DEVELOPMENT OF AN ONLINE SUPPORT TOOL FOR BIODIVERSITY TRAINING OF FOREST ENGINEERS IN TURKEY

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ABSTRACT

DEVELOPMENT OF AN ONLINE SUPPORT TOOL FOR BIODIVERSITY TRAINING OF FOREST ENGINEERS IN TURKEY

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Biodiversity is one of the most important elements of the sustainable forestry practices. However, in Turkey biodiversity is not properly included in the forestry training curriculum and in professional training. There is a gap in the education of forest engineering about biodiversity. This study aims to fill this gap by developing an online support tool targeting dissemination of the biodiversity training with lower cost and time.

The primary aim of this study is to explore the potential of web based tool as a viable solution to dissemination of the biodiversity training to forest engineers in Turkey. This research based on design and development research methodology involving a systematic study of designing, developing and evaluating online support tool for biodiversity training. Subjects of this study were selected from forest engineers that work within General Directory of Forestry. Purposive sampling method was conducted. Quality of

web based learning was ensured by relying the development to Demand-Driven Learning Model as a theoretical framework.

The results of the survey questions, interview sessions and system logs revealed that the perceptions of the participants towards the designed and developed tool were mostly positive. In addition, learners reported that they gain novel knowledge from training program, which they will reflect to their professional life, and find the training tool convenient. Moreover, their attitudes towards the all characteristics of theoretical framework were mostly positive. Findings also indicated that perceptions of the participants towards online training programs have changed as well.

Keywords: Design and development research, demand driven learning model, biodiversity training

ÖZ

TÜRKİYE'DEKİ ORMAN MÜHENDİSLERİNİN BİYOÇEŞİTLİLİK EĞİTİMİ İÇİN ÇEVİRİM İÇİ DESTEK ARACININ GELİŞTİRİLMESİ

Önal, Özgür Ş.

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Biyoçeşitlilik sürdürülebilir ormancılık çalışmalarının en önemli unsurlarındandır. Ancak Türkiye'de ormancıların eğitim ve profesyonel gelişim programlarında yeterli bir şekilde yer almamaktadır. Her ne kadar biyoçeşitlilik eğitimini ormancılık ile bütünleştirme çalışmaları yapıldıysa da, bunlar istenilen seviyede olamamıştır. Orman mühendisliği eğitiminde biyoçeşitlilik konusunda büyük bir boşluk vardır. Bu çalışma biyoçeşitlilik eğitimini daha düşük zaman ve maaliyet ile yaygınlaştırılması için geliştirilecek çevrimiçi destek aracı ile bu boşluğu doldurmayı hedeflemektedir.

Bu çalışmanın asıl amacı geliştirilecek web tabanlı aracın, Türkiye'deki ormancıların biyoçeşitlilik eğitiminin yaygınlaştırılması için geçerli bir çözüm olabilme potansiyelini araştırmaktır. Bu araştırma, biyoçeşitlilik eğitimi için çevrimiçi destek aracının tasarımını, geliştirilmesini ve değerlendirmesini kapsayan tasarım ve geliştirme araştırma yöntemi kullanılmıştır. Denekler amaca yönelik örneklem tekniği ile orman genel müdürlüğü bünyesinde çalışan orman mühendisleri arasından seçilmiştir.

Geliştirilen web tabanlı aracın kalitesi talepten doğan öğrenme modeli teorik yapıya dayandırılarak sağlanmıştır.

Anket soruları, görüşme oturumları ve sistem kayıtlarına bakıldığında, katılımcıların çalışma kapsamında tasarlanan ve geliştirilen araç hakkında olumlu görüşleri olduğu görüldü. Bunun yanı sıra, katılımcılar bu eğitim programı ile profesyonel hayatlarında kullanacakları yeni bilgiler kazandıklarını belirttiler. Katılımcıların araştırmanın teorik çerçevesinin tüm karakteristiklerine karşı tutumları olumlu bulundu. Ayrıca araştırmanın sonuçları, katılımcıların eğitim aracını uygun bulduklarını ve çevrimiçi eğitim programlarına karşı tutumlarının değiştiğini gösterdi.

Anahtar Kelimeler: tasarım ve geliştirme araştırma yöntemi, talepten doğan öğrenme modeli, biyoçeşitlilik eğitimi

To my family:

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LIST OF ABBREVIATIONS

C<X>S<Y>:	Cycle X Subject Y
CEPF:	The Critical Ecosystem Partnership Fund
CSS:	Cascade Style Sheet
DBR:	Design-based Research
DDLM:	Demand-driven Learning Model
DDR:	Design and Development Research
DE:	Distance Education
EBMP:	Ecosystem Based Multi-Functional Planning
EU:	European Union
GDF:	General Directory Of Forestry
HTML:	Hypertext Marking Language
IDD:	Instructional Design and Development
LMS:	Learning Management System
NCC:	Nation Conservation Centre
OBTT:	Online Biodiversity Training Tool
OBTT_ES:	Online Biodiversity Training Tool Evaluation Survey
TELE:	Technology Enhanced Online Environment
WBI:	Web-Based Instruction
WBL:	Web-Based Learning

CHAPTER I

INTRODUCTION

This chapter will include brief information about background of the study, statement of the problem, purpose of the study, significance of the study and research questions.

1.1 Background of the Study

As technology encroaches in human life, it also does so in the domain of education. Many studies have been performed to assess the comparative effectiveness of different technology enhanced learning environments. Inadequate significant difference results have been found neither among the different technology used, nor between traditional and technology enhanced learning environments (Clark, 1994). It is therefore not the media or method itself that will create a difference in the efficiency of learning, but the appropriateness of implementation of instructional methods to create the training/course in the selected media.

It is important to select the correct instructional methods for the media and subject at hand. It is also extremely important to correctly apply instructional theories so they will work well in practice. However there cannot be a solution that would work across disciplines and media. Design principles providing guidance on determining and implementing instructional methods under specific situations are needed (Wang & Hannafin, 2005).

These issues leads researcher to explore systematic processes and construct models to integrate technology more efficiently. As Schofield (1995) indicated that meaningfully integration of technology in educational settings requires a systematic way of utilizing the technology to improve learning.

To explore deeply which application of which theory would work best, a real subject, a real media, and a real audience have to be identified and work should proceed on these real cases. The real case chosen for this study is the training on the importance and role of biodiversity to forest engineers whose main experience and objective to date has been to produce timber, on a web based tool. This study focuses on development of a web-based tool and design model/ principles for developing an online biodiversity training of forest engineers in Turkey.

1.1.1 History of Forestry in Turkey

Beginning of Turkish Forestry extends back to second half of 18th century. The movement of Turkish Forestry can be summarized as:

1857-1916: Realizing the need of infrastructure for forest management and GDF (General Directory of Forestry)

1917-1923: Development of GDF

1924-1936: Emphasizing the importance of management plan preparation for forests.

1937-1954: Acceptance of forestry law

1955-1962: Determining goals of forestry according to improvement plans

1963-1972: Use of air photos and statistical methods for forestry development

1973-1991: Modernization attempts with various studies and projects, passing to functional plans (Ülgen & Zeydanlı, 2008)

1.1.2 The Need of Biodiversity Training

Aside from being an important natural resource, forests in Turkey are considerably rich in biodiversity. Among all the European forests, they hold the most divers woody and herbaceous plant species and therefore constitute the most divers forest types. They also constitute the most intact natural forest cover of Europe. Turkish forests are also rich in wildlife, though most of their populations are rapidly decreasing due to habitat loss and hunting (Muthoo, 1997).

The Forest Law number 6831 has entrusted the use of this natural resource to the General Directorate of Forestry (GDF). Through both its field units and head offices, GDF is managing and using this resource closely following the management plans. At their official website, GDF has a whole section that is destined to biodiversity. Brief information about importance of biodiversity, biodiversity agreements, biodiversity integrated forest management planning etc. Biodiversity is defined as basis of living resources, which has important role in human life, at that section. Statements of scientists are also mentioned that humans will face with serious reduction of living resources because of pollution. Thus, the biodiversity of lands will be a great power for countries. According to Gayford (2000), in order to preserve sustainability, maintenance of biodiversity ensured as a major pathway. Because of this reason, GDF started to integrate the biodiversity into their forest management planning. However, despite some efforts, these plans have kept on being geared towards wood production, and are currently failing to protect and manage biodiversity.

1.1.3 Studies for Biodiversity Training

Among scientists and international political agendas, biodiversity training has become a controversial issue particularly over the last decade. In Turkey, there have been a few initiatives in the recent years to include biodiversity into the forest management plans. Among them are the Forest Resources Information System Project (FRIS), and the Biodiversity Integration Committee to Forest Management Plans within the GEF

'Biodiversity and Natural Resources Management Project'. Unfortunately, the forest engineers responsible for both writing and implementing these management plans have neither been formally nor professionally trained for such tasks. This lack of training presents serious obstacles for the integration of biodiversity into the forest management plans for the correct implementation of the few multi-functional management plans that are now being prepared.

Nature Conservation Centre (NCC) is a non-governmental organization established in 2004 to develop scientific and technical aspects biodiversity conservation in Turkey. NCC carried out two pilot Forest Biodiversity and Monitoring courses in 2007 and 2009, in close collaboration with the Management Planning Department of the Ministry of Forestry, General Directorate of Forestry (see 0 for course programme). First course was funded by The Critical Ecosystem Partnership Fund (CEPF) and second one was funded by European Union (EU). Totally 80 forest engineers were trained in these courses. The pilot course was a success according to both institutions and GDF requested this course to be developed further and delivered to all foresters working in Turkish forests.

Currently neither forest faculties' education approach, nor applications and educational services of GDF possess sufficient tools to implement (accomplish) this issue. In this context, the courses conducted by NCC and GDF can be considered as good start point to educate forest engineers about biodiversity.

Although GDF approached NCC to give this course all the forest engineers in Turkey. Hence, the high cost of the course does not enable it to be given to 1500 forest engineers working in the field. Thus another strategy has to be developed to deliver it to forest engineers (U. Zeydanli, personal communication, 2009).

This study takes the course given by NCC as a guideline to prepare an online biodiversity training tool (OBTT) because of the fact that with an online learning program, the course can be reached to all forest engineers having basic computer literacy and internet access. There are many universities and private corporations in Turkey that give online training

program. Furthermore, the quality of those programs has been raised in recent years. Thus, an online training program can be an effective way to solve forest engineer professional development issue in Turkey.

1.2 Statement of the Problem

Biodiversity is one of the most important elements of the sustainable forestry practices. However, in Turkey biodiversity is not properly included in the forestry training curriculum and in professional training. There are some attempts to provide this service as professional carrier training. Among these, the course provided by NCC appears to be effective and good working solution to the problem. On the contrary NCC's course requires mobilization of high amount of resources which increase the preparation period and the cost of the course. In this study dissemination of biodiversity training course to forest engineers in Turkey is considered as the main problem. The aspects of the problem can be formalized as;

- The cost of training is high with traditional method.
- Budget (supply / funds) of GDF for education is limited.
- 10-15 years are required to reach all forest engineers in Turkey (around 2000) with traditional methods.
- Difficulty in taking policy makers' attention with traditional methods, thus lack of political support.

1.3 Purpose of the Study

The primary aim of this study is to explore the potential of web based tool as a viable solution to dissemination of the biodiversity training to forest engineers in Turkey. This

study will investigate how a support tool for biodiversity training of forest engineers in Turkey should be designed and implemented.

Researcher aimed to give information about biodiversity concepts to the forest engineers for their professional development, whom will be attending to forest management planning in Turkey. Forest engineers' perceptions towards biodiversity and its training, technology usage in education and online training programs were revealed during each prototyping cycle of this study. Also effectiveness of training tool was investigated after evaluation of final study. The results were discussed after final study in order to determine the factors, concepts and parameters to design and develop an online biodiversity training tool for professional development of forest engineers.

1.4 Significance of the Study

The focus of this study is to create an online professional development tool for forest engineers about biodiversity. Thus, this study has many significance aspects. First of all is recently emerged awareness of the importance of biodiversity. The main principle of forestry policy in Turkey is sustainability but also wood manufacturing and profitability of management units was also so important. Over the last decade the decrease in timber values and increase in the importance of nature conservation in Turkey has resulted in an increase of biodiversity issues in forestry applications. (Ülgen & Zeydanlı, 2008 p.10)

Moreover, most of the forest engineers are appointed to the lands as working field. Those engineers are spread to all over the country; to the places mostly there has no city life. However, even these lands are isolated from cities, the 3G technology can be reached from nearby points. This technology brings internet access to the mobile devices such as laptops, tablets, smart phones etc. Thus, this study can help those engineers to reach information online at their working field.

