sadece bu araştırma için kullanılacaktır. Adınız ve kişisel bilgileriniz araştırma raporunun hiç bir yerinde geçmeyecektir ve kişisel bilgileriniz kesinlikle gizli tutulacaktır. Araştırma sonuçlandığında dilerseniz size araştırmanın sonuçları hakkında bilgi verilecektir. İzniniz olursa görüşmemizi kaydetmek istiyorum.

Zaman ayırdığınız için teşekkür ederim.

Görüşme Soruları

A. Demografik sorular

- 1. Eğitim materyali tasarımı ile ilgili daha önce hangi dersleri aldınız?
- 2. Daha önce herhangi bir öğretim materyali geliştirdiniz mi? Sonda1: Ne tür eğitsel materyaller geliştirdiniz?
 - i. Hangi yaş grubu için hazırladınız?
 - ii. Konusu ve amacı neydi?

Sonda2: Tasarım yaparken hangi metod ve toolları kullandınız?

i. Nasıl tasarladınız? Herhangi bir metod kullandınız mı?

B. Öğretim Materyalinin Geliştirilmesine İlişkin Sorular

Öncelikle öğretim materyalini geliştirirken <u>analiz aşamasında</u> neler yapmış olduğunuzu merak ediyorum.

- 1. Analiz aşamasında neler yaptığınızı anlatabilir misiniz?
 - a. İhtiyaç analizini nasıl uyguladınız? Bu süreçte karşılaştığınız zorlukları tarif edebilir misiniz? (öğrenci ve öğretmenlerin ihtiyaçları açısından)
 - b. İçerik analizini nasıl yaptınız? Bu süreçte karşılaştığınız zorlukları tarif edebilir misiniz? (kazanımların yazılması, içeriğin ve aktivitelerin planlanması...)
 - c. Öğrenci analizini nasıl yaptınız? Bu süreçte karşılaştığınız zorlukları tarif edebilir misiniz?(öğrencilerin bilgi düzeyler, öğrenme sitilleri, hangi gelişim basamağında oldukları...)
 - d. Öğretim materyalinin kullanılacağı ortamı nasıl incelediniz? Bu süreçte karşılaştığınız olumlu ve olumsuz deneyimlerinizi paylaşabilir misiniz(çevresel şartlar)
- 2. Eğer bu analiz aşamasında size destek olan bir performans destek sistemi olsaydı, bu sistemin ne gibi özellikleri olmasını isterdiniz?
 - a. İhtiyaç analizi sürecinde nasıl bir destek isterdiniz?
 - b. İçerik analizi sürecinde nasıl bir destek isterdiniz?
 - c. Öğrenci analizi sürecinde nasıl bir destek isterdiniz?
- 3. Çevre analizi sürecinde nasıl bir destek isterdiniz?
- 4. Bu destek sisteminin sizi analiz aşamasında nasıl yönlendirmesini daha uygun bulurdunuz?

Sonda: Destek sisteminin analiz kısmının ara yüzü sizce nasıl olmalı? Sizi yönlendirmeli mi yoksa size öneriler mi sunmalı? Tarif edebilir misiniz?

Sonda: Destek sistemi analiz aşaması için size neler sağlamalı? (Kaynak, örnek, taslak, vb.)

Sonda: Destek sistemini kullandığınızda bu sistemden analiz aşaması için sonuçta size ne sunmasını beklersiniz?

Şimdi birazda öğretim materyalinin <u>tasarlanması ve geliştirilmesi</u> aşamasında yaşamış olduğunuz olumlu ya da olumsuz olan deneyimlerinizden bahsetmek istiyorum.

5. Öğretim materyalinin kazanımlarının geliştirilmesi aşamasını performansınız açısından değerlendirebilir misiniz?

Sonda: Analiz aşamasında elde ettiğiniz veriler doğrultusunda kazanımlarınızı nasıl geliştirdiniz?

Sonda: Kazanımları geliştirirken gerek konu içeriği gerekse teorik açıdan (kazanım nasıl yazılır?) Zorluk yaşadınız mı? Eğer yaşadı iseniz bunu nasıl aştınız?

6. Öğretim materyalinin içereceği motivasyon ve geribildirim öğelerini nasıl tasarladınız?

Sonda: Motivasyon öğeleri için bir model/teori kullandınız mı?

Sonda: Bu öğeleri belirleyip materyalinize yansıtmak konusunda bir sıkıntı yaşadınız mı? Bu sorunu nasıl aştınız?

- Öğretim materyalinizde kullanacağınız değerlendirme öğelerini(test, açık uçlu soru, doğru yanlış) nasıl seçtiniz ve hazırladınız?
 Sonda: Bu değerlendirme öğelerini geliştirirken herhangi bir yardıma ihtiyaç duydunuz mu? Duyduysanız nasıl bir yardım aldınız ya da almak istersiniz?
- 8. Öğretim metaryalizin görsel tasarımına karar verirken ne gibi yöntemler kullandınız? Anlatabilir misiniz?
 Sonda: Materyaldeki renk, çizgi ve görsel öğeler(resim, grafik vb.) kullanımına nasıl karar verdiniz?
 Sonda: Bu konuda herhangi bir destek aldınız mı (eğitmenden, kaynaklardan vb.)?
- 9. Eğer bu tasarlama ve geliştirme aşamasında size destek olan bir performans destek sistemi (yazılım) olsaydı, bu sistemin ne gibi özellikleri olmasını isterdiniz?

Sonda: Kazanımların geliştirilmesinde nasıl bir destek size yardımcı olurdu?

Sonda: Motivasyon ve geribildirim öğelerinin geliştirilmesinde nasıl bir destek size yardımcı olurdu?

Sonda: Öğretim materyalinin değerlendirme öğelerinin tasarımında nasıl bir destek isterdiniz?

Sonda: Sizce görsel tasarıma karar verirken size nasıl bir destek verilmesi başarınızı artırırdı?

Şimdide biraz tasarlamış olduğunuz öğretim materyalinin <u>uygulama ve</u> <u>değerlendirme</u> aşaması hakkında konuşalım.

10. Geliştirmiş olduğunuz materyalin hangi koşullarda uygulanacağına nasıl karar verdiniz?

Sonda: Öğretmenin ve öğrencinin uygulama esnasındaki rolünü nasıl belirlediniz?(Aktif, pasif)

Sonda: Uygulama ortamını nasıl belirlediniz? (sınıfta öğretmenle, evde tekrar aşamasında, uzatan eğitim de vb.)

11. Geliştirmiş olduğunuz öğretim materyalinin uygunluğunu hangi parametreleri göz önünde bulundurarak değerlendirdiniz?

Sonda: Kullandığınız içeriğin uygunluğunu ve sunduğunuz eğitimin kalitesini nasıl ölçtünüz?

Sonda: Geliştirdiğiniz öğretim materyalinin görsel kalitesi ve kullanılabilirliğini nasıl ölçtünüz?

Sonda: Öğretim materyalini geliştirirken seçtiğiniz öğretim ilke ve metotlarının uygunluk olup olmadığını nasıl ölçtünüz?

- 12. Değerlendirme için hangi metotları kullandınız? Değerlendirme metotlarının seçimi, uygulaması ya da değerlendirilmesi konusunda yardıma ihtiyaç duydunuz mu?
- 13. Değerlendirme sonuçlarını öğretim materyalinize yansıttınız mı? Nasıl?
- 14. Materyalinizi uygulama ve değerlendirme aşamasında size destek veren bir yazılım olsa idi bu yazılımdan neler beklerdiniz?
 Sonda: Uygulama alanı ve yöntemi seçiminde nasıl bir destek performansınızı artırırdı?
 Sonda: Değerlendirme aşamasında nasıl bir destek sizce performansınızı artırırdı?
- 15. Son olarak bir öğretim materyali gerçekleştirmek uzun ve meşakkatli bir iş. Bu süreçte çok çalıştınız. Yeni karşılaştığınız birçok kavram ve uygulamanız gereken süreçler oldu. Baştan sona yaşadığınız bu dönemi göz önünde bulundurursanız, size bu süreçte destek verecek, performansınızı arttıracak bir yazılım olsaydı ondan neler beklerdiniz?

Sonda: Kullanım açısından neler beklerdiniz?

Sonda: İçerik açısından neler beklerdiniz?

Bu çalışmaya katıldığınız ve değerli deneyimlerinizi benimle paylaştığınız için teşekkür ederim...

APPENDIX B

INTERVIEW QUESTIONS OF THE INTERVIEW 2

Merhaba,

Her şeyden önce görüşmeyi kabul ettiğiniz için teşekkür ederim. Bu araştırmanın amacı, deneyimsiz öğretim tasarımcıların bir tasarım modeli kullanarak öğretim tasarımı yapmasını sağlayacak bir elektronik performans destek sistemi oluşturmaktır. Bu görüşme sorularına verdiğiniz cevaplar doğrultusunda bu sistem geliştirilecektir.

Açıklamalarınız sadece bu araştırma için kullanılacaktır. Adınız ve kişisel bilgileriniz araştırma raporunun hiç bir yerinde geçmeyecektir ve kişisel bilgileriniz kesinlikle gizli tutulacaktır. Araştırma sonuçlandığında dilerseniz size araştırmanın sonuçları hakkında bilgi verilecektir. Görüşmeyi izin verirseniz kaydetmek istiyorum. Bunun sizce bir sakıncası var mı? Bu görüşmenin yaklaşık yarım saat süreceğini tahmin ediyorum. İzin verirseniz sorulara başlamak istiyorum.

Görüşme Soruları

A. Demografik sorular

- 1. Daha önce herhangi bir öğretim materyali geliştirdiniz mi? Sonda1: Ne tür eğitsel materyaller geliştirdiniz?
 - i. Hangi yaş grubu için hazırladınız?
 - ii. Konusu ve amacı neydi?
 - Sonda2: Tasarım yaparken hangi metod ve araçlar kullandınız?
 - iii. Nasıl tasarladınız? Herhangi bir öğretim tasarım modeli kullandınız mı?
 - iv. Öğretim materyali hazırlanırken kullanılan model? nelerdir? ? karşılaştır mısınız? Hangi durumlarda hangisi tercih edilmeli? Neden?
 - v. Öğretim Materyali hazırlanırken öğretim tasarım modeli kullanılması sizce gerekli mi? Neden?

2. Öğretim materyali geliştirme konusunda kendinizi hangi düzeyde görüyorsunuz? Neden? Kendi düzeyinizi tamınlar mısınız? Neler yapabiliyorsunuz ve ne tür eksikleriniz var.

B. EPSS' in içeriği hakkındaki sorular

1. Öğretim materyali geliştirme sürecinde www.epss.gen.tr adresindeki siteyi kullandınız mı? Nasıl?

Sonda 1: Hangi aşamalarda nasıl kullandınız? Projeniz sürecinde size bir faydası oldu mu?

Sonda 2: Eğer kullanmadı iseniz, neden? Site size neler sunsaydı kullanmayı tercih edersiniz? Sitede neler olursa daha faydalı bir site olur?