Thirdly, cost is a critical issue for conveying this education to the forest engineers. Unfortunately, even the ministry is aware of the importance of biodiversity, they don't have enough budgets to supply this biodiversity education to all engineers work within their system. It was mentioned before that, two NCC training programs were both supplied by European organizations. The reason for that is GDF doesn't have any budget for this purpose. This study will be an effective way of conveying the biodiversity training to all engineers without a requirement of huge amount of budgets.

Some attempts have started to integrate biodiversity training into forestry in Turkey. But these are not in the desired level. There is a gap in the education of forest engineering about biodiversity. This study aims to fill this gap by developing an online support tool targeting dissemination of the biodiversity training prepared by NCC with lower cost and time.

1.5 Research Questions

The primary aim of this study is to explore the potential of web based tool as a viable solution to dissemination of biodiversity training of forest engineers in Turkey. This study will attempt to answer the three main research questions:

- What are the factors that facilitate or undermine effective online biodiversity training for forest engineers in Turkey?
- What are the lessons learned that can be used to improve future online biodiversity training initiatives?
- What are the perceptions of forest engineers about the online biodiversity training tool?
    - What are the perceptions of forest engineers about content of online biodiversity training tool?
    - What are the perceptions of forest engineers about delivery of online biodiversity training tool?

- What are the perceptions of forest engineers about service of online biodiversity training tool?
- What are the outcomes of the online biodiversity training according to the forest engineers' perceptions?

1.6 Limitations

This study has following limitations:

- The sample size was limited for generalization of the findings. More engineers should be reached for further studies in order to generalize the findings to the population.
- The time intervals for evaluation of prototypes were limited for a proper training.
- The validity and reliability of this study is limited to the instruments that are used while evaluating the prototypes.
- The validity and reliability of this study depend to the honesty of the participants.
- The researcher had role at every step of this study. Researcher's role should be decreased for further studies.

CHAPTER 2

LITERATURE REVIEW

This chapter describes the theoretical background of the study. With a straight order of a pattern that researcher followed during the entire study, it includes brief information about adult learning, biodiversity training in a general manner and specific for forest engineer, distance education, e-learning under the topic of Web-Based Learning (WBL) and finally forest engineer professional development.

2.1 Adult Learning

The target group of this study consists of forest engineers. Thus, very importantly, the beginning concept of this study is adult learning, which must be clearly understood and examined in details. Adult learning is defined as learning opportunities of adults in varying formal institution settings to daily works.

Adult learning and development covers both biological and psychological development and socio-cultural and integrative perspectives on development (Merriam, 1999). Adult learning is generally referred as andragogy, which is first authored by a German teacher Alexander Kapp in 1883. According to Knowles (1970), andragogy relates to the the art and science of helping adult learns. Knowles also asserted that andragogy should be distinguished from the more commonly used term pedagogy. Andragogy can be stated with six assumptions related to the motivation of adult learning, which are shortly written as need to know, self-concept, foundation, readiness, orientation and motivation.

One of the most important problems encountered in adult learning is high drop-out rate. Since, attendance is not an obligation at most of the adult training program; the learners would drop the course out without getting the necessary efficiency from it. This case is especially at dramatically high level for the online courses. Knowles (1970) found that adults would like to figure out benefits to them before willing to spend time and energy to learn it. Therefore an adult educator, the researcher here, has to develop a 'need to know' in learners that will answer the question in the learners' mind of why they should learn what the researcher offer them. A suitable case method would help the researcher to do that, which should provide experiences through which the learners conceive the pros and cons of learning. According to Knowles (1970), explaining the benefits of learning by someone else such as colleagues, managers etc. is rarely convincing.

The other important concept for adult learning is self-concept, which means that being self-directing is necessary characteristic for adults. As also Knowles (1970) stated that, the term adult is defined in psychology as person who are in charge his or her own life and own decision makers and live with the consequences. It is also stated that there is growing evidence that people taking initiative in learning; learn more, better, deeply and permanently. There are also lots of studies confirming that there are key concepts for self-directed learning such as teacher-directed and self-directed learning comparison, collaborative work and initiative strategy selection studies.

Knowles (1975) suggests the questions below to start up their self–directed learning process, which also helped the researcher to compose the survey and interview questions in this study;

A scientific research that explores answers to the following questions comprised the basic steps

1. What is the question I want an answer to?

- Is it a question worth asking?

- Is it a question you really care about?
- Is it a question that is answerable by data?
- Is the question clear and understandable to others?

2. What is the data I need to answer this question?

- Are the data available to you within your limitations of time, money, etc.?

3. What are the most appropriate and feasible sources of these data?

4. What are the most efficient and effective means I can use to collect these data from these sources?

5. How shall I organize and analyze these data to get an answer to my question?

6. How will I report my answer and test its validity? (p. 25)

With some exceptions, the longer a human live on this planet, the more experience he or she accumulates. This is a universal truth about living organisms as well, which can be rephrased as human beings found themselves more and more as they live through. This is defined under the 'foundation' premise of andragogy. This experience surely affects the learning process of people. It is the very reason for the light education at high schools and heavy type at universities, which refers to gradual education. According to Knowles, these experiences affect learning of adults in several ways. First of all, adults have a huge background of experience that itself is a rich resource for many kinds of learning situations for both themselves and the others. Therefore, experiential learning strategies such as discussion methods and problem solving exercises or strategies such as simulation exercises and field experiences are used to provide learners experiences which they achieve learning by analyzing them. The second way is that adult learners can enrich the meaning of newly gained skills and ideas by connecting them to a wider range of experience. The more distinctive the bond between the new ideas and the experience background, the deeper and the permanent learning would be. Thirdly, if the age range of

adults is wide, there would be a broader background of experience, interest, ability and learning styles since the adult groups are heterogeneous. Knowles (1970) stated that individualized learning and instruction, through contract learning, self-paced multimedia modules, learning resource centers and other means are the topics with increasing emphasis in adult learning. Final way of affecting the learning, which has potentially negative consequences, is developing biases and thoughts. This effect causes people to close themselves to new ideas because of having presuppositions and prejudices about new things to learn. Nowadays, it is common to hear from most of the adults that 'I have done this before and it did not work'. However, Knowles stated that there have been some techniques developed to solve this problem like sensitivity training, open-mindedness scales, creativity exercises and etc. To sum up, the quality of experience that adults have is significant for learning. They experience too many roles youth doesn't, which define their identity.

The fourth concept of adult learning is readiness. This concept is a much more like consequence of previous concepts. Knowles (1996) noted that "Adults become ready to learn when they experience in their life situation a need to know or be able to in order to perform more effectively and satisfyingly" (p. 256). This is an opposite assumption for the exact same concept of pedagogical model. In that model, learners get ready when an authority tells them what they should learn. However, it is opposite for adults because of self-concept and need to know properties of adults. According to Knowles, the best way of adult learning is when adults choose to dedicate themselves to learn.

It is seen as one of the most important origin of readiness that adults have transition phases from one developmental stage to another in their life. Havighurst (1972) pointed out that as we confront having to perform the development tasks of next stage of development, we become ready to learn those tasks; and the peak of our desire to learn them. Those moments of passing between these stages are called teachable moment by Havighurst. There are specific typical sequences of those development tasks, which can be listed as to begin a process of career planning, to acquire competencies required for a

first job, to get a first job, to master those competencies, to plan and prepare for a next step-up job and finally retirement from a career. Consequently, adults are mostly ready and have eager to learn not when they are told to learn but at those moments of transitions between developmental stages that have tasks to do.

The fifth concept of adult learning is orientation. Knowles stated this concept as with a task-centered, which is also called problem-centered or life-centered, adults begin to involve in a learning experience. Again differently than pedagogy, at which learning is subject-centered, the content of adult education is composed of real life tasks. Examples of those tasks can be listed as writing better business letters, writing for pleasure and profit and thirdly improving professional communications. This concept has been mostly applied in a wrong way. Instead of configuring the tasks around real life situations, the topics are sequenced as the history and philosophy of X, the market and products of X and professional policies of X. When content is organized around more real life situations and tasks, the participants of the training would learn the content with a purpose of using it in their life.

The last concept of adult learning is motivation, which can be both extrinsic and intrinsic types. The results of most of the research show that adults are motivated to learn. In the pedagogical model, children and youth are motivated mostly by extrinsic motivators. For example, their parents make them pressure to learn a specific subject. It is valid for adults too. For example, adult learners motivate themselves because of extrinsic motivators like wage raises, promotion, better working conditions etc. However, according to Knowles, the first concept is also important for adult learners, which was ‘need to know’.

To sum up, there have been too many researches about how would adults learn better. Malcolm Knowles gathered the findings of those researches under a well-organized concept. And those concepts haven been taken to considerations at every step of this study by researcher, since the target group of this research is adult learners.

2.2 Biodiversity Training

Biodiversity concept has been defined as web of life that has an extraordinary variety, which has been evolved for 3.8 million years in various ecosystems. It is also a very key topic of evolution of species. However, biodiversity is under threat for last decades. It is still a controversial issue that the reason is whether natural or human caused. Because of these current threats, importance of biodiversity concept increased. Although many national standards, guidelines and organizations remarked this concept as an important topic of life sciences, they do not point many important aspects like ecological and life quality perspectives.

There are several reasons for why biodiversity is so important. First of all, St. Antoine and Runk (1996) pointed out that it is important to protect biodiversity for diversity of life for medical and economic reasons. On their official website, GDF pointed the aspects of scientist as biodiversity is a great power for countries. Especially in an economical manner, rich biodiversity means powerful economy for governments. It is also important for medical reasons as well. The resources for most of the medicines are coming from botanical origins. Another reason may be stated as the role of biodiversity to maintain ecological functions like oxygen production, pollination, flood control, which plays key roles for supporting life on earth. This list of reasons is extensible. Preserving food chain, protecting natural habitats, sustaining agricultural variety and integrity and preventing continous acceleration of global warming etc. can be added to the importance list of biodiversity. To sum up, biodiversity is one of the major branches to preserve life on earth.

2.3 Distance Education

Among education problems, learning is at the centre from ancient times. People has been tried to find solution for learning and teaching concepts for a very long time, even from time of Aristotle. Former way of solving this problem was face to face. People came together to learn from and teach to each other. However, during time, there have been many developments, especially technological developments. Those improvements brought the chance of accessing to equal resources from any time at any place. One solution chance that technological developments brought is distance education, which gives people time and place independency for learning. For last decades, growing and gaining speed of internet caused a new dimension for online instructions that is learning and teaching from distance.

Distance education has been defined simply by Moore and Kearsley (1996) as students and teachers are separated by distance and sometimes by time. Actually, the first time that distance education had seen in a modern sense was far before the time of internet, at 1840s by Sir Isaac Pitman. He thought a system of mailing texts transcribed into shorthand on postcards. Since that time, the media of distance education that are called artificial communication medium have been changed. The use of printed and electronic technologies has become the primary form. Learners are at the centre of distance education. Moore and Kearsley (1996) stated that "distance education aims to provide instruction in places and time that are convenient for learners rather than teachers and teaching institutions" (p. 3).

There are two main types of distance education, which are synchronous and asynchronous. In synchronous type of distance education, all students and instructors participate simultaneously. The main advantage of synchronous type DE is real-time property of it, which makes it immediacy. Examples of synchronous DE are interactive TV, teleconferencing, computer conferencing, internet chats, etc. Other advantages of synchronous DE can be listed as;

- Motivation: synchronous type DE brings a group together that constitutes energy between group members that provides motivation. Thus, learners keep up with the group and continue with their studies.
- Tele-presence: As mentioned above, there is a real time interaction during synchronous DE. By this way a group cohesion forms and it brings a feeling to be part of a group to the learner. This cohesion is formed by help of spreading of tone and nuance.
- Good feedback: During synchronous systems, learners can quickly respond to an activity with their ideas and supports. This would be very helpful to improve decision making with a community. This advantage embellishes DE.
- Pacing: Synchronous events encourage students to keep up-to-date with the course and provide a discipline to learning by prioritizing their studies (Collis, 1996).

On the other hand, participants of asynchronous DE are not required simultaneously. All students can participate to the training from different places at different times. Thus, it is more flexible than synchronous type. Examples of asynchronous type DE are video and audio taped courses, e-mails, web-based courses etc. Major advantages of asynchronous DE are;

- Flexibility: Learners can access to the training material at anytime from anywhere they want. They can use the material from home, work, internet cafes etc. at day or night.
- Time to reflect: At synchronous type, a learner has the only chance to respond for an activity. However at asynchronous type, a learner can check references, think over a reaction or idea, and go over to previous messages and take his/her time to compose a comment.
- Situated learning: Hence DE provides place independency; learners can access and apply the new knowledge gained from the online course or other resources in Internet in their work.

- Cost-effective technology: It is globally equal to access a text based asynchronous training program. Also requirements and costs of this type system are very low.

There are three important elements to create a successful distance education environment, which are instructional design, support and technology. These three elements must be taken into consideration at all distance education programs.

There are numerous research studies to prove that distance education is quite beneficial. For example, a study done by Arbaugh at 2000 shows a great deal of woman participation to training program. Also Verduin and Clark (1991) made 56 studies and concluded that "DE methods achieve similar, if not superior, when compared with conventional instruction methods" (p. 213).

2.4 Web-Based Learning

Web-based learning, which is also subset of e-learning, is a specific type of distance education. Lau (2000) defined e-learning as a modern type of distance education that is delivered via computers, Internet and multimedia presentation. As Kirschner and Paas (2001) emphasized e-learning includes online learning, Web-based instruction and computer-based training. During last decades, the role of internet has increased tremendously in education field. Beside internet is a database for a rich media in text, images, videos, audios and many other formats, it is also a household for various tools for communication among users, which can be listed as file transfer protocols, online chat, bulletin boards, discussion boards, online meeting programs, virtual realities etc. These properties of internet attracted considerable attention from instructors as well. Most of the instructors use online media to upload their teaching materials. Countless web-based instruction media has been designed and delivered to the online media.

Web-based instruction, web-based training, web-supported learning, online learning, online training are used interchangeably in the literature. Khan (1997) defines Web-

Based Instruction (WBI) as: "...a hypermedia-based instructional program which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported" (p. 6). According to Khan (2001) major components of the WBI system are: theoretical frameworks, instructional strategies and techniques; and physical components which include multimedia elements, Internet tools, computers and storage devices, connections and service providers, authoring tools, management programs and standards, and server and related applications. Huang (2000) also stated commonly used technologies to facilitate online learning are the Web, online discussion groups, online resources, and online courseware.

There are several advantages of WBI, e-learning which can be listed under groups of logistical, instructional and economic advantages. First of all, through web-based environments, a vast amount of information and variety of media can be carried from anywhere to anywhere. Also e-learning provides interdisciplinary framework including collaboration, traditional learning and content management (Gartner, 2002). There are numerous research studies that are concluded as the fact that e-learning enhances collaborative and group based activities.

Another advantage is that WBI provides flexibility. An online learning model proposes instruction via online delivery media as a bridge in which an instructor and learners are physically separated. In general, synchronous and/or asynchronous communication, Web–based instruction, Web search, online resources, and technical support are provided in online computer–mediated environment (Huang, 2002). But as also Vrasidas and McIsaac (2000) stated one of the most salient features of online learning is time and place independency.

In 2000, Birmingham, Drabenstott, Frost, Warner, and Willis published a report that lists the advantages of 'WBI' as follows;

- They reduce geographic, organizational, and time barriers of distance.
- They enhance collaborative and group based activities.
- They provide access to collections of information in multimedia formats that are not available to off-campus students.
- They allow users to personalize or customize information access and representation.
- They provide information at any time and in any place (p. 21).

Some of the research studies that show the fact that WBI is a quite effective way of achieve learning, are listed below;

One study was made by McKavanagh, Kanes, Beven, Cunningham, Choy (2002) in Australia, which was examining the effectiveness of web-based flexible learning practices. According to research, a Web-based flexible mode offered 120 modules in Australia in 1998. 2300 student were served by these modules, with a median of 31 students. They concluded that there is a great potential of Web-based programs to support learning. They also stated that Web-based program designers must benefit all the benedictions that technology offer to them in order to enrich the content, interaction and encourage the self-directedness and reflections.

Also there were another study performed by Yıldırım and Özden (2001), distinctive characteristics of a hierarchically designed hypermedia-learning environment through students' perceptions was evaluated. They pointed out that a feeling of empowerment has been promoted by this hypermedia environment and students are better motivated with this environment. They also reported that both hypermedia- learning environments and traditional learning environments should be used together.

However, there are some drawbacks of e-learning as well. For example, due to e-learning has not been fully investigated in terms of pedagogical aspect; there is lack of empirical evidence to support its effectiveness (McElhinney and Nasseh, 1999; Noble, 2002). The availability of well-designed, effectively implemented, and efficiently delivered online

courses is essential in order to satisfy the unique needs of growing numbers of adult learners (MacDonald & Gabriel, 1998; MacDonald et al., 2002; Palloff & Pratt, 2001). McGorry (2003) emphasizes necessity of theory-driven empirical research for developing effective Internet-based programs.

Khan (2001) reported 8 dimensions of WBI as a framework for e-learning. And there were also sub-dimensions for each dimension as well. Each sub-dimension focuses on a specific aspect of e-learning environment. These dimensions can be listed as;

- Pedagogical: Teaching and learning are intended in pedagogical dimension. Issiues like methods and strategies of e-learning environments together with content, audience, goal, media analysis, design approach and organisation are adressed in this dimension.
- Technological: Technology infrastructure in e-learning environments issues are explored with technological dimension, which includes infrastructure planning, hardware and software.
- Interface Design: It is intended to get an overall look and feel of e-learning with interface design dimension. This dimenson covers page and site design, content design, navigation and usability testing. Evaluation: Evaluation dimension is composed of assessment of learners and evaluation of the instruction and learning environment.
- Management: Maintenance of learning environment and distribution of information issues are adressed with this dimension.
- Resource Support: Resource support dimension explores the online support issues as well as resources required to provide meaningful learning environments.
- Ethical: The issues that are related with ethical dimension are social and political influence, cultural diversity, bias, geographical diversity, learner diversity, information accessibility, etiquette and the legal issues. This dimension intends to social and political influence, cultural diversity, bias, geographical diversity, learner diversity, information accessibility, etiquette, and the legal issues.

- Institutional: Administrative affairs, academic affairs and learner services related issues are intented in this dimension.

There are several e-learning models that have been evolved from the ones that replicate classroom activities to the ones that integrate pedagogical issues and technology to the e-learning. While technology seen as content, delivery, and electronic services provider in initial e-learning models; pedagogical issues are much more considered in recent ones (Engelbrecht, 2003).

2.5 Demand-driven Learning Model (DDLM)

With the rapid improvement in technology and growing up expectations from technology, e-learning went through a hype cycle (Engelbrecht, 2003). But early studies of use of technology in learning environments couldn't return successful learning results as expected (Logan 2001; Taylor 2002). Lack of success in the results leads researcher to explore systematic processes and construct models to integrate technology more efficiently. As Schofield (1995) indicated that meaningfully integration of technology in educational settings requires a systematic way of utilizing the technology to improve learning. In 1990s, a model comprising three elements: service to the learner, content and technology was raised in e-learning initiatives (Engelbrecht, 2003).

In order to answer the research questions, a generic evaluation measure to examine effectiveness and validity of a web based learning program should be used. The quality of the measure that is used must be referenced to an underlying theoretical framework. MacDonald and colleagues (2001) stated that “For a large segment of the population (working adults), traditional universities have designed, or will need to design new learning models in order to meet consumer demands” (p. 9). For compensating this demand, she and her colleagues reviewed the literature about development of Web-Based Learning (WBL) and use the results as a foundation for the proposal of their new model for WBL, called Demand-Driven Learning Model (DDLM).

Primary objective of DDLM is to develop an evaluation model for WBL that would be relevant and useful to the consumer regardless of content. DDLM, formulated from a constructivist theoretical paradigm, is chosen for this study since it was developed by academics and experts from private and public industries collaboratively. Also constructivist nature of DDLM is important for the target group of this study to be encouraged for participating in and find their own personal way to achieve knowledge, which is proven to be beneficial for adult learning and very appropriate for biodiversity training. Thus, it brings academic solutions for industrial demands especially such groups as;

- Working adults who do not have the desire or resources to attend on-campus programs,
- Adults in jobs where their employers (e.g., the high technology sector) cannot afford to provide long leaves of absence,
- Adults in Third World countries or isolated communities who do not otherwise have access to brick and mortar institutions,
- Single parents or economically disadvantaged adults who have to work full time,
- Working adults who travel too much to attend regular programs, and
- Undergraduate students who need or want an alternative to on-campus programs for economic, social, personal, or practical reasons (Macdonald et al., 2001, p. 13).

DDLM is presented as a theoretical framework to ensure a high-quality standard for web-based learning by focusing on most serious challenges of web based learning and putting them into practice (MacDonald et al., 2001). In order to specify the model, during the formation process, the team had examined the advances in educational technology and the issues in existing measures of WBL programs in detail. This examination shows that there must be a conclusive development of an evaluation measure for researchers and

practitioners with a broad range of WBL settings. That was the main reason that gives birth to DDLM.

The origin of DDLM was the concepts that are brought together by academics who were drafting the parameters from literature for more effective, reliable and valid online learning. Consequently, a full description of the theoretical background and the development of the DDLM were provided in MacDonald et al. (2001). Initial prototype of the model was presented to the industrial experts during a panel. A detailed feedback was requested from experts after the model took the attention of a highly respected sampling group of the most influential and innovative North American stakeholders in online technology and the education field. A pilot study was designed after that feedback as a quick respond with refinement of model. That study consist of five phases, which are in turn clarifying and defining the constructs of the model, writing of the questions or items of constructs, assessing the psychometric properties of survey questions, which comprised the base of the survey questions of this research, and initial exploration of constructs, initial analyses of responses and applying the measures to evaluate usefulness. Holistic measure and indicators of the model was supposed to be determined at the end of this study. In order to do that, refined questions about constructs of DDLM were asked in three WBL programs, which are probably similar to this very research. After conducting the experiment appropriately with suitable academic analyses, as results of this study, it was expected to form the final state, which is used now, of the model with the resolution of equivocal factors like inconsistency related to the placement of constructivist theoretical variables and program outcomes within the same model, and an apparent overlap among the variables of the framework. Also standardized instrument would be configured as needed. After the study was completed, the DDLM as it is used today was comprised, which is expected to be utilized by private and official industries and academic works.

DDLM bases on the model of technology, content and service. In addition to this, DDLM also emphasizes technology as a tool to achieve a high-standard quality of superior

structure and desired learning outcomes in a cost-effective way. DDLM defines consumer (learner) demands in three categories as high quality content, delivery and service. Thus, there are five main components of DDLM, which are clearly described in Figure 2.1.