Sizin bu siteden beklentileriniz nelerdi?

Siz böyle bir site yapsaydınız? İçinde neler olurdu? Neden?

Öğretim materyali hazırlamanın aşamaları sizce nelerdir? www. epps.gen.tr sitesi sizce öğretim materyali hazırlanırken hangi aşamalarda kullanılabilir? Neden? Ve nasıl?

2. Biraz daha detaya inersek, analiz aşamasında www.epss.gen.tr adresindeki siteyi kullandınız mı? Nasıl?

Sonda 1: Hangi basamaklarda (hedef, içerik, öğrenen, ortam analizleri) nasıl kullandınız? Analiz sürecinde size bir faydası oldu mu?

Sonda 2: Eğer kullanmadı iseniz neden? Site size neler sunsaydı kullanmayı tercih edersiniz? Siz böyle bir siteyi tasarlasaydınız nasıl olurdu? Ne tür farklılıklar olurdu? Neden?

3. Design&Development aşamasında www.epss.gen.tr adresindeki siteyi kullandınız mı? Nasıl?

Sonda 1: Hangi basamaklarda(motivasyon öğelerinin belirlenmesi, feedback oluşturma, değerlendirme araçlarının geliştirilmesi, görsel tasarım) nasıl kullandınız? Design & Development sürecinde size bir faydası oldu mu?

Sonda 2: Eğer kullanmadı iseniz, neden? Site size neler sunsaydı kullanmayı tercih edersiniz? Siz böyle bir siteyi tasarlasaydınız nasıl olurdu? Ne tür farklılıklar olurdu? Neden?

4. Değerlendirme aşamasında www.epss.gen.tr adresindeki siteyi kullandınız mı? Nasıl?

Sonda 1: Hangi basamaklarda(değerlendirme araçlarının tanımlanması, ön değerlendirme ve son değerlendirme) nasıl kullandınız? Analiz sürecinde size bir faydası oldu mu?

Sonda 2: Eğer kullanmadı iseniz neden? Site size neler sunsaydı kullanmayı tercih edersiniz? ? Siz böyle bir siteyi tasarlasaydınız nasıl olurdu? Ne tür farklılıklar olurdu? Neden?

EPSS' ten beklentiler

1. Size sunulan EPSS'i içerik açısından değerlendirebilir misiniz?

Analiz, Design, Development, Implementation ve Evaluation basamaklarını ayrı ayrı düşünürsek bu aşamalarda size sunulan içerik ve destek ihtiyacınıza cevap verdi mi? Nasıl?

Sonda 2: Öğretim tasarımı esnasında Tercih edeceğiniz ideal destek nasıl olabilirdi? Tarif edebilir misiniz?

2. Size sunulan www.epss.gen.tr'ı görsel olarak nasıl değerlendirirsiniz? Siz nasıl tasarlardınız? Neler olmasını tercih ederdiniz neden?

3. Öğretim sistemi tasarımı sürecinde deneyimsiz öğretim sistemi tasarımcılarına yardım edecek bir destek sistemi olması beklentisi ile geliştirilen bu sitenin amacına daha iyi hizmet etmesi için sizce sahip olması gereken içerik, arayüz özellikleri ve diğer özelliklerinden bahsedebilir misiniz? Siz olsaydınız nasıl tasarlardınız? Neden?

APPENDIX C

INTERVIEW QUESTIONS OF THE INTERVIEW 3

Merhaba,

Görüşmeyi kabul ettiğiniz için teşekkür ederim. Araştırmanın amacı, ogret.ceit.metu.edu.tr sitesinde kullanımınıza sunulan Ogret'in öğretim materyali tasarlama sürecinizde performansınıza olan etkilerini ortaya çıkarmaktır.

Açıklamalarınız sadece bu araştırma için kullanılacaktır. Adınız ve kişisel bilgileriniz araştırma raporunun hiç bir yerinde geçmeyecek ve kişisel bilgileriniz kesinlikle gizli tutulacaktır. Araştırma sonuçlandığında dilerseniz size araştırmanın sonuçları hakkında bilgi verilecektir? Bu görüşmenin yaklaşık yarım saat süreceğini tahmin ediyorum. Görüşmeyi izin verirseniz kaydetmek istiyorum. Görüşmeyi istediğiniz aşama da bitirebilirsiniz. Bunun sizce bir sakıncası var mı izin verirseniz sorulara başlamak istiyorum.

Demografik sorular

- 3. Daha önce herhangi bir öğretim materyali geliştirdiniz mi? **Sonda1:** Ne tür eğitsel materyaller geliştirdiniz?
 - i. Hangi yaş grubu için hazırladınız?
 - ii. Konusu ve amacı neydi?
- 4. Tasarım yaparken hangi metod ve araçlar kullandınız?

Sonda1: Nasıl tasarladınız? Herhangi bir öğretim tasarım modeli kullandınız mı?

- 5. Öğretim Materyali hazırlanırken öğretim tasarım modeli kullanılması sizce gerekli mi? Neden?
- 6. Öğretim materyali geliştirme konusunda kendinizi hangi düzeyde görüyorsunuz? Neden? **Sonda:** Kendi düzeyinizi tanımlar mısınız? Neler yapabiliyorsunuz ve ne tür eksikleriniz var.

Ogret'in Detaylı Değerlendirilmesi

1. Ogret'de size sunulan <u>"Proje Yönetimi/Project Management"</u> kısmını kullandınız mı? Nasıl?

Sonda 1. Bu bölüm sizce hangi konularda kullanılmalı? Neden? Sonda 2. Bu bölüm sizce nasıl kullanılmalı? neden?

Ogret'de size sunulan soruları nasıl değerlendiriyorsunuz?
 Sonda 1. Sizce anlatımları nasıl?
 Sonda 2. Aşamaları (analiz, design, development, implementation ve evaluation) tamamlamak için yapmanız gerekenlerin size soru yolu ile sunulması konusunda ne düşünüyorsunuz?

Sonda 3. Soruları cevaplamakta zorluk yaşadınız mı? Anlatır mısınız.

Soruların cevaplanması için size sunulan yardım seçeneklerini(açıklama, örnek, video) kullandınız/incelediniz mi?
 Sonda 1. Açıklamalar nasıldı? Siz tasarlasanız nasıl yapardınız?
 Sonda 2. Örnekler nasıldı? Siz tasarlasanız nasıl yapardınız?

Sonda 3. Videolar nasıl? Siz tasarlasanız nasıl yapardınız?

- 4. Forum hakkında ne düşünüyorsunuz? Kullandınız mı?
- 5. Rapor oluşturma kısmını kullandınız mı? Nasıl?
- **6.** Genel olarak Ogret'in arayüzü hakkında ne düşünüyorsunuz? Önerileriniz var mı?

Ogret'i kullanılarak geliştirdikleri proje hakkında

- **1.** Bu dönem CEIT 225 dersinde geliştirdiğiniz eğitsel materyali nasıl geliştirdiniz? Analiz, design, development, implementation ve evaluation aşamalarında neler yaptınız? Anlatır mısınız?
- 2. Proje sürecinde hangi görevleri yerine getirdin?(Raporların yazımı, broşürün geliştirilmesi, flash materyalinin geliştirilmesi vb.)
- 1. Bu dönemki projenizi geliştirirken Ogret'i kullandınız mı? Nasıl?
- 2. Ogret'in projenizi tamamlamanız konusunda olumlu ya da olumsuz bir katkısı oldu mu? Nasıl?
- 3. Ogret'i başka bir projede de kullanmak ister misin? Nasıl?
- 4. Ogret'in daha faydalı ve etkili olması için sisteme neler eklenmeli? Açıklayınız.
- 5. Ogret'in daha faydalı ve etkili olması için sistemden çıkarılması gereken şeyler neler? Açıklayınız.
- 6. Sizce Ogret deneyimsiz öğretim tasarımcılarına öğretim sistemi tasarımı konusunda yardımcı olabilir mi?

Sonda: Ogret'in deneyimsiz öğretim tasarımcılarına hangi konularda yardımcı olacağını düşünüyorsunuz? Açıklayabilir misiniz?

- 7. Öğreti siz tasarlasaydınız nasıl tasarlardınız? Neden?
- 8. Sizce Ogret 225 dersi ile birlikte nasıl kullanılmalı?
- 9. Eklemek istediğiniz herhangi bir öneri/istek ya da yorumunuz var mı?

APPENDIX D

AN EXAMPLE OF TRANSCRIBED AND CODED INTERVIEW

Interview

Codes

F: Her şeyden önce görüşmeyi kabul ettiğin için gerçekten teşekkür ediyorum. Bu araştırmanın amacı deneyimsiz öğretim tasarımcılarının bir tasarım modeli kullanarak öğretim tasarımı yapmasını sağlayacak bir elektronik performans sistemi geliştirmek eğer işte bu topladığım interview verileri ikinci dönem farklı calısmalar da olacak bunlardan elde ettiğim sonuçlar doğrultusunda bir akıllı sistem geliştirmeye çalışıyorum. 323 dersi alan öğrenciler işte materyal tasarımı geliştirmek isteyen öğrencilere bu sürecte vardım edecek gerek iste bilgi sağlayacak, gerek o süreci yaparken işte adım adım ilerlemelerini sağlayacak bir sistem yapmaya çalışıyorum. Bu sistemin ihtiyaçlarını belirlemeye çalışıyorum. Bu araştırma için kullanılacak verdiğin bilgiler. Adın ve kisisel bilgilerin kimse ile paylaşılmayacak. Herhangi bir sekilde notunu etkilemeyecek. .

Öncelikle şunu öğrenmek istiyorum. Eğitim materyali tasarımı ile ilgili daha önce herhangi bir ders aldın mı? I: Aldık.

F: Hangi dersleri aldın?

I:Kürşat hocanın 225 dersini aldık. Daha öncesinde de 207 handout, video, webpage dersi vardı. Adını tam hatırlayamayacağım ama orda da işte daha küçük çaplı. <u>Orada bir broşür hazır...şey poster</u>

Types of instructional materials: text-base, handout, video, webpage hazırladık, bir print materyal hazırladık (hi hi) handout gibi

(kitapçık gibi) kitapçık gibi bir tane de eee video hazırladık.

Birde web sitesi hazırladık o dersi anlatan.

F: Kürşat hocanın dersinde ne yaptınız?

I: Kürsat hocanın dersinde herkes bir konu secti internet güvenliği ile ilgili. Ben mesela online alışveriş güvenliği ile ilgili bir konu sectim. O konu ile ilgili önce bir brosür hazırladık, handout şeklinde, sonra eee, bir küçük çapta bir animasyon gibi flash animasyonu flash base material. Cok animasyona benzemedi bizimki. İnteraktif olmadı daha çok sey gibi oldu ama kitap gibi. Bir de video yaptık.

F: Grup projesi miydi onlarda?

I: değil. Bireysel

F: Bireyseldi

I: o bayağı zor olmuştu. Birde ilk defa biz böyle raporları filan görünce (hi hi) biraz zorlanmıştık. (zorlanmıştınız)

F: peki hangi yaş grubu için hazırlamıştın? Konunuz, amaçları neydi hatırlıyor musun?