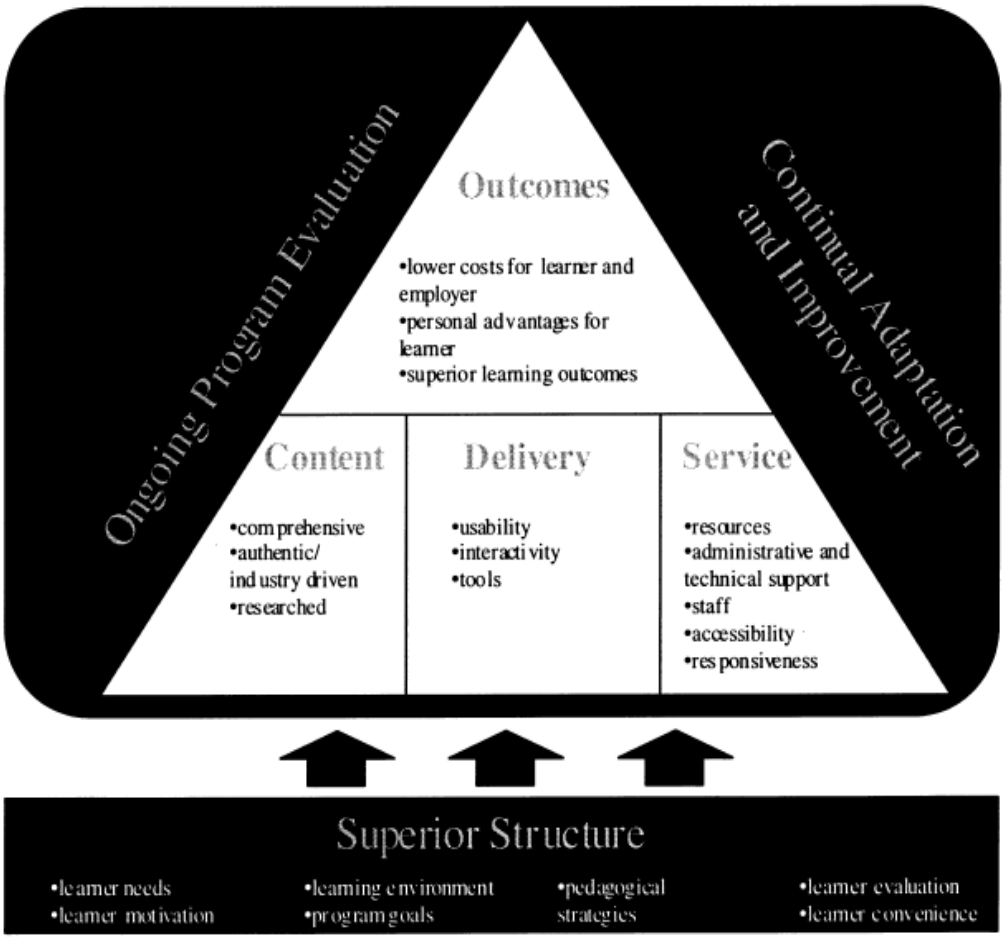

Figure 2.1 The demand-driven learning model (Source: MacDonald et al, 2001)

Each five elements can be divided into different sub-terms as indicated in the figure to be studied separately. These sub-terms can be defined as the characteristics that each element should possess. Those characteristics should be examined in detail and understood carefully. Each element should be put as a base under the steps of creating the tool.

Content:

The first element of the model is the content of the tool, which should be comprehensive, authentic/industrial-driven and researched.

- Comprehensive literally means broad scope, which clearly states that the tool must include the most of the information that the consumer should know about the discipline that is tried to be taught. The information should be objective and with a necessary level of depth and breadth, which must have a broad range of understanding level.
- The content surely has to be academic that is coming from an empirical experiment. It should be validated by authorities.
- The information has to cover the issues related to the possible problems that may have encountered in work life of the consumer that is must be industry-driven. For example, this very study is purposing to create a tool for biodiversity training not only to teach forest engineers the biodiversity but also to apply them in real life for proper conservation of the beautiful nature of our country from mistreats. According to Savery & Duffy (1996), learners are interested in activities including cognitive challenges similar to ones that they encounter in their work environment. This refers to authenticity that has generally two types, which are factual authenticity where the environment particular tasks should be similar to the real world situations and procedural authenticity where the practices should be similar to those can be engaged in outside.

Delivery:

Since DDLM assumes that e-learning programs are interactive and web-based, delivery is considered as the consumer demand construct and the second element of it. Delivery should have the characteristics of usability, interactivity and tools.

- High quality delivery is defined as carefully consider the usability. The features of a well-considered usability are keeping the information up-to-

date, an easily understandable user interface with a good navigational support and an appropriate page length for consumers. It is also important because a good planned user interface helps to solve one of the major problem of e-learning slightly that is durability of participant by breaking the curriculum into clear and not boring sections like adjusting the time intervals just as needed.

- Second characteristic of the delivery construct of DDLM is interactivity which is as important as others for helping to solve problems of e-learning even if just a bit. Interactivity is defined as interaction between learners and learner and the practitioner and learner and the content. DDLM-based programs seek the incorporation of activities which encourage interactivity (Berge, 1999; Wagner, 1997; Willis & Dickinson, 1997).
- According to Jonassen et al. (1999), DDLM defines technology as intellectual tool kits that facilitate learners to build more meaningful interpretations and representations of the world. This characteristic of delivery is also related with the interactivity, since; the tools should be selected according to desired interactions that are both social and content. For example, DDLM uses text, graphic, audio and video in order to improve learning experience and to address different learning styles. As mentioned above, desired level of interaction determines that which tool will be used to deliver the content to the consumer. There are both content interactions in which the consumer experience, process and reflect on the course and social interactions in which learners are socially interact with the other learners and the designer like blogs etc.

Service:

The third element of DDLM constructs under the consumer demands section is the service, which should fulfil the requirement for administrative and technical support with the qualified staff and the resources, which should be easily accessible, needed to for learning as well.

- The administrative and technical support characteristic of service has some fundamental criteria. First of all, it should be freely available for consumers. Secondly, an informative introduction letter should be send to the learners at the beginning for getting into learning environment. Moreover, designer should provide necessary help for accessing and beneficially using the system of learning environment. Finally, facilitators and competent authors at the field of content should have access to the learning environment for interaction with learners.
- The universal standards that a staff should have are valid for the high standard service as well like being qualified and adequately experienced individuals. In web-based learning studies, specifically, the staff should be the researcher, field experts and technical supporters. A collaborative work between the research team that is responsible for design, development and delivery is necessary. Meyen et al. (1999), define characteristics of DDLM team members as demonstrating effective collaboration and communication, respecting for roles, sharing their expertise, and having shared values.
- Another basic characteristic of the delivery is the accessibility. The direct access to the learning environment without any complicated orientations should be avoided in the delivery construct of DDLM. At least one of the research team that can sufficiently help to the learners should be available and easy to reach all the time. All the contents, tools and services should be freely accessible all the time by learners.
- The last item is the responsiveness of the research team that will assist the learners with quick feedbacks for assignments and adequate responses with tools like e-mails or blogs etc.

Learner Outcomes:

One of the main goal of this research is lowering the cost of the biodiversity training in order to provide it to a wide range of the forest engineers for solving the lack of knowledge problem. It is also an item of the learner outcome at the studies that is

constructed with DDLM. Other items are personal advantages for the learner and superior learning outcomes.

2.6 Professional Development

Professional development was defined by Guskey (2000) as processes and activities designed to enhance the professional knowledge, and skills of educators to aiming to cause improvement on learning of students. Guskey made that definition for teachers; however, this definition may be adapted to the all areas of laboring. When an individual acquire skills and knowledge for career advancement, it is called professional development. All types of facilitated learning opportunities, ranged between college degrees to formal coursework, are included in professional development. This concept has a huge space in human life at the transitions between developmental stages. Guskey (2002) reported five levels of information that should be collected and analyzed in order to determine best fit of professional development event in to a local context of a study. The complexity is increased through levels. Also, a practitioner should be successful at each level in order to be successful at the one more complex. The evaluation of levels developed from formative to summative. Guskey (2002) describes each level as follow:

Level 1: Participant Reaction

- Purpose: to gauge the participants' reactions about information and basic human needs
- Technique: usually a questionnaire
- Key questions: Was your time well spent? Was the presenter knowledgeable?

Level 2: Participant Learning

- Purpose: Examine participants' level of attained learning
- Technique: test, simulation, personal reflection, full-scale demonstration

- Key question: Did participants learn what was intended?

Level 3: Organizational Support and Learning

- Purpose: Analyze organizational support for skills gained in staff development.
- Technique: minutes of district meetings, questionnaires, structured interviews or unobtrusive observations
- Key questions: Were problems addressed quickly and efficiently? Were sufficient resources made available, including time for reflection?

Level 4: Participant Use of New Knowledge and Skills

- Purpose: determine whether participants are using what they learned and using it well
- Technique: questionnaires, structured interviews, oral or written personal reflections, examination of journals or portfolios, or direct observation
- Key question: Are participants implementing their skills and to what degree?

Level 5: Student Learning Outcomes

- Purpose: Analyze the correlating student learning objectives.
- Technique: classroom grades, tests, direct observation
- Key question: Did students show improvement in academic, behavior or other areas? (p. 50)

The last level that Guskey described was about teacher professional development. It can be adapted to any profession as well. Moreover, Zalles (2005) pointed out that proliferation of Web-based learning environments provide professional development programs as instructors might otherwise present in a workshop or other training program. He listed the professional development applications in mutually exclusive categories in Web-based learning environments as;

- Digital libraries that permit the retrieval of standards, lesson plans, assessments, evaluation resources, full texts of articles, artifacts such as student work, and other resource materials, in any medium.
- Multimedia learning technologies for training purposes that present information, assess learning, provide feedback, and individualize the learning path.
- Tools and environments for synchronous and asynchronous professional communication and collaboration (e.g., e-mail, whiteboards, chats, listservs, video-conferences, file-sharing systems, etc.).
- Professionally useful databases that permit members of professional communities to post, metatag, query, mine, and link records of interest.
- Annotation interfaces layered over digital library resources that make it possible for members of professional communities to exchange context-embedded reflections and feedback about them. (p. 1)

There are both advantages and disadvantages of Web-based technologies for professional development as it is valid for all kinds of distance education. Zalles (2006) listed those advantages over other forms of professional development as openness, vastness, the ubiquity of the web and just in time capabilities of content delivery. He also listed the disadvantages as lack of face to face interactions; the risk associated with inappropriate interactions among users, unfiltered content, client hardware and software variances such as browser, disk, RAM, connection speed etc., viruses and other technical disruptions.

There are also some limitations for data collection in web-based instructions such as:

- What types of formative evidence can be collected to refine a Web site during development?
- What data should be gathered when 'observing' the online learning experience?
- What data constitute reliable evidence of the quantity and quality of Web site use?
- What types of outcome data can be gathered to gauge program success?

- How can outcomes be measured against quantity and quality of use in order to determine impact? (Zalles, 2006, p. 5)

2.6.1 Forest Engineer Professional Development

Forest engineer is defined as someone who applies principle of engineering in forest industry. Together with other specialist professionals, forest engineers will take role in planning, harvesting and managing multipurpose forests to the benefit of owners, the public and the environment. For those purpose, they have to acquire the required skills and abilities through professional development programs. GDF made a survey between 02.06.2012 and 08.10.2012 in order to reveal the problems encountered in institution (Orman Genel Müdürlüğü, 2012). 770 staff attended to the survey and the results showed that there is a list of lacking themes under professional development topic at work life, which can be removed easily with education. They indicated especially three themes, which are communication, public relations and motivation. The staff also demanded that the professional development program should be analytical and applicable, reflected to the performance and increase the motivation. Furthermore, according to survey results, the most urgent problem is lack of professional knowledge with %19.8 score. Also, the second knowledge that the staff thinks which is lacking and wanted to be developed is technical equipment with a score of %15.2, just after foreign language. These survey results indicate that there is lack of professional knowledge and technical equipment, which the staff of GDF feels. The target of this particular study as an online professional development material will be to solve motivation problem by increasing their knowledge about an important concept of forestry, which is biodiversity.

2.7 Literature Summary

This chapter revealed the literature on adult learning, biodiversity training, and distance education, e-learning, demand-driven learning model and finally professional development. Researcher tried to identify how adult learning theories, e-learning

parameters and professional development criteria influence on education and biodiversity training program. In addition, the demand-driven learning model which was the theoretical framework of this study was explained. Also, it reveals the advantages and disadvantages of distance education, e-learning and professional development. Adult learning principles were also introduced in order to separate from pedagogical theories. Furthermore, researcher could not find any research about online biodiversity training that is specific to the forest engineers, especially in Turkey. There have been some initiatives by GDF for young trainees, mostly high school students, in recent years. However, purpose of those intiatives has been mostly about guiding trainees to interest and protect biodiversity, but not sole education. Thus, there is a huge gap in the online training domain about explanatory biodiversity training. Finally, perceptions of GDF staff, whom are mostly forest engineers towards professional development lacking at their work life were given to address the research problem of this study.