I: Konu online alışveriş güvenliğiydi benimki. Yas grubunu biraz geniş tutmuştum ben. Hani kredi kartı sahibi olan, kullanıcılar için 18 ile 45 yaştı galiba benimkinin aralığı. Hani birde internete alışkın olan, internetle haşır neşir olan grup mesela 50 yaşın üstündekiler çok fazla Interview olmaz diye 18 ile 45 yaş arası daha çok üniversite öğrenciler arasından. Hatta interview yapmıştım. Bir arkadaşımla. Üniversite öğrencisiydi oda.,

F: peki tasarım yaparken herhangi bir metod, araç kullandın mı? Mesela eğitsel metotlar ya da ADDIE model gibi model kullandın mı? Kullanırken bir zorluk yaşadın mı? Nedir ne değildir?

I: Geçen sene ADDIE modeli kullandık. Kürşat Hocanın dersinde Hani adım adım gitmeni sağlayacak şekilde öğretti bize. İşte ADDIE, Analiz, Design, Development, ondan sonra Implementation and Evaluation. Ondan önce ASSURE model diye bir şey kullanmıştık. Hepsi özünde Perspective aynı galiba bunların. Hepsinin sıralaması aynı.

F: Hemen hemen mantıksal problem çözme basamakları.

I: Geçen sene bir hocamızda gelmişti işte. Instructional 111 nasıl diyim. Eğitim metaryali tasarlayan bir şirkette çalışıyormuş. Oda öyle söylemişti. Hani hangisini kullanırsanız kullanın hani sıralama pek değişmez, ama o sıralamayı bilmeniz önemli olan. Nasıl bir sıra ile gideceğiniz demişti. Onda pek zorlanmadık. Kürşat Perspective hocamız gayet iyi açıklamıştı.

F: Peki bir model kullanmakta senin için zorluk olmuş model: difficult to apply,

Design of instructional material: choosing topic Types of instructional material: text-base. handout, animation, video Interactivity

Design of instructional material: choosing topic, target group

Instructional design model: ADDIE, ASSURE

Perspective about instructional design model

about instructional design model

about instructional design
muydu. Daha önce.	necessary to use
I: Aslında kullanırken zor geliyor ama daha sonra	
düşününce hani onu kullanmasam afallar mıydım diye	
düşünüyorsun, kullanmamız iyi oldu yani.	
F: Anladım. Şimdi bu en son geliştirdiğin öğretim	Analysis
materyalini düşünelim. Onun üzerinden gidelim şimdi.	Choosing topic
Onun analiz aşamasında neler yapmıştın? Merak ediyorum.	Need analysis
Analiz asamasında neler yaptın onu bir anlatır mısın kısaca	relevance
bana.	
I: Analiz aşamasında biz grup olarak konuyu belirledik	Division of labor
önce. Bir arkadasımız gitti, bir matematik öğretmeni	
tanıdığı vardı. Onla sey interview yaptı. Röportaj,	Peer evaluation, feedback
interview yaptı. Ee ondan sonra çocukları nişine yarayacak	of the facilitator
bir konu secelim dive. Önce ücgenler secmistik. Sonra	
dedikti hani bu cok da sev değil hani cocuklar zorlanmıyor.	Revision
Cember ve daire dive bir konu sectik. Sonra konu pavlasımı	
yaptık biz. Analiz raporundaki bölümler hakkında. Herkes	
kendi bölümünü vazdı en son iste hepimiz diğerlerinin	Source of data: student,
bölümlerini okuduk. Yani hepimiz olmasa da okuduk. (hi	teachers
hı). Düzeltilmesi gereken yerler varsa sizin de verdiğiniz	Need analysis
feedbackler doğrultusunda düzeltmeye çalıştık.	Students' need
F: Peki mesela ihtiyaç analizini nasıl uyguladınız? Bu	
uygulama sürecinde herhangi bir zorluk yaşadınız mı?	
I: İhtiyaç analizinde işte hoca ile yaptığımız ve öğrencilerle	
de (student, teacher) . 8A sınıfıydı galiba Hamdullah Suphi	
İÖO'nun. O öğrenciler hani şu derste şu konuyu yaparken	
zorlanıyoruz filan derken o zorlandıkları iki konuyu	
belirledik. Biz onların arasından birini seçtik. Birde hoca	
da dedi. İşte çocuklar bu konuları anlarken zorlanıyorlar	Student's need
hani ek materyal olsa daha da kolaylaşabilir anlamaları	
diye. Biz ona göre seçtik. İhtiyaç analizini öyle yaptık.	
F: Peki hem öğrencilerin hem de öğretmenlerin ihtiyaçlarını	
göz önünde bulundurdunuz mu? Yani iki açıdan da baktınız	
mı?	
I: ikisinin ortak zaten iki tane çıktı. İkisinin ortak	Content analysis
olanlarından birisini seçtik. Hani öğrenciler daha da fazla	Source of content
söyleyebiliyorlar, şu da zor bu da zor diyebiliyorlar ama	Formative evaluation
öğretmenler bir kaç tane söylüyorlar. Bunlarda	Text book, Subject matter
zorlanıyorlar diye. İkisinin ortak noktasında ki konuyu	expert
seçtik biz.	
F: Peki, içeriğe nasıl karar verdiniz? Bu süreçte herhangi	
bir sorun yaşadınız mı?	
I: İçeriğe karar verirken biraz sorun yaşadık. Eee önce biz	
MEB MEB MEBin curriculumundan baktık. Her şeyi	
ayarladık en son işte formative evaluation almaya gidince	

Safure hocamızın yanına o biraz sorunlu olabilir dedi. Keşke başta gitseydik. Amaa (süre yetmemiştir belki). Ama yani hemen hemen aynı aşağı yukarı şeyler. Biz MEBin curriculumuna göre bide Milli Eğitim Bakanlığının kullandığı kitabın içeriğine göre gittik daha çok.

F: Peki Safure hoca nasıl bir sorundan bahsetti.

I: sorun değilde de galiba o yeni hazırlıyormuş galiba Interview yeniden kendisi hazırlıyormuş. Bunları da kullansaydınız observatio keşke dedi. Hani biz olmayınca MEB programında onlardan bahsedemedik.

F: Anladım, ama zaten sizin güncel olan programa göre yapmanız gerekiyordu. Siz doğru olanı yapmışsınız. Peki, öğrencinin analizini nasıl yaptınız?

I: Öğrencinin analizi. (Learner analizde) Ee onda da yani Türkiye'deki şartları göz önüne aldık. Birde eğitim psikolojisi dersinden kalan bilgilerimiz vardı. O yaş grupları var. Piaget'in ayırdığı yaş grupları filan. Onlara göre yaptık biraz. Hani bilimsel yanının onlara göre. Pratik yanı da, y ani pratik derken hani oradakilerin aynısı olmayabilir. Hani o yüzden yaptığımız interview sonucu çocuklarda gözlemlediğimiz, çevremizde gözlemlediğimiz çocuklara göre biraz bir şeyler yazmaya çalıştık. Birde Expected Türkiye şartlarına göre.

F: anladım. Peki, bu analiz aşamasında mesela size destek eden, destek veren bir akıllı sistem olsaydı. Yazılım tarzında bu sistemin ne gibi özellikleri olmasını isterdiniz. Neler olsaydı bu süreç sizin için daha kolay, daha verimli geçerdi?

I: Mesela

F: Mesela parça parça düşünelim. Mesela ihtiyaç analizi sürecinde size neler sunmasını isterdiniz böyle bir şey programın?

I: İhtiyaç analizi. Ya ihtiyaç analizi yaparken mesela soru, ne gibi sorular üretebileceğimizi veya ne gibi metotlar üretebileceğimizi söyleyebilir bize.

F: soru derken interview soruları mı?

I: Mesela interview yapılırken biz mesela zorlandık. Ne sorsak acaba diye. Mesela o <u>örnek sorular olabilir</u>. Veya örnek bir interview olabilir. Veya hangi metotları kullanacağımızı bunu kullanırken. Mesela biz kafamıza göre interview dedik, gittik. Ama başak bir metod yararlı olabilirdi belki. Mesela onları bilmiyoruz biz. Biz daha kolay olur diye interview yaptık dedik.

F. Anladım. Peki, içerikte mesela nasıl şeyler sunmasını istersin.

Learner analysis Literature Interview observation

Expected features of EPSS, sample interview questions

Sample interview question Sample interview Information about methods

Current curriculum Activity examples Facilitating

I: içerikte güncel. Programları, güncel curriculumları bize sunabilir. Ve ekstradan şu etkinliği de yapabilirsiniz diye bize sunabilir. Biz direk kitaptaki etkinliklerden bahsetmek zorunda kaldık. Veya bize akıl verebilir. Hani şöyle yapsak daha mı iyi olur gibisinden.	Organizing content	
F:Peki içeriği parçalamakta sorun yaşadınız mı?		
I: içeriği parçalamakta,		
F: anlamlı parçalara, sonuçta siz küçük bir materyal yapıyorsunuz belli kazanımları kullanacaksınız mesela o anlamlı bütünü oluşturmakta zorlandınız mı? Ya da nasıl oluşturdunuz? I: o anlamlı bütünü. Biz şöyle sınıflandırdık. İşte çember, daire bunların yardımcı elemanları var. Ee açılar var. Üç ana başlıkta topladık bir önce. Onların her birine işte etkinlikler, konu anlatımı ekledik. Aslında biraz zor oldu diyebilirim. Çünkü iki taneydi bizim. İşte konseptimiz. Çember ve daire. İkisini de parça parça yapmak biraz zor oldu. (İçeriğiniz çok oldu o zaman di mi?)İçeriğimiz hani çok gibi gözüküyor. Aslında içinde de pek bir şey bulamadık biz yaparken	Learner analysis Features of EPSS: information about learners, characteristics of students Turkish literature	
F: anladım. Peki, öğrenci analizinde nasıl yardımı olabilir	Context analysis	
size?	,	
I: <u>öğrenci analizinde</u> 11. Türkiye'deki eğitim mesela. Türkiye'deki eğitim sistemindeki öğrencilerden biraz bilgiler yarabilir biza Hani biza algılda yani bizim algılda	Place Implementation	
nasıl söylesem kitapları okurken eğitim psikolojisi alırken hep böyle Amerika'da ki eğitim sistemi üzerinden gidiyoruz. (evet) Türkiye'dekini biz biliyoruz ama daha psikolojik açıdan nasıl acaba (daha literatür açısından nasıl onu) evet onu cok iyi bilemiyoruz biz	Supplementary material, main material	
F: Peki context analiz sürecinde neler olsa iyi olurdu? Yani bu süreçte mesela contexti analiz ederken size nasıl	Decision about material type	
I: contexde , eee mesela context bizim materyalimizin bütün hali, nasıl bir sıralamayla gittiğimizi, nasıl bir sıralamayla gidebileceğimizi gösterebilir bize (context		
nerde uygulanacağı, yer.) hı anladım (hani yeri seçip, yeri ortam şartlarını) biz şöyle belirledik onu. Okulda diye belirledik işte .okulda öğretmen gösterecek, öğrenciler evde uygulayacaklar. Geçen sene yaptığımızda yine öyle	Decision about material type	
yapmıştım. Biz şöyle düşünüyoruz yani kitap ana materyalimizdir. Ondan işleriz, bunlar yardımcı materyaldır . Belki bu da ana materyal olabilir. F: Tabi	Web base material	
I: Bunun farkını kavrayamıyoruz işte biz . Hepsini yardımcı		

materyal olarak alıyoruz.