CHAPTER 3

METHODOLOGY

In this chapter, research methodology of the study is included in order to clarify the perceptions of forest engineers for evaluating effectiveness of Online Biodiversity Training Tool (OBTT). Nevertheless, trustworthiness of this material will be discussed deeply through flow of this section. By order, research questions, theoretical framework behind the design of the study, the method of the research, procedure of designing the tool, ways of collecting data, sampling of subjects, researcher's role, ethics, the concern's about the trustworthiness and quantitative and qualitative analysis methods will be discussed in detail within this chapter

3.1 Assumptions

The researcher made two following assumptions:

- All participants are computer literate and interested in learning biodiversity
- All participants responded to the data collection methods intentionally

3.2 Research Questions

The primary aim of this study is to explore the potential of web based tool as a viable solution to dissemination of biodiversity training of forest engineers in Turkey. In order to achieve succession at figuring out problems of the research, this study will attempt to answer the three main research questions:

- What are the factors that facilitate or undermine effective online biodiversity training for forest engineers in Turkey?
- What are the lessons learned that can be used to improve future online biodiversity training initiatives?
- What are the perceptions of forest engineers about the online biodiversity training tool?
    - What are the perceptions of forest engineers about content of online biodiversity training tool?
    - What are the perceptions of forest engineers about delivery of online biodiversity training tool?
    - What are the perceptions of forest engineers about service of online biodiversity training tool?
    - What are the outcomes of the online biodiversity training according to the forest engineers' perceptions?

3.3 Theoretical Framework

In this study, The Demand-Driven Learning Model (DDLM) was used as theoretical framework of e-learning. This model was developed in Canada as a collaborative effort between academics and experts from private and public industries (MacDonald et al. 2001). This model is quite cost effective way that supports to achieve desired learning outcomes. This model aimed to encourage a practitioner to take active role in technology development process of fulfilling consumers' demands. The details of this model were given in more detail at section 2.5.

3.4 Research Method

The aim of this study is to create an Online Biodiversity Training Tool (OBTT) for forest engineers; and investigate factors affecting the training, and perceptions of forest engineers towards the tool. Thus, the product of this study would be a tool that will help the forest engineers to close their gaps about biodiversity, especially about forestry.

3.4.1 Design and Development Research: Product & Tool Development

There have been too many educational researchers, policymakers and practitioners in learning sciences addressed the same question that asked above. According to one of those, Barab and Squire (2004), identify education as an applied field and emphasize the need of studies to develop tools, curriculum and theories facilitating researcher to systematically understand and predict how learning occurs. Additionally, Amiel & Reeves (2008) stated that, with few exceptions, tools such as computers and internet did not affect education as much as expected. Within this manner, studies on the design of technology-enhanced learning environments (TELEs) had arisen. "TELEs are technology-based learning and instructional systems through which students acquire skills or knowledge, usually with the help of teachers or facilitators, learning support tools, and technological resources" (Shapiro & Roskos, 1995; Land, 2000; Aleven, Stahl, Schworm, Fischer, & Wallace, 2003; Wang & Hannafin, 2005, p. 5). Technology develops very rapidly in recent years (e.g., computers, wide-area internet, and smart phones) that may be even a new one has popped up as this words are written, which resulted in generation of considerable enthusiasm towards TELEs within the design community. However, according to Hannafin (2005), innovations and studies in education field, did not lead to contribute practice when the progress in design and research is considered. Therefore, TELEs did not have a wide use in learning (Cuban, 1986, 2001; Kent & McNergney, 1999). Amiel & Reeves (2008) summarized this situation nicely with these words; "The Internet is in danger of becoming yet another example of society's all-too-frequent, but usually failed, infatuation with the educational

potential of new technologies" (p. 29). Also Cuban (1986) stated that, results of former studies indicate that instructional technologies do not assure to cause high student achievements or a fix on distributing learning opportunities fairly. Moreover, they suggest continuing to develop new strategies on educational technology researches grounded on technology based on instructional principles to achieve using Internet most beneficially as an instructional technology. As it can be easily concluded from these statements that design and research are two very important concepts that improve the quality, validity and effectiveness of blending technology in the learning sciences.

The first concept is design concept, which has been an important and complex type of a problem that needs an orginal work of humans for complicated conditions. Two of many reasons for this are having multiple solutions to the design problems, and need to build strong argumentation skills to rationalize the process of choosing a given solution. Solutions to the technical requirements, restrictions of the contextual field and the requirements of the stakeholders are needed to be addressed by a design solution. As Ireland (2003) emphasized that understanding consumer and getting input is crucial for designers who aim to attract them for their designs. Moreover, according to Richey and Klein (2007), the words 'design' and 'development' are often used interchangeable. Development has been defined as change in an improved manner or increase in a situation. Richey and Klein (2007) stated that they take the position that design and development is a science. On the other hand, research, which cannott be apart from development, is defined by Shuttleworth (2008) as "In the broadest sense of the word, the definition of research includes any gathering of data, information and facts for the advancement of knowledge." Research plays role of holding material during a theory is being turned into practice. Thus, importance of research can definitely not be ignored. However, Amiel & Reeves (2008) argued that much research in educational technology still ignores, with many other aspects, the meaning of research. It can easily be concluded that a method that effectively combine these two important concepts together would solve much of the problem of creating a useful online education environment.

At this point, when it is traced back to the definition of Brown (1992); and Collins (1992), Design-Based Research has emerged as a paradigm for the study of learning in context through the systematic design and study of instructional strategies and tools. Collins et al. define Design-Based Research as:

> Design experiments bring together two critical pieces in order to guide us to better educational refinement: a design focus and assessment of critical design elements. Ethnography provides qualitative methods for looking carefully at how a design plays out in practice, and how social and contextual variables interact with cognitive variables. Large-scale studies provide quantitative methods for evaluating the effects of independent variables on the dependent variables. Design experiments are contextualized in educational settings, but with a focus on generalizing from those settings to guide the design process. They fill a niche in the array of experimental methods that is needed to improve educational practices (p. 21).

While DBR was as its infancy, DBR collective (2003) has assembled as a first forum to position DBR as framework for inquiry and draw up a comprehensive definition for the field.

Reeves (2000) describes design-based research as a systematic process that consists of the following steps: (a) analysis of practical problems by researchers and practitioners, (b) development of solutions within a theoretical framework, (c) evaluation and testing of solutions in practice, and (d) documentation and reflection to produce design principles. Problems, solutions, and methods are refined recursively through the entire process (see Figure 3.1).

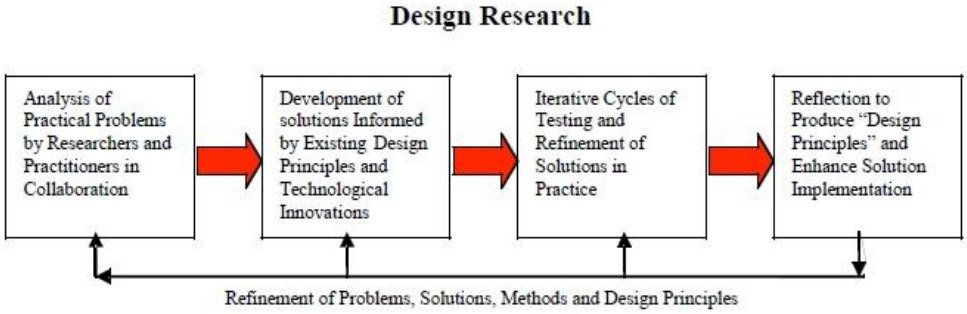

Figure 3.1 Design Based Research Approach (Source: Reeves, 2006)

DDR is a practical form of research seeking to test theory and validate practice. It covers a broad range of design and development issues. Richey and Klein (2007) stated that unlike the most other research efforts, design and development research is in a position to substantially expand the theory base of Instructional Design by reaching beyond the traditional foundations of teaching and learning research. Thus, they noted that in many aspects, design and development research serves as an important link between theory and practice.

Nunamaker et al. (1991), viewed and defined design and development research as a bridging function (see Figure 3.2) in the research cycle that begins with initial identification of the problem and concludes with the evaluation of impacts that research product recovered. Design and development research aims to form the bridges to strengthen the link in identification and evaluation processes.

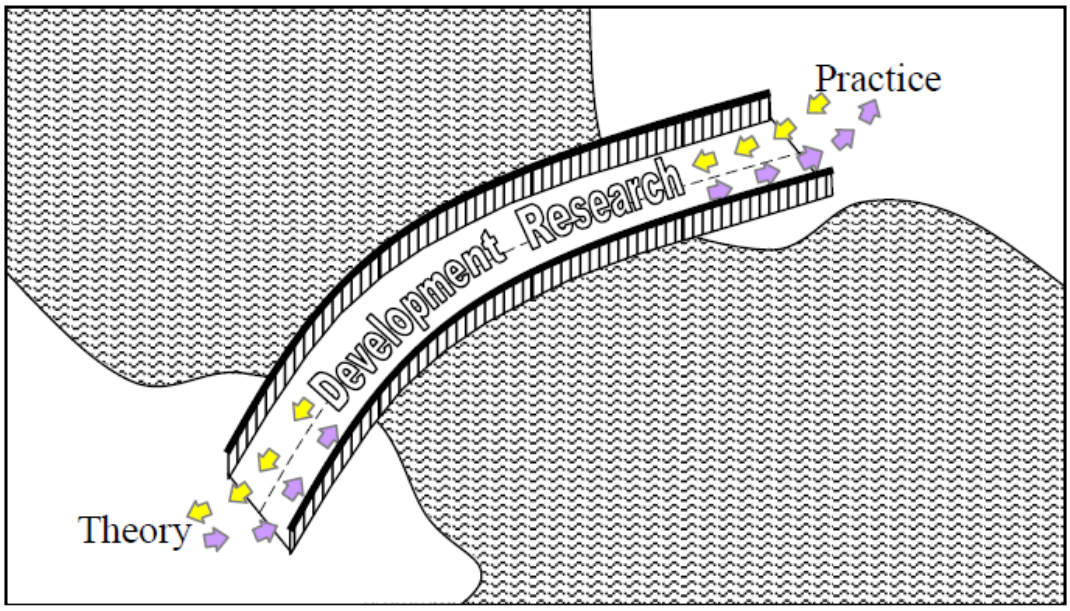

Figure 3.2 Bridging function simulation of DDR (Source: Ellis & Levy, 2010)

Beside those steps, Richey and Klein (2007) define six major areas of instructional design and development as learners and how they learn, the context in which learning and performance occur, the nature of content and how it is sequenced, the instructional strategies and activities employed, the media and delivery systems used, and the designers themselves and the process they use (Richey & Klein, 2007).

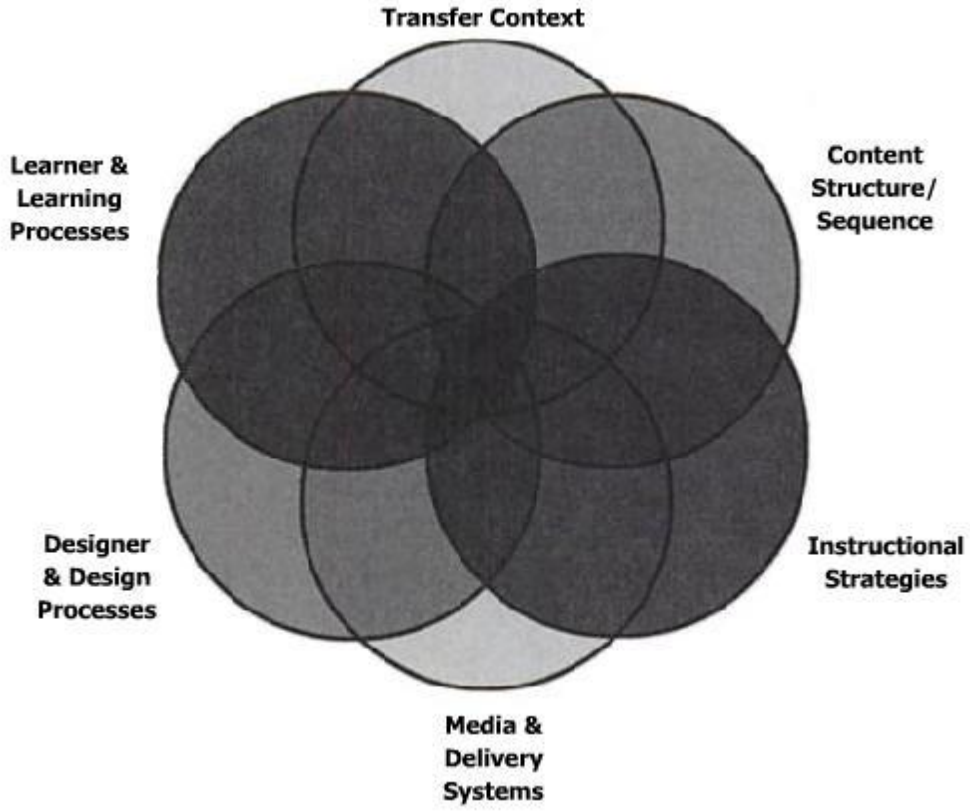

Figure 3.3 The Instructional Design and Development knowledge base (Source: Richey & Klein, 2007)

Defining by order, learners are forest engineers working with General Department of Forestry. Context had no limits. Learning occurs in their bureau, at home or wherever they connect internet. Content of this training program is subjects of biodiversity, especially ones related with forestry. Instructional activities are mainly self-regulated study, collaborative learning and discussion boards. Media of this study comprised of digital text, digital graphics and video. Designer and developers are the researcher, NCC experts, a colleague and an authorized lecturer of the subjects of biodiversity.