F: Yani ana materyal yapsanız ne içerir onu mu tam bilemiyorsunuz? Yani ana materyal ile yardımcı materyal arasındaki farkı mı?

I: Mesela hangi konular ana materyal olarak kullanılabilir mesela. Onu çok iyi kavrayamıyoruz.

F: Anladım. Peki, contexti seçerken hiç uzaktan eğitim filan düşündünüz mü?

I: Şey dedik de internette bir sitesi olacak o dersin . Hoca hazırlayacak veya okuldaki birisi hazırlayacak. Oraya Features koyacak. İste evde interneti olanlar evde tekrarını yapıp sorusunu çözebilecek, vitamin gibi . İnterneti olmayanlarda işte internet kafelerde ve va okulda. okuldaki bilgisayarlarda kullanmaları sağlanacak dive düşündük(anladım) Birde ilk dersi anlatırken ilk hoca bilgisayar laboratuarında anlatacak diye düşündük biz. F: Anladım. Peki, mesela bu size yardımcı olacak sistem ee Assesment items analiz aşamasında sizi nasıl yönlendirsin isterdin. Yani mesela arayüzü nasıl olmalı? Sizi yönlendirmeli mi yoksa öneri mi sunmalı? Ya da farklı bir sekilde mi yardımcı olmalı. Yani yardım etme şeklini nasıl düşünürdün? I: Analiz asamasında, Konu sınırlandırmasında mesela . Konuyu nasıl sınırlandıracağımızı veya ne gibi boyutlarda examples olacağını, olacağı konusunda bize yardımcı olabilir . Bide hangi konu mesela. Matematikte biz oyun ya.. oyun hazırlarken çok zorlandık. Ne gibi oyunlar olabileceği examples konusunda bize yardımcı olması (örnek sunması açısından)(Baş sallayarak onayladı.). Assesment kısmı hakeza. Oda biraz zorlandığımız yerdi. Mesela hangi topic konuya ne gibi sorular hazırlanabilir? Bu konuda bizi yönlendirebilir yönlendirmesi iyi olurdu yani. F: Peki nasıl yönlendirici tarzda mı? Kontrol programda mı

olsun isterdin, yoksa sizde mi olsun?

- I: O bize yol göstersin biz ona göre seçelimcontentF: Seçelim veya seçmeyelim.target groI: Bize örnekleri sunabilir meselatarget gro
- F: anladım. Mesela analiz aşamasında size neler sağlasın isterdin? Mesela kaynak, örnek, taslak, ya da bu tarzda şeyler.
- I: Örnek. Örnek olsa çok güzel olur.(13:42)
- F: Peki materyal örneği mi? Yoksa O aşamanın örneğini mi? Bitmiş bütün bir örnek mi yoksa o analiz aşamasında

I: Mesela o analiz aşamasında ne yapacağımız belli, hani konuyu neye göre seçeceğimizi bize bildirmesi lazım. (hı hı) biz mesela hani neye göre seçeceğimizi çok iyi

Analysis EPSS: of organizing content, topic Educational game examples interaction with EPSS target group instructional approach

bilmiyoruz. Mesela şeyi yapmıştık başta. Acaba hangisini yapsak materyal hazırlarken daha kolay olur bize diye düsündük. Yani o konuda nasıl bir ko... konuyu nasıl sececeğimizi bize gösterebilir. Eee nelerden bahsedeceğimizi, nelerden bahsedebileceğimizi söyleyebilir. Yaş aralığını mesela, yaş aralığını sınırlandırmayı, mesela bizim konularda yaş aralığı belliydi ama mesela bazı konular olabilir orda yaş aralığı daha genis, daha dar olabilir. Onu daraltmamızı gösterebilir Başka... bide işte şeyleri gösterebilir. Hani bunu nasıl anlatsan daha güzel olur. Sevi mesela instructional approachu (hıhı) konuya göre nasıl, ... konuya göre ona Feedback uygun instructional approach önerebilir bize. (anladım) bizde hazırdı ama hazırda olmayabilir di. F: Hazır olmasavdı zorluk mu cekcektiniz? I: zorluk çekebilirdik. Cünkü geçen senede hazırdı gerçi de. Hazır olmasaydı evet zorluk çekebilirdik. F: Anladım peki mesela bu destek sistemini kullandın, işte analiz asamasında. Sonuç olarak sana ne sunsun isterdin? Yani sadece örnekler mi versin? Yoksa sonuçta hani senin eline bir döküman mı versin? Eğer öyle bir sey istiyorsan o doküman nasıl bir şeye benzesin. Hani sonuçta sana ne Examples, samples sunsun ki sana yardımcı olur? I: Sey gibi mesela biz, ihtiyaçlarımızı yazacağız o bize rapor sunacak o sekilde bir sey mi? F: Yani her sey olabilir. Sence hangisi seni daha destekler. Bu süreci daha verimli geçirmeni sağlar? Sadece benim ihtiyacım olan şeyleri I: orada bulabileceksem, böyle rapora filan gerek yok. Ama eee bize ihtiyaçlarımızın ne olduğunu bildirip o bize geri feedback verse o da güzel olabilirdi yani. F: Nasıl yani mesela atıyorum, aaa kullanıcının ihtiyaçlarını Writing objectives girdin. Öğretmenin ihtiyaçlarını, öğrencinin ihtiyaçlarını girdin. I: O bir sonuç olarak rapor olarak mı verecek bize? F: o senin tercihine bağlı. Sen ne istersin yani? I: Anket gibi olacak o zaman. Hani orda belki şey olabilir yani, yanılma olabilir. Bizim verdiğimiz cevaplar çelişebilir bazı birbirleriyle. Birde hazır sorular olduğu için bizim ihtiyacımız olmayan sorularda olabilir belki. O yüzden bize örnek vermesi, örnek göstermesi veya bizim aradığımız örneği orda bulabilmemiz daha mantıklı olur herhalde. F: Anladım. Şimdi birazda design ve işte development asamasını düşünerek devam edelim. Simdi öğretim materyalinin kazanımlarının geliştirilmesi aşamasında

performansın nasıldı mesela? Bu konuda kendini değerlendirebilir misin? Kazanım yazma açısından, belirleme acısından.

I: Kazanım yazarken yine her zaman olduğu gibi şeyden Writing objectives yararlandık. MEB in programından. Biz kendimiz de tabi genişlettik onları. Bazıları mesela etkinlik var, etkinliğe bakıyoruz, hani oda kazanım gibi. O etkinliği yapınca ondada bir kazanım elde ediyoruz. Kazanımları zaten başta yazdık, ona göre de hazırlamaya çalıştık, Kazanım yazarken konuya hakim olmadığımız için biraz zorlanabiliyoruz. (ee subject expert olmadığınız için mi) Evet. İste orda da Writing objectives matematik öğretmenlerinden ve Safure hocamızdan yardım almaya çalıştık.

F: Anladım, peki analiz aşamasında elde ettiğiniz veriler doğrultusunda kazanımları geliştirebildiniz mi? Yani o analiz raporunuzdaki, raporunda elde ettiğiniz sonuçları designda developmentta o kısma iletebildiniz mi?

I: kazanımlarımızı sonuçta yani başarabilmek için. Öğrencilere aktarabilmek için, contenti ona göre hazırladık zaten. Soruları da ona göre hazırladık. Eee yaptığımızı düşünüyorum ben.

F: Peki kazanımları geliştirirken mesela teorik açıdan Feedback kazanım nasıl yazılır, falan onlarla ilgili zorluk yaşadınız mı?

I: Ya birinci sınıftan beri bununla uğraştığımız birinci demeyimde ikinci sınıftan hani baya birçok derste bununla uğraşıyoruz, hatta hala uğraşıyoruz. Bu yüzden kazanım zorlanmıyoruz yani bu projede çok yazarken artık zorlanmadık. Geçtiğimiz projede çok zorlanmıştık. Kürşat hocanın diğer 225 te.

F: mesela o zaman ne açıdan zorlanmıştın?

I: İşte kazanımın nasıl yazılacağını bilmiyordum. İşte kazanım yazarken çeşitli şeyler var. İşte bir kriter olması lazım, bir sınırlandırma olması lazım. (18:33) eee işte ne şartlarda oluyor bu kazanım? Bide bir şu kazanım fiilleri var. (H1h1). Onları biz çok iyi bilmiyorduk. Direk götürünce bunlar olmaz dediler. (Anladım). Baştan kazanım yazmayı bilmiyorduk. Evet.

F: Anladım. Peki, öğretim materyalinizi bu son yaptığınız materyali geliştirirken içeriğinde olacak olan motivasyon ve geri bildirim öğelerini nasıl tasarladınız? Hani bir model/teori kullandınız mı?

I: raporda ben o kısmı yazmadığım için çok iyi hakim değilim o kısma ama. (19:11)ARCS modelini kullandık. Orda anında geri dönüt galiba ama onu başarabildik mi? feedback