According to Richey and Klein (2007), Design and Development Research is classified into two large categories as:

- Product & Tool Research
- Model Research

This categorization was made according to whether conclusions are context specific or generalizable. Understanding these categories can facilitate an appreciation of the breadth and depth of Design and Development Research. Usually, there is no end product in model research studies. For those studies, Yagodzinski (2012) stated that they focus on discovering general principles or validation of this model rather than application. On the other hand, product and tool research are often context-specific DDR projects tend to describe, analyse and document a particular design and conclude to identify the situations appropriate to use the product or to improve the tool to be more convenient.

According to Richey and Klein (2007), the most straightforward design and development projects fall into the first type in which research conducted during the entire design and development of a product or tool. Those researches generally cover designing and developing process of a tool for a specific situation that is firstly analysed and described then developed and finally evaluated. That tool is context and product specific. The whole process of designing and developing of a new product, evaluation of this product and evaluation of effectiveness of this product are documented in these studies. Outcome of this type of researches can be listed as lessons learned from development of new product / tool and interpretation of conditions to increase use it. Besides, there are different types of participants in this type of research: designers, developers, clients, subject matter experts, evaluators, learners, instructors, organizations (Richey & Klein, 2007). They also stated that some research focus on only one aspect of design and development such as production, or de-emphasizes some phases, such as need assessment.

This study, according to its goals, will be a need assessment research that uses Product & Tool Research method while creating an online professional development material for forest engineers. Richey and Klein (2007) stated that research designs vary depending to a great extend upon whether the study has a quantitative and qualitative orientation. According to them, there are some general concerns that should be considered when designing any research project. Four concerns were emphasized by Richey and Klein (2007) as:

- Establishing the validity
- Establishing conditions that make casual inferences plausible
- Facilitating generalization and interpretation
- Anticipating problems.

In order to deal with these issues the research method has been cooperatively combined with the theoretical framework. It will be discussed in next section.

3.4.2 Integration of DDLM into the DDR

According to Richey and Klein (2007), the key undertaking in a research design is to establish conditions that will enable one to make valid conclusions as a result of the research process. This establishment should have done both quantitatively and qualitatively with respect to different approaches and procedures. There are two types of validity, which are internal and external validity. These terms will be discussed at section 3.10 in detail. Moreover, in a research design, independent and dependent variables should be casually related according to casual inferences concern. Determining causality is not solely area of quantitative research but also qualitative forms are concerned with the term. Thirdly, generalization of findings of a particular study to a larger population, which is done by establishing external validity quantitatively, and interpretation and inference from samples, even from small samples, which is done by combine careful non-biased observations with purposeful sampling techniques employed with qualitative research, should be facilitated in design and development research. Finally, Richey and

Klein (2007) stated that research design is a process of anticipating everything that will happen during study. Retrieving these anticipation problems, some specific procedures should be proposed.

Those statements prove that dealing with all concerns should include either quantitative or qualitative approach. These approaches are devised with specific procedures and they are focused with special strategies. Those strategies should be employed with themes of characteristic aspects of a theoretical framework. The theoretical framework of this study is DDLM. Thus, this framework is used as a validation resource for dealing with of concerns of product & tool research method of DDR. Researcher decided to integrate the DDLM into the process of Design and Development Research from development of solutions phase. The themes of characteristics of DDLM will be checklist for validity concerns of this study, which were defined and listed at related section 3.3.

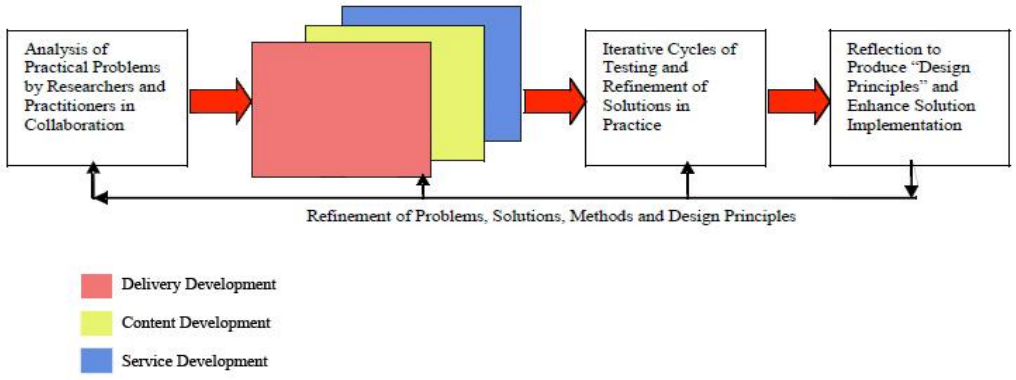

Figure 3.4 Integration of DDLM in Design and Development Research Model

3.5 Procedure

This particular research study includes a pilot study, first iteration and a final study in order to design, develop and evaluate an OBTT. Analysis, design and development, and evaluation phases are being involved throughout the whole procedure with usage of rapid

prototyping technique, which supports iterative design that includes prototyping cycles. These prototyping cycles include analysing, developing, testing the results and making the logical changes according to those results in or order to reach a superior structure as an end product of final study. The evaluation of the product formed after final study will seek whether the product meet the requirements of a forest engineer in the matter of beneficially understanding the biodiversity concept. These procedures and cycles are aimed to ensure the quality and usability of this online biodiversity training tool. The prototyping procedures will be explained in detail below.

3.5.1 Pilot Study

The pilot study is comprised of analyse, design and development, and evaluation phases. There were need analysis, context and the content analysis were conducted by researcher in order to create first prototype. The researcher, also act as an instructional design expert based on his skills and background, and experts of Nation Conservation Committee (NCC) decided the context and content of professional development training. When the analysis phase is done, researcher designed and developed the HTML based first prototype with software. After the pilot study implementation phase of the material, NCC experts were asked to voluntarily examine the material. The evaluation phase of the pilot study was conducted according to the results of interviews and survey questions performed with the NCC experts.

3.5.1.1 Analysis

The pilot study analysis phase started with the need analysis. The researcher was interested in biodiversity topic through his social environment and the work place background. The experts of NCC had conducted biodiversity training within the forest engineers with a meticulously prepared content, which can be found at APEENDIX M. This training was received a great enthusiasm from General Directory of Forestry (GDF) and requested to be delivered to a broader range. This positive feedback was actually a proof that forest engineers need a well scheduled biodiversity training that should spread

across the country, since there is a huge education gap of biodiversity for forest engineers. Thus, the researcher focuses on delivering this biodiversity training to the technology enhanced online environment (TELE), which can be easily accessed from anywhere with an internet connection. If researcher could solve the problem of delivering a well scheduled tool to the online environment, it would be easily presented to the forest engineers across the country.

According to the 2012 annual report of GDF, the presence of forest is %27.6 of total area of the country. This area is comprised %53.3 of normal (yielded) forest and %46.7 of abnormal (distorted) forest. Whether a forest is normal or abnormal is defined according to the closeness of its stand cover, which can be stated as if the rooftops of the existing trees in the forest cover the stand more than %10, it is defined as normal and vice versa. At the very same report, the first strategic goal of the GDF is stated as protection of forests, the places to be a forest and the biological diversity in those places against any kind of biotic and abiotic pests. Under this statement, it is declared that biodiversity in the whole forest areas will be identified, biodiversity will be integrated into the forest management as a function and with this purpose, and 450.000 hectare area will be planned. In order to achieve these objectives, GDF is aware of that the quality of biodiversity knowledge of forest engineers and even permanent workers must be developed. That is the very reason for positive feedback that NCC experts received from GDF after training. However, it would be very costly and time-taking process, if this training is proceeded as it is given by NCC.

This reason directed the researcher to create a tool for professional development training to the forest engineers in order to generate the same environment with the NCC classrooms of biodiversity training, which will help them to be competent at biodiversity field and be successful at their work life. It would also be almost costless for GDF and time independent for forest engineers.

After need analysis, researcher was started to instructional design on the online environment as a delivery medium. There are a lot of advantages, especially according to the fact of ultra-fast development of technology nowadays of internet as compared to face to face method such as ease of access, flexibility on time, lower cost, etc.

The analysis phase was finalized with the content analysis, which was decided after a collaborative work between the researcher and NCC experts. These experts are mostly biology department graduated and volunteer old-timer of NCC. They all have graduate degrees on biology with different expertise. The most of the content is parallel to the content of previous biodiversity workshops conducted by NCC. The researcher and the experts also made a short literature review for add something that may be more useful and effective for professional development material in online learning experience. After that, an authorized instructor was consulted for reviewing the validity, reliability and effectiveness of the content. Content text was composed by the researcher and reviewed by the field experts.

3.5.1.2 Development

Content Development:

Content development has been planned to base on the fundamental features of web based courses stated in `Regulation of Distance Higher Education Based on Inter-University Communication and Information Technologies` (Özden, 2002) as Title Page, Course Content Page, Course Pages, Discussion Board, Student List - grade pages, Assignment - practice pages, Frequently Asked Questions page, Additional Links page, and Information Page to follow up web based courses.

In content development phase, the parameters of DDLM are taken as a baseline like a skeleton structure for further fill up of the bones. First the researcher started with designing the HTML based first prototype in the rough manually with the help of his computer background. Then he added the adapted content, which created in analysis phase, as its simplest form in order to ease the further discussions with NCC experts.

Thus, the first draft was kept simple. After a while, the content has been moved to another environment, Moodle, which will be discussed at delivery development phase.

During the whole pilot study, the content of the training had been reviewed with the NCC experts regularly in order to conform to the authenticity/industrial driven parameter of DDLM, since these experts are well aware of the needs of forest engineers. These reviews were also planned to supply validity to the content rigorously. Content was enriched by adding variety of representative media such as pictures, videos, animations etc. to get close the content with forest engineers' workplace and application areas.

Firstly, subjects planned to be given in the Online Biodiversity Training Tool were categorized with NCC members. According to categorization, course content is divided into five main categories: 'Orman ve Biyolojik Çeşitlilik', 'Orman Ekolojsi', 'Fonksiyonel Planlama', 'Orman Ekosistemi Hizmetleri' and 'Diğer'.

'Less Known Parts of Forest Biodiversity' was selected as a starting subject to accomplish for the first iteration, rather than developing whole biodiversity training in the first iteration. After further discussions, new subjects were added to provide integrity in the content to present in the first iteration. Prepared content was presented under 'Orman ve Biyolojik Çeşitlilik' main chapter. It was planned to accomplish the content of other main categories in further iterations.