Criteria, verbs

Motivation, ARCS model

Time management interactivity, sound, visual elements, game

Şöyle başarabildik . Sorularda mesela eee yanlışa tıkladığı zaman yalmış, birde doğrusunu veriyor aslında şöyle	
yapmamamız daha iyi olurdu ama zaman yetersizliğinden	Feedback
dive bir ipucu verip tekrar soruvu cözmesini sağlasavdı	Design tool
daha iyi olurdu. Bunu Safure Hocamızda böyle söyledi ama	
işte zaman yetersizliğinden onu yapamadık. EE motivasyon	
açısından da hani zaten interaktif bir materyal olduğu için	
bizim ki motivasyon elementleri genelde sesler, görseller,	
bide işte en barızı oyun.	SME facilitator
F: Aniadim. Peki, bu mouvasyon elemenuerim bennerken feedbacklere karar verirken hani ne vanacağınız konusunda	SME, facilitator
zorluk vasadınız mı? Bunlara sevaparken	Assesment items: working
I: cok zorluk yaşadık. Ee feedback biraz sıkıntılı bir konu.	examples, multiple
Hani bizde şikayet ediyoruz hocalarda düzgün feedback	choice, matching, fill in
vermiyor falan diye de. O gerçekten zor bir iş. Hani neye	the blanks
göre feedback vereceğiz, neye göre başarılı çocuk. Bir	
dogru yapınca başarısız, 4 dogru yapınca başarılı mi?	
Hani konu tekrari yan bu biz o sekilde feedbackler verdik	
Konu tekrari vap, gavet basarilisin, gibi feedbackler verdik	
ama hani bunlar ne kadar etkili çok bilmeyerek belki yaptık	
bunları.	
F: anladım. Peki, bu feedback ve motivasyon öğelerini	
belirleyip materyalinize yansıtma konusunda bir sıkıntı	
yaşadınız mi? Hani mesela nasil aştınız bunu, boyle bir sorun yarsa? Nasıl aştınız?	assesment items
I [·] Aslında belirlerken hani haval gücüvle sınırlı	assesment nems
Belirleyebiliyoruz hani şunu yapsak daha iyi olur, bunu	
yapsak daha iyi olur derken de. Ama flash bilgisi kod filan	
girince içine (hı hı) biraz zorlanabiliyoruz yani.	
F: mesela öğretim materyalinde değerlendirme öğeleri de	
kullandınız işte test, açık uçlu soru, o şekilde doğru-yanlış	
uyoulayacağınızı naşıl belirlediniz? Buna naşıl karar	
verdiniz?	
I: grupça karar verdik . De hani subject matter experte pek	
danışmadan hani sizin verdiğiniz feedbackler doğrultusunda	Visual design
hani sonda olacak sorular. Bizim sorular şöyle. Örnekler	~ .
var şeyin içinde, hani örnek sorular var ama çözümlü konu	Color
aniatimi içinde ama sonunda test kismi ayrı bir şekilde	estnetic
coktan secmeli. Karsılastırma bide sev doldurma input	
Sorusu kullandık. Hepsini birlikte verdik yani.	
F: peki hani bir teori, bir model ya da ne biliyim bir eğitsel	readable

literatürden faydalandınız mı soruları seçerken? I: Raporda yazmışızdır kesin ama yaparken biraz şey oldu galiba . (anladım) F: Peki bu değerlendirme öğelerini geliştirirken bir yardıma ihtiyaç duydunuz mu? Yani seçim aşamasında olsun, işte o değerlendirme sorularının yazılmasında olsun? I: orada da aslında şeyden faydalandık, biraz kitaptaki örneklere uygun örnekler yazmaya çalıştık. Hani tutupta orda göstermediğimiz bir soruyu sormamaya çalıştık. (Anladım.) Hani internetten bir şeyler bulup direk yapıştırmamaya çalıştık. Oradaki anlattığımız konuyla bağlantılı sorular sormaya çalıştık . Mesela çemberin elemanları dedik. Karşılaştırma sorularında hep o elemanları karşılaştırma yaptırdık	usability test peer evaluation facilitator Alignment, opposite colors		
F: Anladım. Peki öğretim materyalinizin birde görsel tasarımı vardı. Bu tasarıma karar verirken görsel olarak. Ne, hangi yöntemleri kullandınız? Nasıl karar verdiniz? Bu sürec nasıl isledi sizde?	Position of pictures		
I: görsel olarak . Hani, en önemli görsel renk. Renge aslında hani Cihangir arkadaşımız daha çok flashda o daha çok şey oldu. Hani o daha çok yaptı. O renge baktı. Hani söyledi uygun mu sizce. Bizimde gözümüze hoş geldiği için onu seçtik. Ama grup olarak karar verecektik yani. F: yani gözünüze hoş gelmesini kriter olarak aldınız. Beğenmeniz, estetik bulmanız açısından. I: yani hani renk karmaşası yoktu ve gayet seçilebiliyordu yazılar ve işte <u>usebility testi</u> de uyguladık design	Source of data: presentation, prior knowledge		
sürecinde. Hani çocuklar zorlanmadıkları için yani farketmede peer evaluationdada mesela arkadaşlarımızda gayet beğendi. Sizin verdiğiniz feedbackler doğrultusunda da hani değiştirmemiz gereken yerleri değiştirdik. Göze çok batan yerleri. F: peki hiç şey kullandınız mı? Mesela daha önceki derslerde işte çizginin önemi. Çizgiler işte ne bileyim resimler, boşluğun kullanımı, renklerin kullanımı, zıt renkler, karşıt renkler işte sıcak, soğuk renkler. I: onu 225 dersinde yine Kürşat hocamız öğretti. İşte allignment, zıt renkler filan . (24.20). ee onu kullandık. Mesela yeşil tonlarını yaptık biz. Ama mesela her yerde yeşil tonu var üstüne kalkıp mesela yeşilde belli olmayan bir renk yapmadık. Belli olabilecek bir şekilde yaptık. Resimleri de ee orantılı şekilde. Resim yazı orantılı şekilde dağıtmaya calıstık.	Features of EPSS: tutorial (Storyboard, learning objects)		
F: mesela bunları seçerken herhangi bir kaynaktan faydalandınız mı?	Learning objects		

I: Kaynaktan... şöyle faydalandık. Derste Kürşat hocamızın işlediği işte slaytlar olsun veya derste anlattıkları olsun onlardan favdalandık vani oradan öğrendiğimizden.

F: mesela bu design development asamasının tamamını düşünürsek. Böyle bir yardımcı yazılım olsaydı hani bu sistemde en çok olmasını istediğin kısımlar ne olurdu? Senin bu süreci daha kolay geçirmeni, daha verimli yaşamanı sağlaması açısından.

I: mesela bir storyboard nasıl çizilir? Neler bulunması lazım bunda? Bunları açıkça belirten bir materyal olsa daha iyi Biz mesela storyboard cizerken hani olur. bazı belirtmediğimiz yerler oldu. Veya learning object kısmımız bizim eksikti galiba. Orda mesela hani. Arkadaşımız yapıyordu onu galiba ne yapması gerektiğini tam bilememis. Bunları dahada acıklasa.

F: learning object nedir tam açık değil miydi sizin için? Tutorial (learning object) Öğrenme objesi nedir...

I: o biraz son ana kaldı bizim. Arkadaşımız yaparken herhalde tam algılayamadı. Bizde son anda kontrol ederken karıştırdık mi ne yaptık öyle bir şey oldu artık.

F. peki simdi açık mı? Mesela öğrenme objesi nedir? Hani bu konuda soru işareti var mı aklınızda?

I: Mesela Safure hoca anlatmıştı. Mesela öğrenme objeleri hani mesela bir küpü öğretirken bir onun modelini kullanma bu öğrenme objesi. Bizde nasıl olabilir. Bizde de ne olabilir?

F: Aslında öğrenme objesi Safure Hocanın söylediği gibi değil de şöyle bir şey, mesela programlamadan örnek verelim. Programlamada mesela bir kalem nesnesi yazıyorsun ve o kalem nesnesi farklı programlarda o nesneyi çağırarak kullanabiliyorsun. Hani öğrenme objesi de mesela cemberin 7. Sınıflarda öğrenilmesi konusunda bir öğrenme objesi tasarlıyorsun. Her şeyiyle. İşte ders anlatımı, testi, değerlendirmesi, oyunu, bu tamamıyla bir Implementation öğrenme objesi. Bu öğrenme objesi tamamen tanımlı olduğu için bunun attributeleri mesela hani bir fonksiyonun Student-centered attributeleri olur ya. Attributelerini düzgün bir şekilde yazdığında herhangi bir öğrenme sisteminde direk o öğrenme objesi senin işte atıyorum 7. Sınıflar için vapmıssın va senin aklındaki A sınıfı için oluvor ama bu bilmemne okulundaki bilmemne sınıfı kollanılabiliyor. Usubilitysi cok yüksek. O cünkü her şeyiyle tanımlanmış bir obje. Aynı programlamadaki nesne gibi.

I: Anladım hocam. Tamam anladım Sonradan yaptılar

Type of tutorial (animation, text) Usability

Visual design Features of EPSS: tutorial

içinde Supplementary material

galiba

F: yani o şekilde düşünürsen, kavraması daha kolay olur.

I:hı hı. İşte böyle anlatılırsa

F: peki bu anlatım şeylerinin text basemi olmasını istersin, video mu olmasını istersin, işte nebiliyim animasyon mu olmasını istersin? Hangisi senin için daha uygun olur?

I: Daha ilgi çekici olduğu için animasyon ya da video olması daha mantıklı. Tabi textide hani Kürşat hocamız bize öyle yaptırıyor. Hem animasyonu hemde text base materyali. Animasyonu her yerde açıp şey yapamayız ama diğerini kullanabiliriz her yerde.

F: peki mesela görsel tasarımda karar verirken mesela o süreçte nasıl yardımcı olmasını isterdin?

I: görsel tasarım. Bu tasarım ilkelerini, tasarım prensiplerini, biz biliyoruz da onu daha ayrıntılı bir şekilde anlatan bir doküman olabilir.

F: peki şimdi son aşama uygulama ve değerlendirmeye gelirsek, Geliştirmiş olduğunuz materyalin hangi koşullarda uygulanması gerektiğine nasıl karar verdiniz?

I: hangi koşullarda. Bunu yine şeyde hani derste hocalarımız bahsetti. İşte kullanılacak güzel bir materyal olursa diye.

Bizde şöyle düşündük. Hani önce hocamız, şey hocamız diyorum. Matematik öğretmeniyle interview yapmıştık. Orada da hani şöyle düşündük biz hoca derste bir kere gösterecek kullanımını çocuklar kendisi kullanacak diye düşündük. Yani derste sırf onun üzerinden gidilmeyecek. Öyle düşündük. Biz.

F: yardımcı materyal olarak

I: evet. Buna kendimiz karar verdik diyebilirim.

F: Başta böyle bir tercihte bulundunu ona göre ilerlediniz.

I: Evet ona göre ilerledik. (29:15)

F: Peki mesela öğretmenin öğrencinin rolünü nasıl belirlediniz? Öğretmen aktif mi olacak, pasif mi olacak işte materyalin uygulamasında kim daha çok rol alacak?

I: öğretmen rehber gibi olacak önce. Sadece o kullanmayı gösterecek. Öğrenciler kendileri kendi çabalarıyla orada Learning theories konu anlatımına çalışacaklar, evde yani. Tekrar açısından düşündük biz bunu. Evde işte konu anlatımına çalışacak, instruction methoo testlerini çözecek, oyunun oynayacak. Bu şekilde kendisi, öğrenci merkezli olarak düşündük.

F: anladım. Peki seçmiş olduğunuz materyalin uygunluğunu hangi parametreleri göz önüne alarak değerlendirdiniz? Hani verimli olduğunu, sizin hedeflediğiniz baştaki hedeflere uygun olduğunu

Teacher's role: facilitator Student's role: active Context Student-centered Formative evaluation Usability test Visual quality: peer evaluation. facilitator Quality of instruction: fulfilling objectives instruction method

I: öncelikle kısım kısım ayırarak gittik. Evaluation report tta olduğu gibi. Contentine içeriğine içeriğini belirlerken.	Evaluation
icerio almus mu dive Safure hoca ile konustuk. Vine	Content visual design
matematik öğretmeni ile bir kez daha konuştuk. Hani bu	usability
olmus mu dive Usabilitysi iki öğrenci ile onu kontrol	interview observation
ettirdik Birde sizin verdiğiniz feedbackler doğrultusunda	
F [·] mesela görsel kalitesine nasıl karar verdiniz?	
I: Görsel kalite daha cok peer evaluationla ve sizin	peer evaluation. facilitator
verdiğiniz feedbackler doğrultusunda devam ettik görsel	F
kaliteye.	
F: Peki sunduğunuz eğitimin kalitesine nasıl karar verdiniz?	
I: içerik olarak mı?	
F: Hem içerik olarak hemde kazanımları ne kadar	
gerçekleştirdiğine.	
I: Ona ee MEB deki şeylere kazanımlara baktık. Eğer	Time management, group
onların hepsini sağlıyorsa sağlıyordu bizim ki. Matematik	work
öğretmenine sorduk. Derste tamamen işlenmeyecekse evde	
çocuklara yardımcı kaynak olarak güzel bir materyal dedi.	
Safure hocamiz birkaç eksiğimizden bahsetti. Ona göre	
yaptık. O eksiklikleri doldurmaya çalıştık.	interview
F: Aniadim. Peki seçmiş olduğunuz nanı geliştirme	
aşamasında seçtiginiz öğretim ilke ve metotlarına uygun	
uvgulanmasının doğru olun olmadığını	
I o konuda aslında hani hiraz hayada kaldı ama Vine seve	taking notes
göre gittik Vine o matematik öğretmenine sorduk. Hani	peer evaluation
eğitimci olduğu icin Hani bunu bövle anlatsak daha mi ivi	peer evaluation
olur. Tam anlamıvla bilgisi vok ama concept teachingle	usability test, observation
mesela. Bu sekilde örneklerle desteklemeniz güzel olmuş	
gibisinden söyledi. Ona daha çok kendimiz karar verdik	
diyebiliriz.	
F: Anladım. Şimdi değerlendirme için mesela bir sürü	
envanter kullandınız. Hangi metotları kullandınız. Hangi	
araçları kullandınız. Bu metotları yada araçları seçerken bu	
seçimi nasıl belirlediniz? Yani bu süreç nasıl işledi sizde?	usability test
I: iște biraz önce dediğim gibi ayrı ayrı evaluation reportta	
ayırmışız ya şeyi. Değerlendirme aşamalarını. Hani herkes	
açısından. İçerik açısından, görsel açıdan, usibility	
açısından, kullanılabilirlik. Bunların nepsini ayrı ayrı	
olçmeye çalıştık. İçerik açısından interview yaptık. Safure	
observation inceleme hani bir cocuğa kullandırtmaya	
calistik Hani suraya da girebiliyor musun buraya da	
girebiliyor musun. Onu kullanırken notlar aldık Bu sekilde	
gircomyor musuri. Onu kunamiken notiai aiuik. Du şekilde.	

Bide görsel açıdan da peer evaluation ve sizin verdiğiniz feedbackler doğrultusunda .

F: değerlendirme için kullandığınız metotlar. Bunların hazırlanmasında herhangi bir sıkıntı yaşadınız mı? Mesela interview de ne gibi sorular soralim, gözlemde nelere consistency bakalım, topladığımız verileri nasıl değerlendirelim?

I: zaman sıkıntısı. Hani grup projesi olduğu için, ve rastgele arkadaşlarımız seçildiği için birbirimize zamanlarımız uymuyordu. O yüzden hani o anda karar verdik sorularımıza. Önceden hazırlayıp gitmedik.

F:Interview esnasında mı karar verdiniz.

I: o esnada karar erdik. Onları da not almaya çalıştık. Hocanın bize verdiği cevaplardan. Safure hocayla böyle oldu. Diğer Matematik öğretmeniyle Erdal gitti konuşmaya.

O galiba hazırladı önceden soracağı soruları.

F: peki nasıl kaydettiniz? Not mu aldınız?

I: not aldık. Sadece Safure hocanın pek vakti yoktu. Hani öyle, bizden sonra bir grup daha girecekti. Hızlıca bize işte feedback verdi. Peer evaluationda mesela aynı şekilde not alarak yaptık. Görsel açıdan nasıl olmuş gibisinden. Usebilityde de aynı şekilde not alarak. Observationda not aldık. En sonunda da sorular sorduk çocuklara işte. Nasıl olmuş. Peki mesela observation yaparken, usubilityde de önceden hani nelere bakacağınızı not ederek mi gittiniz? Yani öyle kafanızda bir taslak varmıy dı? Kullanma esnasında mı incelediniz daha çok?

I: önceden işte biz hani şurada acaba zorlanan var mı diye düşündük. Oralara daha çok şeyaptık. Tamamen kullandırdık materyali kullanırken düşündüğümüz hani burada sorun yaşayabilirler dediğimiz yerlerde sorun yaşarlarsa direk değiştirmek için onlara tik attık.

F: anladım. Peki bu sonuçları yaptığınız materyale nasıl yansıttınız. Yani bir düzeltme yaptınız mı?

I: yaptık. Baya düzeltme yaptık. Mesela oyun yapmıştık Revision biz. Safure hocaya gösterdik. Hani ben anlamam oyundan da dedi bir baktı iste ya bu oyun gibi olmamış iste eğlence içermiyor bu dedi. Bu assesment gibi olmuş dedi. Hemen onu değiştirdik. Kürşat Hocaya da sorduk aynı gün. Değiştirdik onu. İşte çocuklar bazen sorularda bakarken ya bu pi 3 mü 3,14 mü alacaz biz ne alacağız gibisinden karmaşa yaşadılar. Hemen 3 olarak belirttik pi yi. Veya başta işte o oyun gibi hazırladığımızı assesmenta ekledik. Biz onu input yaptırmak için. Hani çocukların bile dikkatini çekti yani. Hep yeşil gidiyor arka planı orda beyaz gibi böyle mavi gibi bir renk. Hani bu farklı olmuş biraz dediler

Features of EPSS: how to make implementation

Evaluation

Method of collecting data

Interactive example of data collection methods

Analyzing data

Upgrade

yani çocuklarda. Peer evaluationdada aynı şekilde ve onları değiştirdik. Söyledikleri doğrultusunda.

F: materyalinizin uygulama ve değerlendirme aşamasında size destek veren yine bir yazılım olsa idi bu uygulama ve değerlendirme kısmında neler beklerdiniz ondan. Mesela uygulama alanını ve yöntem seçiminde nasıl bir destek sunmasını isterdiniz?

I: bize amaçlarımızı söylerdik belki yazılıma oda bize nasıl bir ortamda verebileceğimizi anlatırdı.

F: peki mesela değerlendirme aşamasında nasıl yardım.

I: değerlendirme aşamasında mesela biz hep böyle ya kolay olduğu için veya bilmediğimiz için hep interview yaparak gitmeyi planladık. Ama daha değişik metotlar vardır belki bilmediğimiz. Onlar konusunda bize bilgi verebilir. Hatta bunlarla ilgili örnekler verebilir. Veya bize bir o metotlardan birisini uygulayabilir. Bunun gibi sizde uygulayabilirsiniz diyebilir.

F: anladım. Peki mesela bu interviewi değerlendirirken notlarınız elinizde. Nasıl değerlendirdiniz? Yani ondan nasıl bir çıkarım sağladınız? Ne gibi yöntem kullanarak? Birebir cümlelere mi baktınız? Yoksa bir tematik araştırmamı yaptınız. Normalde interviewlerde öyle şeyler yapılıyor mesela. Kodlar mı çıkardınız?

I: biz genelde şeyleri hani olumlu taraflara değil de olumlu tarafları zaten olmuş onları öyle bırakıcağız zamanımız kısıtlı olduğundan.olumsuz tarafta değiştirebileceğimiz bir şey var mı diye baktık. Yani değiştirebilirsek, zamanımız el veriyorsa değiştirdik. Hani bazı şeylerde vardı hani baya zaman alacaktı onları da şey olarak belirttik hani şimdi yapamadık ama ilerleyen zamanlarda yapılabilir böyle güncellemeler gibisinden.

F: anladım. Son olarak bir öğretim materyali geliştirmek uzun ve meşakkatli bir iş. Yaparken de fark ettiniz, çok yoruldunuz. Çok çalıştınız. Yeni karşılaştığınız birçok kavram ve uygulama vardı burada. İşte interview yapmak olsun işte ne bileyim flashla bir materyal geliştirmek olsun. Çok daha ciddiye aldınız. Diğer derslerinizdeki gibi değildi. Daha da uzun bir süre istedi. Baştan sona bu materyal geliştirme şeyini göze alırsan bu süreçte böyle bir destek yazılımı olsa neler olsa bu yazılımda performansın artardı? İşte kullanım açısından nasıl bir mesela internet üzerinden mi işte bir CD üzerinden mi çalışmak isterdin? İçerik olarak sana neler sunsa aklına neler geliyor? En çok hangi noktalarda zorluk yaşadın? Hani burada bir destek olsa daha iyi olur, daha çabuk atlatırdım bu süreci daha verimli

Features of EPSS: internet base, user accounts

Online survey tool

Examples, sample projects, information about reports, tutorial, videos

Multiuser Group study şeyler hazırlardım diye düşünüyorsun?

I: mesela internet üzerinden olsa daha iyi yani daha kullanım rahatlığı veya kullanıcı adı ile de girebiliriz bu dersi alanlar. Bize hazır metotlar sunabilir mesela.

F: metod derken ne metodu?

I: mesela online olarak gönderebileceğimiz mesela bir şey var yazılım var. İste altına katılıyorum katılmıyorum. Anket gibi. Biz oraya sorusunu yazacağız onun sonunda değerlendirme yapabilecek bir yazılım olabilir mesela. Mesela biz birkaç kişiye yapabildik. Ama mesela bunu 30 kişiye yapsak daha güvenilir olabilirdi. Söyle deyim. Hazır olacak sadece böyle sorusunu yazacağız oraya insanlar oraya katılıyorum, katılmıyorum. Sonuçta bize anket gibi. (anket programları var internet üzerinden, anket yapıp birden çok kişiye uygulayabiliyorsun. Onun gibimi) onun gibi mesela olabilir. Dediğim gibi örnekler, örnek projeler içerebilir.geniş açıklamaları olabilir mesela raporlarla ilgili. Görsel mesela görsel açıdan iyi bir materyal nasıl olur? vapılabilir? Bununla ilgili Nasıl bir acıklama olabilir.videolar olabilir. Örnek, daha çok örnek üzerinden Tutorial: how to use tool gidersek daha örnek olursa daha iyi olur.

F: peki mesela bu kişisel kullanılan mı bir yazılım olsun yoksa mesela işte farklı birden çok kişinin kullanabileceği ortak seyler vapabileceği bir yazılım mı olsun? Hangisi sence daha uygun olur.

I: zaten birden çok kullanabileceği şekilde düzenlenirse bir kişi de kullanabilir onu. O yüzden birden çok. Grup çalışmaları yoğun olduğu için bizde. Gruba yönelik olursa daha iyi olur. Herkesin farklı bakış açılarını yansıtabileceği bir yazılım olursa.