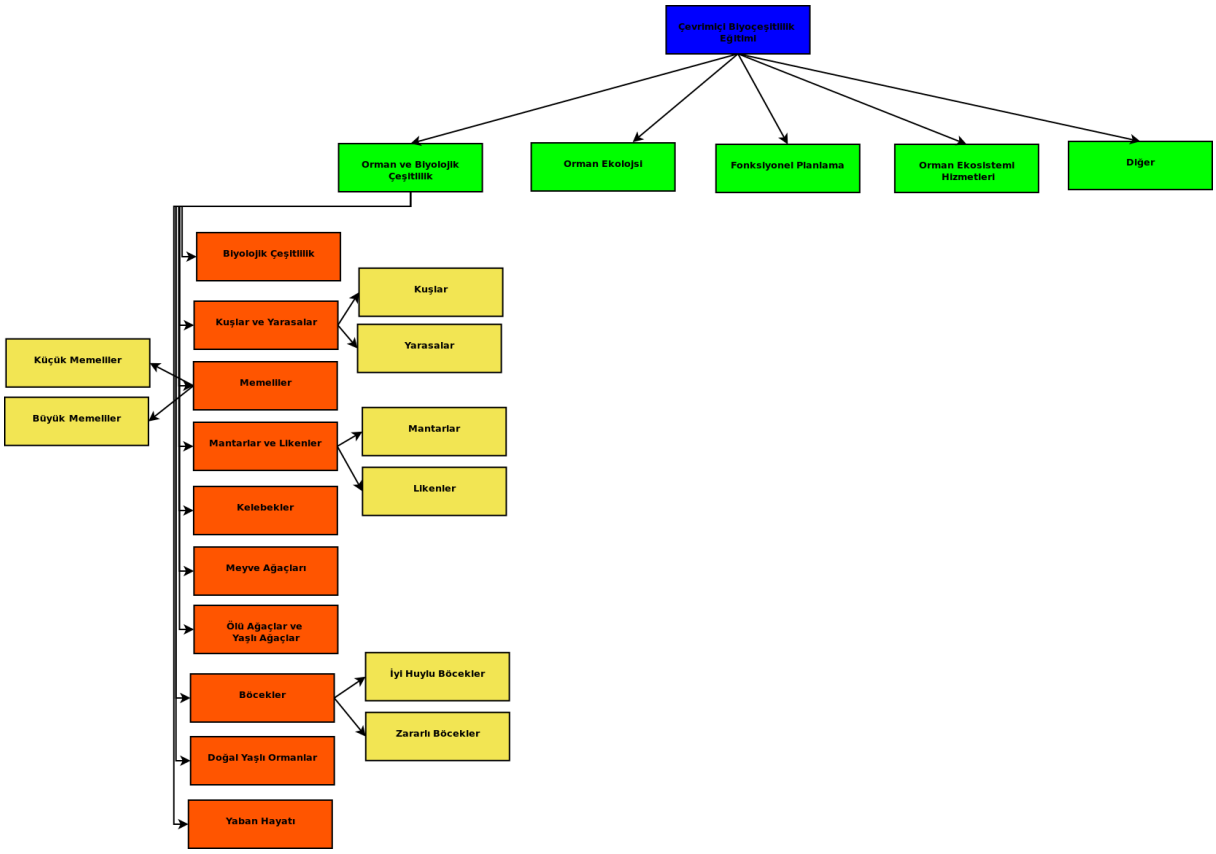

Figure 3.5 Hierarchy of the content implemented in the Online Biodiversity Training Tool OBTT_v0.0.08

Delivery Development:

Due to this study basis on DDR requiring rapid development and iterative improvement, Moodle was selected as main framework for OBTT. Moodle (Modular Object-Oriented Dynamic Learning Environment) is an open source course management system (CMS) as also known as learning management system (LMS). Moodle as an open source platform provides developers to be able to modify any part of the system. Due to methodology of the research, Design and Delivery Development, basis on iterative cycles and requires rapid system-wide changes to be managed. Moodle's object-oriented infrastructure allows developer to be able to make that kind of modifications. In this study latest stable Moodle

Release 1.9.9 is used. Moodle was installed on an Ubuntu Server with PHP4 and MySQL4 support.

Moodle has a very rich modules library including lots of attractive plug-ins to handle early discussed LMS needs. Lots of plug-ins which were found effective were applied and tested in the beginning of the pilot study. This version includes blocks: HTML, Upcoming Events, My Profile, Online Users; and modules: Discussion Board, Book, and Contact Form.

HTML block was used to create a non-course content related menu including links for Homepage, Scope, Discussion Board that is different than the original Discussion board module, which was applied after each section of training to obtain perception of users about that section, User Manual, FAQ, Contact, Other links. Upcoming events block was used to inform users about events in the online course with links to view the calendar. My Profile block was used to provide users an easy access to adjust their personal profile settings. Online Users block was used to display who are or had been online in the course. Discussion Board module was used to porvide a platform that participants can discuss and share ideas about biodiversity topic with instructors and other course users. Book module was used to present in a book like format as chapters and subchapters. Contact Form module was used to facilitate participants to reach instructors and technical support. The output of the form is adjusted to be forwarded to researcher and all instructors.

In the modules of Moodle, there were missing Turkish language translations, which lead to meaningless symbols formed. These missing translations had been completed during pilot study.

After selecting the main framework, the researcher started to fill up the OBTT with necessary modules in order to follow the requirements of DDLM delivery parameters, which are considered as usability, interactivity and the tools. The delivery was also criticized by NCC experts too. According to NCC experts, an attractive visual

environment is vital for the OBTT. Researcher followed up this suggestion by adding new definitions and classes in Cascading Style Sheets. Cascading Style Sheets (CSS) is a style sheet language used to define and manage the view and format of documents written in HTML. By default, Moodle and its themes are based on CSS. Using CSS enables to manage site-wide changes in style / formatting / view. Content of the tool was embedded to Moodle with respect to CSS. Also new classes were defined for additional needs such as different type of headings, text boxes etc.

As it was mentioned at the features of DDLM, high quality delivery is defined as carefully consider the usability. The features of a well-considered usability are keeping the information up-to-date, an easily understandable user interface with a good navigational support and an appropriate page length for consumers. Researcher followed up the usability by adding easy to understand blocks like My Profile, Upcoming Events, Content of Scope, Online Users (also shows online users at last 30 min.) and User Manuel blocks. He also removed the redundant modules/blocks that come with standard of Moodle, in order to eliminate redundancy. Nevertheless, researcher considered the scrolling problem as well. He re-categorized the content by cooperation with NCC experts in order to avoid long pages. Instead, he gathered all heading of the related subject under an index link on the left pane. Furthermore, in order to avoid long scrolling pages, beside, re-categorizing the subjects, content toggling (a javascript code) is implemented. Content that toggling is implemented become expandable / collapsible by clicking toggled content or plus / minus icon as another precaution that researcher took.

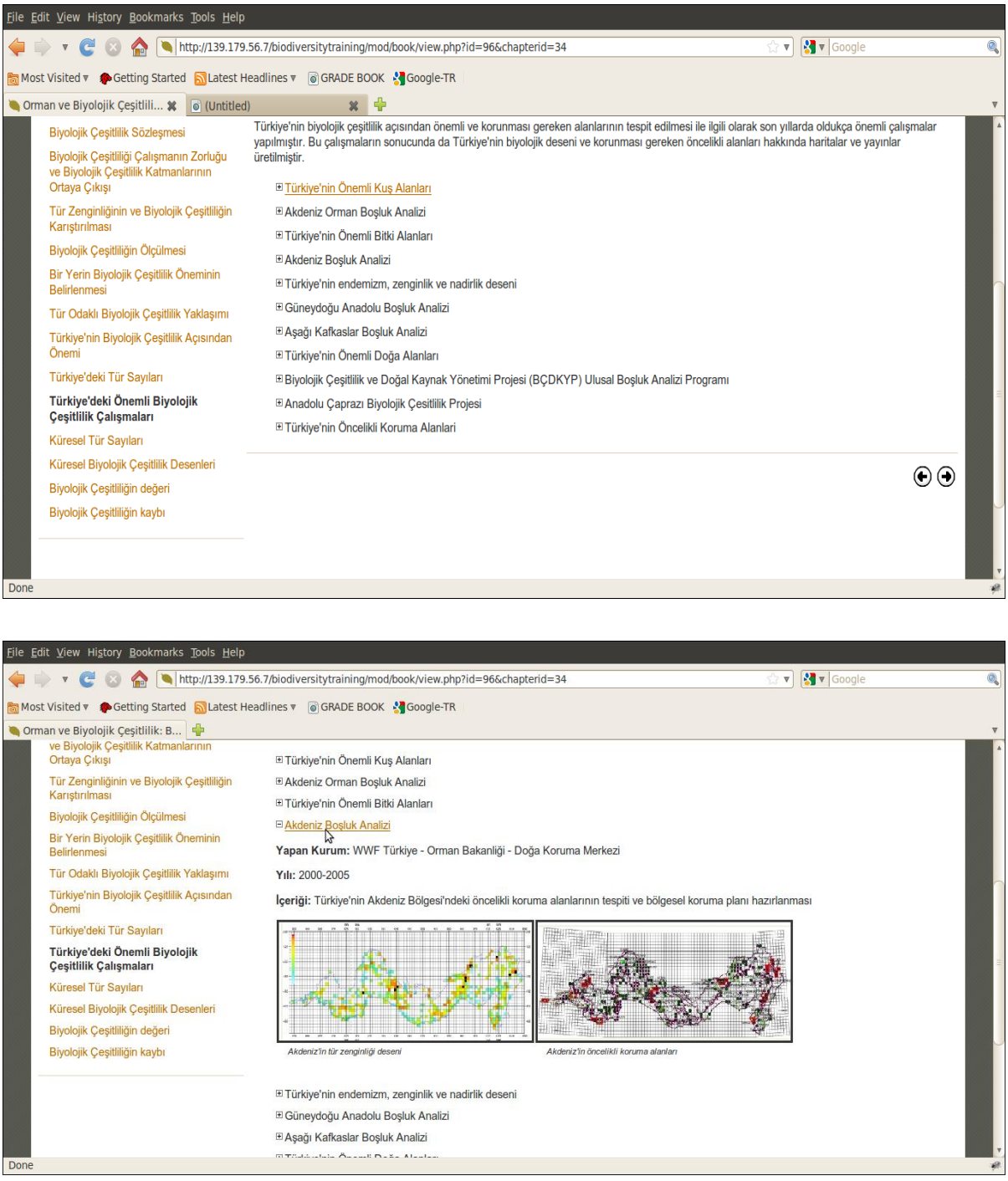

Figure 3.6 Content Toggling

Researcher also followed the parameters of adult learning as well like discovery learning, which is considered as one of main presentation mode for adult learners, focuses on providing menu of resources from which adult learner pick and choose to enrich their personal learning experience (Kidd, 2010). Asynchronous environment can be designed to allow learner to manage instruction by controlling content sequence, pacing, access to learning support (Clark & Mayer, 2008). Dividing concept into smaller meaningful chunks and presenting them via a drop-down menu have been supported discovery learning mode. Researcher decided that Moodle's default menu was found a bit weak to handle large amount of hierarchical menu items. Drop-down menu allows representing the hierarchy of the course subjects. This also removes the need for site maps since it acts like a dynamic site map. One other advantage of Drop-down menu is that it enables to navigate in whole web site content with just one click. Dynamic expansion and collapsion of menu items provides navigation menu to take up less space. Thus a javascript dropdown menu is integrated to Online Biodiversity Training Tool.

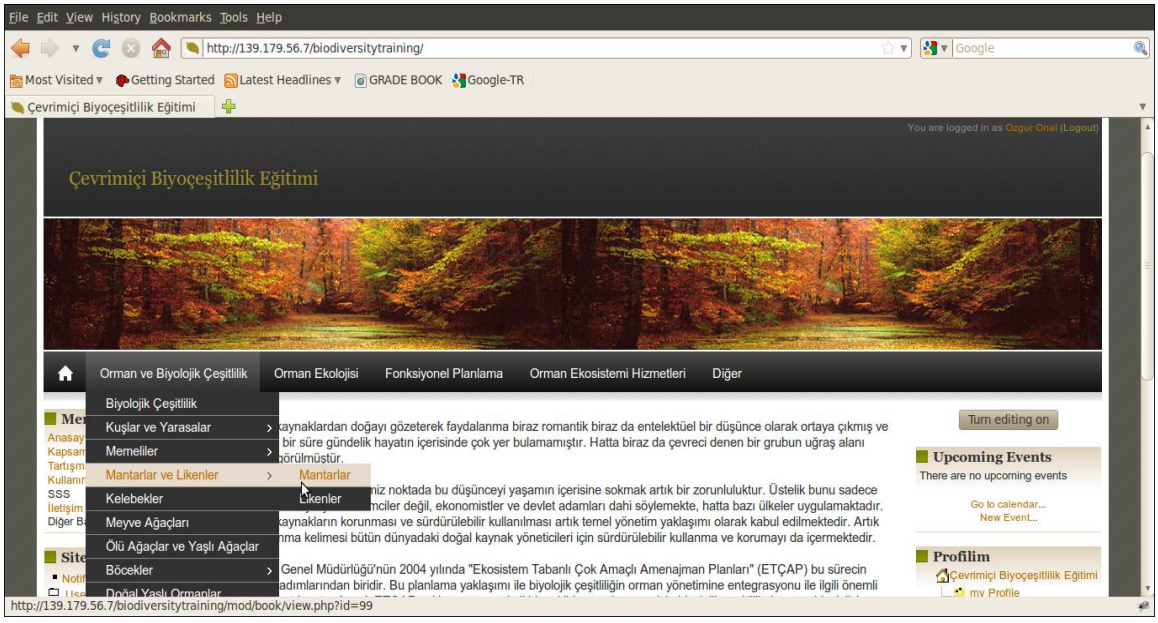

Figure 3.7 Javascript Drop-down Menu

The other important characteristic of delivery with the DDLM framework is tools. The tools that researcher used at pilot study are;

A theme ‘autumn’ was selected and modified. Content related icons, images are added to provide close authentic workplace environment. Lightbox, a javascript based effect used to overlay images on the current page by allowing images to be presented in a slick window, while darkening the rest of the page.