F: peki mesela şimdi şeyi düşünelim. Fatih projesini biliyorsun duymussundur. Artık birçok öğretmen materyal, görsel materyaller hazırlamak zorunda kalacaklar. Teknoloji tabanlı işte gerek flash olsun gerek video olsun. Bu tip şeyler daha çok iç içe olacak ve işte öğretmenlerin büyük bir kısmı bu konuda çok yetersiz. Konularını çok iyi biliyorlar atıyorum bir matematik öğretmeni sizde matematik ile ilgili bir materyal yaptınız. Konuyu çok iyi biliyor ama onun nasıl yansıtılacağını, işte görsel tasarım moodle, bilmiyor, işte küçük bir öğrenme nesnesi neleri içermesi interactivity gerekir onları bilemiyor. Uygulama açısından birçok şeyde eksik. Mesela bu yazılım onları da göze alan onlara da yardımcı olacak bir yazılım olsa idi. Mesela onların bu konuda cok bilgisi yok hani neler içerse o insanlarıda kapsardı. Onlara da yardımcı olurdu sence?

Tutorial: instructional design process

Tutorial: ADDIE model, video, animation, text

implementation

student-centered, teachercentered

forum. chat. I: kendilerimi hazırlayacaklar?

F: hi hi. Kendileri ve vazılım sadece.

I: sonuçta. O zaman baştan bir yazılım yapmanın o sürecin	Motivation to	make
nasıl olduğunu o processi anlatan bir şey olması lazım	research	
başta. Şöyle başlamalısınız hani diyerek. Hani analizle		
başlayacaksınız designla devam edeceksiniz. Development. information source		
Bunu anlatan bir şey olması lazım.		
F: yani materyal geliştirme modellerinden birini ADDIE		
model dan bahsetmesi gerekiyor diyorsun.	relevant sources	
I: evet. Sonra kullanacağı program mesela flashlamı		

hazırlayacak bunu.flashı iyi anlatan bir video dersleri olabilir. Yine animasyonlar olabilir. Videolar, veya şey text dokümanı olabilir. Üçünü de içerdiği. Bunu öğretmesi lazım baştan

F: peki böyle bir şeye sizde ihtiyaç duydunuz mu mesela flash gelistirirken.

evet .çürük bazı şeyleri bilmiyoruz. I: Lablarda öğrendiğimiz kadarı ile yapamadık. Mutlaka bize ekstra kodlar ekstra eee hani ekstra bir şeyler lazımdı flasla ilgili .(templete gibi mi?) templete gibi değil de hani işte şu Moderator, düğmeyi şuraya işte bunu buradan sürükleyip buraya experiences bırakmayı nasıl yapacağız. Veya geri gelmesini nasıl yapacağız? Bizim mesela oradan oraya sürüklemesini öğretiyorlar zaman vetersiz olduğu icin ama hani geri gelsin değişik interaktif seyler nasıl yapılır onları bilmiyoruz. Biz hazır kod lar bulduk biraz

F: peki başka neler olabilir?öğretmeni düşünürsek

I: öğretmeni düşünürsek, derste nasıl verecek bunu. O olabilir. Hani derse çıkıp aynı eski yöntemle anlatamaz. Derste nasıl yapacak? Öğrencilere mi bırakacak tüm seyi voksa kendisi mi vine devam edecek söyle kullanır böyle kullanılır diye. Öğrenci merkezli, öğretmen merkezli. Bu konuda da ona yardımcı olabilir. Bunun dezavantajları avantajlarını verir.

F: Peki coklu kullanım açısından bu coklu ortam nasıl olmalı bir forum mu yoksa chat mi ne tarz bir şey sence uygun olur? Bu bilgi paylaşımı açısından.

I: moodle var bizim kullandığımız onlar olabilir. O da hem forum içeriyor hem chat içeriyor. Karşılıklı bilgi alışverişi de yapabiliyorlar. Moodle kullanılabilir.

F: Benim soracaklarım bu kadar. Senin eklemek istediğin şuda olsa iyi olur dediğin bir şey var mı.

I: yazılım hakkında çok ben kafamda canlandıramıyorum şimdi ama hani olursa çok güzel olur. Çünkü her an her şeyi

sharing

soramıyoruz biz size. Hani bunu damı bilmiyorsunuz demenizden korkuyoruz belki. (yok öyle bir şey, hiç korkmayın) ama işte öyle bir şey olursa hani biraz daha araştırmaya yönelik olur bizi araştırmaya yöneltiyor hocalarımız o zaman daha araştırmaya yöneltmiş olurlar çünkü kendimiz bir şeyler. Hani kaynak bulmakta da zorlanıyoruz hani bunlarla ilgili çok fazla kaynak yok. Yada şöyle diyim. yada açık fazla kaynaklar var ama hani bizim işimize yarayan yok . (yada o kaynakların hangisinin size hitap ettiğini bilmiyorsunuz) . yada o kaynakların hangisi bize yarıyor. Bu direk bize yönelik bir şey olduğu için çok işe yarayacağını düşünüyorum ben.

F: peki mesela bu sistem bilen expertler tarafından desteklenmeli mi? Yoksa mesela ne bileyim sen bir materyal yaptın. Bu sistemi kullanarak. O materyalini örnek olarak oraya ekledin. Böyle mi gelişsin yoksa hani bir expert tarafından sürekli işte eğitim materyali tasarımında şu şu şu örnekler yapıldı. Şunlar yapılabilir. Yada mesela feedback ihtiyacın olduğu zaman soru gönderip forumda ondan cevap yada destek aldığın bir destek mi olsun?

I: şey yani yöneten bir kişi olsun mu diye soruyorsunuz (hı hı, yani o sistem nasıl gelişsin? Bir yönetici tarafından mı, katılımcılar tarafından mı? Yoksa ikisi birden mi?). katılımcılar tarafından olsa daha iyi olur. Hani bir sürü tecrübeyi alırsak hani aralarından kötü örneklerde tabi çıkacaktır da onu da bu işi bilen birisi ayırabilir.

F: şimdilik bitti senin ekleyeceğin bişi?

I: inşallah yetişir. bir dahaki seneye biz(bizde kullanabiliriz diyorsun)

F: çok teşekkür ederim katıldığın için verdiğin bilgiler bana çok faydalı olacak.

I: bende teşekkür ederim.

APPENDIX E

SAMPLE CONTENT OF EPSS

Analysis

1. <u>Aim of this phase</u>

What are we going to do in this phase?

In this phase we are going to make the analysis of the instructional material that is going to be designed by you. In this phase we are going to gather important data that is going to provide valuable information in design phase. Moreover, with this analysis we will be able to decide whether it is appropriate to spent money and time for this material or it is not wise. To fulfill the analysis phase;

1. We are going to find out the need about the instructional material that we are going to design

2. We will select our main goal and sub goals.

- 3. We will analyze our target group who is going to use designed material
- 4. We will decide content of the material
- 5. We will decide where to use material and how to use it.

Now, let's start Analysis phase.

A. Analysis Explanation

Analysis phase is one of the phases that we should give importance during an instructional design. In this phase we decide;

1. why an in which way we need the designed instructional material,

- 2. which goal and sub goals should an instructional material have to fulfill the need
- 3. what are the characteristics of our target group
- 4. what should be our content
- 5. where we are going to implement instructional material or what is the ideal place?

B. Analysis Sample

For example; if we are going to design an instructional material whose subject is "How to use printer?", in analysis phase:

1. We should analyze why and how there is a need this material? For example, there can be serious problems in printer usage in our client corporation and these problems may lead financial problems in this company.

2. At, goal analysis phase, we should decide our instructional material's goal. For example, "Goal of this instructional material is to teach employees how to use a printer". With this statement we have decided on our goal. Then, we should select our sub goals that lead us to our main goal.

3. Next, we should analyze our target group. For example; their prior knowledge, computer knowledge, learning styles, age and developmental level.

4. considering the data that we collected up to know, we should develop a content that answer needs of the company and target group and fulfill their needs. For example, if our target group stated that they did not want to read long texts and instead prefer visual presentations we should organize our content with respect to these data or our if employees know what printer was and its basic features, we should not bore them by giving details in these topics.

5. We should decide where and how designed instructional material is going to be used. Will it be used in office, home or in a seminar that will last one day? We should decide that.

2. Developing instruments

Question 1. Who will you contact with to do your analysis?

- Students
- Teachers
- parents
- School administration
- employees
- employer
- other

Question1. Explanation

In this phase, you should decide who will use your material. After that, you should get in contact with groups or people that can explain your target group's needs, characteristics. Hence, while answering these questions you should both state your target group and other people who can provide information about their needs.

Question1. Example

When we are doing need analysis of the material development project whose topic is "How to use printer?" we should think about whom we are going to give this instruction. Let's assume that we are going to give this instruction to the employees of company A. Hence, we should select "employees" item. With the help of the data that collected from employees can provide information about the needs of them.

After that we should thing about who can provide information about our target group (employees) needs. Moreover, we should contact with subject matter experts (SMEs) to decide our content. In our case, these persons can be administrators, staff manager or peoples whose responsibility is providing technical support. These people can provide information about what they are expecting from this instructional material, at what level

employees need this material. In this manner, we should contact with the following people to provide data in the analysis step.

- Employees
- Others (administrators, staff manager, peoples whose responsibility is providing technical support)

Question2. Define the characteristics and numbers of the people that you selected in the previous question.

Question 2. Explanation

Specify the characteristics of the people that you selected and provide how many people will you contact to gather data.

Question 2. Example

- Employees: 10 people, employees of the company A.
- Administrator: 1 people
- Technical support staff: 2 people
- staff manager: 1 people

Question 3. How do you collect your data in the analysis phase?

- Interview
- Questionnaire
- Observation
- other

Note: you can design a questionnaire or interview form by following tools link.

Question 3. Explanation

In analysis step, we should support our analysis by data. With this method you can say that your analysis report is not based on your personal ideas but on scientific data. With this analysis results you can provide an objective analysis report about do they really need this instructional material, if there is a need how should be its content, whose the target group and in which context this instructional material is going to be used.

After the analysis, you may see that there is no need to an instructional material or you can conclude that target group needs more comprehensive material or maybe training.

Question 3. Example

For our material named as how to use printer, we can use the following instruments.

Instrument	People	When will it be applied?
Questionnaire	Employees	Data
Interview	Administrator	Data

Question 4. Before beginning to write your answers to analysis phases, please be sure that you have completed following steps.

I have developed questionnaire, interview and other instrument for analysis.

If you will make interviews, have you decide with whom you are going to make interview and get appointment from them.

If you will use questionnaire, have you decided to whom you will apply questionnaire and at where?

I have applied instruments.

I have decided how I am going to analyze data.

I have reviewed the results of questionnaires, interviews and etc.

Question 4. Example

We have checked all items in this question as yes and we have a document in our hands like the following.

General notes that we take from the analysis of the instrument results:

The questionnaire that we applied to employees; we have learned that employees are not have enough knowledge about the use of printer. According to results six people out of 10 do not know how to print documents in different programs. Most of the employees do not know how to print in different formats (both sided, landscape and etc.).

Results of the administrator interview; He emphasize their complains about financial problems and waste of sources due to the wrong usage of the printer. Moreover, he states that work flow is slow because of this.

Results of the technical support stuff interviews; they have stated that due to the time and people limit, they have problems in providing support to the employees and instead of temporary solutions they need an instruction.

Results of the staff manager interview; he stated that employees has basic computer skills but they have problems in using printer effectively.

3. Need analysis

Question 1. Describe the needs of's about your topic?

Question 1. Explanation

While you are answering this question you should answer the question by using collected data. In need analysis, collected data can help us to justify that there is really a need for this material and it also indicate that it's reasonable to spent time, money and labor for this project.

Otherwise, if the results of the collected data showed that there is no need for this material; analysis phase would provide a chance to cancel the project before spending resources.

Question 1. Example

We have 4 different types of people that we contact with to make analysis. These are

Employees: 10 people, employees of the company A.

- Administrator: 1 people
- Technical support staff: 2 people
- staff manager: 1 people

As a result for this example we will see this question as

1. What are the needs of employees about the topic?

Most of the employees do not know how to use printer and they stated that they need an instruction for this. Hence, the material should provide the basic information about the topic. 60% of the employees stated that they do not know how to print your documents in different programs. Therefore, the material should show how employees can print their document in programs that used in company A.

In this part, you should continue to explain the need of target group according to your results.

2. What are the needs of employees according to administrator?

According to interview results, administrator underlined that to prevent wasting and interruptions in the workflow, they need this material.

In this part, you should continue to explain the need of target group according to your results.

Answer other questions in the same way and explain why this people think there is a need for this material.

Question 2. What kinds of problems they face in the topic you selected to teach.

Question 2. Explanation

In this question summarize the data about learning problems of the students and underline the need.

Question 3. Write your decisions about your project.

4. Goal Analysis

Question 1. State your main analysis.

Question 1 Example

If our topic was "how to use printer?" we may write a main goal for this instructional material as;

• To teach how to use printer in MS Word program to print out.

Question 2. List your expected behaviors and gains to reach your main goal.

Question 3. Review your written gains and expected behaviors and then reorganize them in a logical order.

Question 3. Explanation

List your gain list that you provided in question 2 according to priority.

Question 5. Review the last form of your list, some gains may be the sub-gains of others. Remove the extra gains that include another gain.

Question 6. Review your list, for last time order them from most important one to the least.

Question 6. Example

- 1. Be able to explain how to take print out in MS Word program.
- 2. Be able to describe how to open the printer properties menu.
- 3. Be able to list what can be done by using properties menu.
 - a. Be able to state what are the options that advanced tab provide the users in printing.
 - b. Be able to tell what are the options that paper/quality tab provide the users in printing.
 - c. Be able to list what are the options that effects tab provide the users in printing.
 - d. Be able to explain what are the options that finishing tab provide the users in printing.
- 4. Be able to predict print outs style when options are given.
- 5. Be able to predict how example print outs can be printed.
- 6. Be able to prepare required print outs.

5. <u>Target group analysis</u>

Question 1. Who is your target group? (Age, gender, grade level, etc.)

Question 1. Explanation

While answering this question, describe your target group's characteristics according to data that you collected. In your description, state your target group's average age, gender, grade level and other important characteristics that can affect your instructional material's design.

You should mention about your collected data while you are answering this question. For example 40% of the students are female.

Question 1. Example

In our example, our target group consists of employees of company A. we can gather data about the demographics of the employees from staff manager. For example in the interview of the staff manager, we can ask questions about the characteristics of the employees. According to interview and questionnaire results, we may answer this question as:

According to results of the interview there are 100 employees in the company. 30 % of them are female and 70 % of them are male. Moreover, average age of the employees is 40.5. According to interview result, staff manager stated that educational statuses of the employees are listed in the following list.

- 20% of them has master or doctoral degree
- 50 % of them graduated from university
- 20 % of them graduated from has associate degree
- 10 % of them graduated from high school

Question 2. What is the prior knowledge level of your target group about your topic?

Question 2. Explanation

By knowing the prior knowledge of your target group, you can decide how to prepare the content of your instructional material. For example; if your target group have some prior knowledge about numbers, your instructional material should not give detail information about already known concepts. If you give unnecessary information in your material, this can reduce the motivation level of your target group and also you may spent your effort to an unimportant part in your instructional material.

If you learn your target group's prior knowledge from different sources, it will support r justification. For example, some students cannot remember previous year's topics. Hence, it can be safer to interview teacher and support your data with teacher's and students' statements.

Question 2. Example

To understand previous knowledge of our target group, we may prepare a test about how to use a printer or we may add extra questions to our questionnaire to measure their previous knowledge about the topic. According to analysis of data, we may answer this question like;

According to results of the questionnaire that we applied to employees, we understand that they know how to take print out but they do not know taking print outs in different formats. According to questionnaire results; 75 % of the employees do not know how to take print out in landscape format, 80 % of them do not know taking print out in both side.

Question 3. What type of prerequisite knowledge and skills those are important to be able to start your instruction?

Question 3. Explanation

No matter for which group we are designing an instructional material, to design the needed material we should know the prerequisite knowledge that target group should now before using our instructional material. While answering this question, write target group's prerequisite knowledge and skills to use your material. For example; learners may have to know basic computer skills to use a computer-based multimedia material. Another example is that students may need to know how to solve simple equations before using an instructional material about how to solve equations that have two unknowns.

Question 3. Example For our example topic we may answer this question in following way.

For the efficient and effective use of our instructional material, employees should have basic knowledge about how to use computer. Moreover, they should have knowledge about how to use MS Word at beginner level. According to interview and questionnaire results all of the employees have basic knowledge about how to use computers. Moreover, 98% of the target group stated that they have knowledge in MS Word program at least at beginner level.

Question 5. How your target group would like to learn?

Question 5. Explanation

Knowing learning styles of our target group and analyzing their learning style will make our instructional material efficient and effective. For example; if our target group is primary school students and they have stated that they would like to learn by games, an instructional material that includes game elements can enhance our target group's motivation.

Hence, we should use the data that we collected via questionnaire and interviews while answering this question and mention our target group's learning style and preferences.

Question 5. Example

For our example instructional material, we may answer this question as;

According to results of questionnaire our target group consist of adult learners. They generally states that they stated that they would prefer instructional material that give the main points of the topic. They also stated that they prefer an instructional material that shows how to use the printer in brief words and do not include long texts. Most of the employees (80 %) states that instead of an instructional material that include decorative visual elements and unnecessary long explanations, they would prefer goal oriented, application base instructional material.

Question 6. How do theorists (e.g. Piaget, Ericson, Knowles (adult learning)) define this age group's developmental level, and the way they learn?

Question 6. Explanation

Search literature about your target group age and developmental level. There are some theorist like Piaget, Ericson and Knowles research on this topic. You may use books, articles of these researchers to find out information about your target group. Summarize your search results about your target groups developmental level and how do they learn in this question. Do not forget to give reference.

Question 7. What does motivate your target group to learn?

Question 8. What are their attitudes toward the topic that you intend to teach?

Question 9. What is your decisions about the instructional material design project according to target group analysis.

Question 9. Explanation

You have gathered many information about your target group in the target group analysis phase. However, if you do not use this information in your instructional material design, there is no meaning to make a target group analysis. For example; if your target group's age was not proper for abstract thinking and you used abstract examples in your material, you cannot reach your instructional goal. Similarly; if you provide only explanations while your target group required active learning in your instructional material, your instructional material would be inefficient to reach your goal.

Therefore, you should transfer your knowledge about your target group into your material and write your decisions in detail in this question.

6. <u>Content/Task Analysis</u>

Question 1. Write your topics main and sub titles.

Question 2. Add the prepared content of your material here.

Question 2. Explanation.

If your content is not completed, add your contents prepared parts.

Question 3. How do you know this is a valid content for your instructional material? Where do you find this content? How do you decide this is the proper content.

Question 3. Explanation

If you are the SME of your topic, you should decide whether your topic is appropriate for your material. To ensure that you can use course books, suggested books and publications. Moreover, you should ask SMEs whether your content is proper for your goal and target group.

While answering this question refer your sources and state which source/sources you have used to prepare your content.

Question 4. Prepare a concept map and add the picture here.

Question 4. Explanation

Concept map is a map that shows the relationships between the concepts of a topic. By developing a concept map, you may see the relationship between the important concepts that you teach in your material and also instructors may clearly see the borders of your instructional material.

7. Context Analysis

a. <u>Orienting Context</u>

Question 1. Are the learners willing to participate in this instruction?

Question 2. Why do they want to participate such instruction?

Question 3. Do they think that the instruction will be beneficial for them?

b. Instructional context

Question 1. Where do your learners want to take the instruction ?

- Classroom
- Computer lab
- Home
- other

Question2. What resources should be provided in learning environment to use your instructional material?

- Computer
- Projector
- Smart board
- other

Question 3. Describe the place where your instructional material implemented. For example, if it is a computer lab, describe the organization of computers and desks, their number, position and etc.

Question 4. Who will solve technical problems?

Question 5. Will the learner use the materials by himself/herself or under the supervision of a person?

Question 5. Explanation

How your target group will use the material? Describe in detail in this question. Will it be before an instruction or after an instruction? Will learners use on their own or with instructor. You should also decide whether it will be a student-centered or teacher-centered material. Write your decisions about the material.

Question 6. What's your decisions about the project with respect to context analysis?

Question 6. Explanation

According to data that you gathered in the context analysis, write your decisions about your instructional material. For example, if you visit a school and you decided to use your instructional material in this school. However, school has no projector. Hence, you should consider this fact while you are designing your project and either you should design an instructional material that needs no projector or you should provide one.

c. Transfer context

Question1. What kinds of context you will provide them to apply their knowledge and skills?

Question 2. Provide information for how students will apply what they learn from your instruction.

8. Create Report

In this stage you can create a draft report for your instructional material project. First, you should form your draft report and scan it. Then, you should write the final report by rewriting your draft report.

CURRICULUM VITAE

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EDUCATION

Degree	Institution	Year of Graduation
MS	METU - Computer Education and	2009
	Instructional Technology	
BS	METU - Computer Education and	2006
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WORK EXPERIENCE

Year	Place			Enrollment
2006- 2013	Middle	East	Technical	Research Assistant
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FOREIGN LANGUAGES

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SELECTED PUBLICATIONS

1. Chapters

Uğur Erdoğmuş, F., & Çağıltay, K. (2013). Türkiye'de eğitim teknolojileri alanında yayımlanan yüksek lisans ve doktora tezlerinde genel eğilimler. In K. Çağıltay & Y. Göktaş (Eds.), *Öğretim teknolojilerinin temelleri: teoriler, araştırmalar, eğilimler* (279-290). Ankara: Pegem Akademi.

2. Journal Papers

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4. Thesis and Dissertation

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