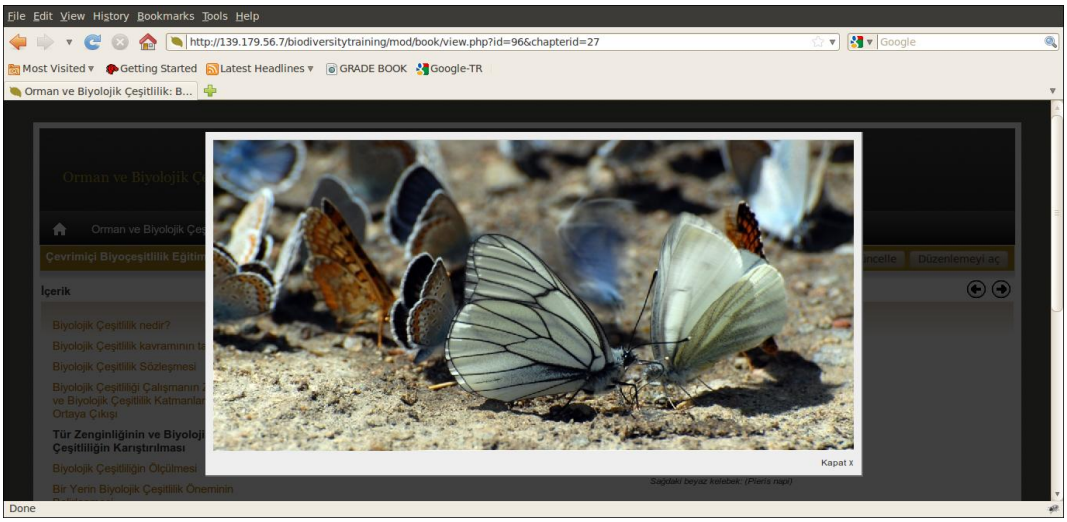

Figure 3.8 Lightbox effect on picture / image links

Videos recorded from NCC's previous workshops were synchronized with the presentations presented during these workshops. For synchronization, VCASMO, a web based multimedia presentation service, was used. In addition to synchronization of multimedia files, Vcasmo was used to host the videos (see Figure 3.9).

Figure 3.9 View of a presentation synched with video

In each day of the biodiversity workshops conducted by NCC had there was an approximately half an hour closing session for evaluation of that day by discussion and questioning. Practice activities are necessary for learners to assess their performance, and change their learning strategy if necessary (Ritchie & Hoffman, 1997, p.23). In OBTT, practice activities have been added at the end of each chapter. These activities consist of multiple choice questions. Practice questions were prepared and chapters' practice activities parts were formed by NCC members and researcher collaboratively.

Training had been given to NCC members about how to create effective practice elements in terms of Clark and Mayer's principles for practice. Clark and Mayer (2008) suggested principles to leverage practice such as: mirror the job, provide explanatory corrective feedback, determine the amount of practice based on job performance requirements; distribute practice throughout the learning environment, apply the multimedia principles to the design of practice questions, and transition from examples to practice gradually via fading (p. 236). It has been decided to form practice questions pool. This practice questions pool, was controlled by both researcher and a support team created from NCC experts regularly in order to quick response to the questions asked by the users via contact form that had been added and arranged to be forwarded to the

researcher and the support team. Interactivity characteristic of DDLM framework was meant to be provided with this way. Another item of OBTT created by researcher and the support team collaboratively that provides interactivity was a Demographic Survey.

A demographic survey (Ön Bilgi Anketi) was formed (see APEENDIX K) and requested to be filled by participants in the beginning of the course. In biodiversity workshops, there is a session called general view of course in which aim, objectives of the course were mentioned and expectations of trainees and trainers were discussed. To apply this in web platform, this practice was added as a discussion board however it has been decided to add it under the demographic survey. Furthermore, an OBTT evaluation survey (Çevrimiçi Biyoçeşitlilik Değerlendirme Anketi) was formed and added to the tool.

Finally a Welcome page had been added. The welcome page includes a brief explanation on the purpose of this online material, which developed with NCC experts according to both learning science and biodiversity parameters. There was forest based theme under the identity of the material. There were three main bars on the right pane, which are 'Login', 'Online users' and 'Contact form' from up to down order. There was also multiple redirector of Login on the welcome page, which are at the right top, right bottom and just under the information. Finally, there was the name of platform at the bottom of the welcome page.

Service Development:

The service development of this study was proceeded in order to provide the resources, for administrative and technical support in addition to the needs for learning. Staff of this study was adequate for this purpose. First of all, NCC experts are greatly experienced at biodiversity training and they are well qualified on the field that almost all has PhD at plant biology. They were also trained during study to create effective practice questions for e-learning. A support team was formed from these experts that would respond to the users, whom have a question about the content of training via mail, phone and direct

contact. Quality of this service will be assured by controlling its accessibility and responsiveness.

The administrative and technical support needed was given by the researcher, who is well-qualified at computer science through his background. He would respond to the any question that addresses the usability and accessibility of the tool. All these characteristics would be provided by contact from that had been added and arranged to be forwarded to the researcher and the support team.

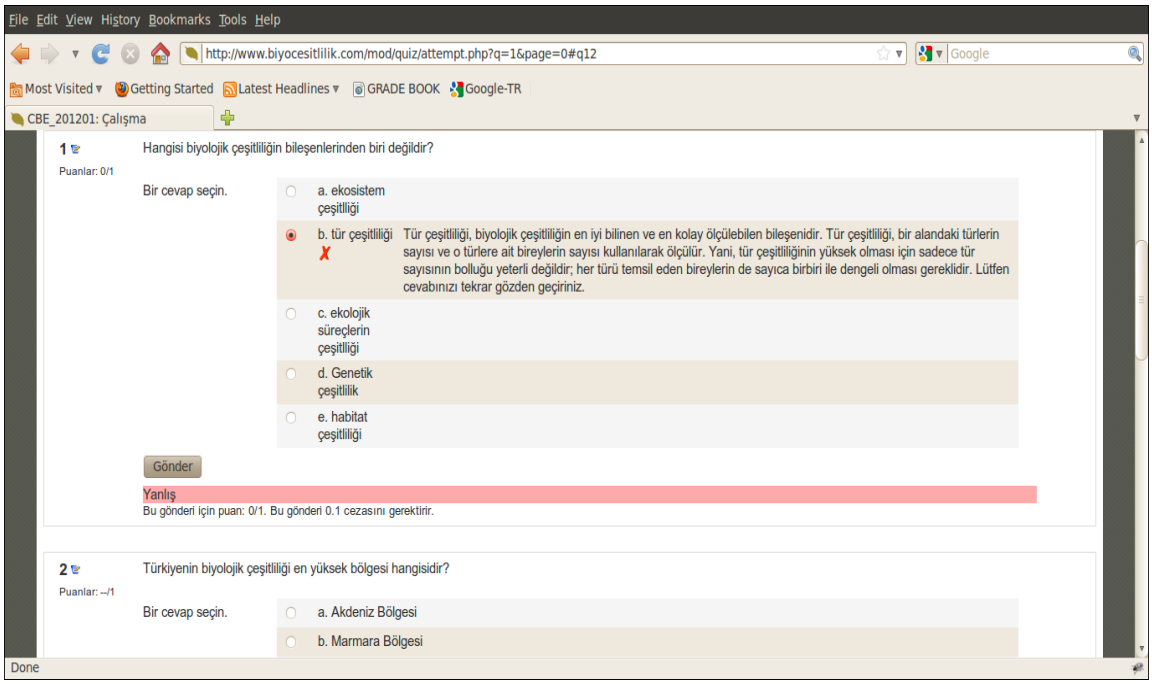

Figure 3.10 Screenshot of a practice activity & feedback

3.5.1.3 Evaluation

After implementation of OBTT, researcher asked NCC experts to evaluate the tool according to their experience of what forest engineers need and expect from this training and the tool. He both interviewed with the experts and asked them to fill the evaluation survey questions. After half an hour interviews, participants, experts, filled the survey.

In evaluation phase, the researcher listened and transcribed audio files recorded during the interviews, to text via MS Word 2010. Text data transferred to Nvivo 7 for qualitative analysis immediately afterwards. Moreover, survey results had been entered into IBM SPSS Statistics 20 to implement quantitative analysis. The results were presented in chapter four in detail. However, the considerations about pilot study according to evaluation are given below.

- Content should be divided into smaller segments
- The tool should me more interactive. Examples should be increased in order to develop interactivity of the tool
- Time interval should be rearranged. Consistency and fluency should be developed.
- Directivity of the tool should be increased. Navigation properties of the tool should be rearranged.
- The design of the tool should be easier and more attractive. The menu items should be rearranged.

3.5.2 First Iteration

The first iteration includes phases of diagnose, redevelopment and evaluation of the material. Researcher started with issues related with content according to pilot study considerations and made related changes like adding new information to OBTT or redesign the content with a new order. Researcher developed the first iteration prototype with respect to outcomes of the pilot study. After diagnose and development, he implemented the new OBTT prototype and requested to 40 forest engineers to complete the training program. After he contacted with GDF, he send invitation letter to the forest engineers (see APEENDIX G). Researcher completed the first iteration with evaluation of OBTT according to feedbacks given by participants.

3.5.2.1 Diagnose and Re-Development

Content Diagnose and Re-Development

Pilot study prototype was applied to the NCC experts. However, this prototype after first iteration would be applied to forest engineers. The content would be extended to its almost final state. According to pilot study considerations, content was cut into smaller segments and rearranged according to Biodiversity workshop executed by NCC, which has a logical flow through sessions.

As Gay (1986) emphasized more structured / linear environment should be provided for learners whose prior knowledge of the subject is low and learners whose prior knowledge is high can be given more control over the instructional system. Also Charney (1987) stated that learners who are new to the subject domain may sequence the information poorly or omit important information altogether with non-linear /less structured learning systems. According to Depover & Quintin (1992), age, prior knowledge, learning progress, complexity of material and familiarity with the subject of learners are the dependencies for the degree of learner control. Forest engineers, subjects of this study, are adult learners considered as familiar with course subject. So the content of the tool was designed in more learner control / non-linear manner. However content hierarchy of first design were found ill-structured when compared with the content flow of workshops after biodiversity workshops report formed. Content hierarchy had been rearranged to provide trainees a recommended path to follow up the course without removing the flexibility of navigating any user interface of their choice.

The content of the tool at pilot study was designed in more learner control/non-linear manner. However content hierarchy of first design were found ill-structured when compared with the content flow of workshops after biodiversity workshops report formed. Content hierarchy had been rearranged to provide trainees a recommended path to follow up the course without removing the flexibility of navigating any user interface of their choice. In order to accomplish this purpose, an activity lock module had been

added and a dependency policy was applied. According to these changes, the trainees wouldn't be able to move along the chapters, rather one had to finish one chapter in order to access to the other chapter in line. Also the content has been re-categorized by dividing into smaller segments and adding new chapters in order to extend it into its final state. Content of 'Orman ve Biyolojik Çeşitlilik' main chapter have been divided and renamed as 'Orman Biyolojik Çeşitliliği ve Ekosistemi' and 'Orman Ekosisteminin Parçaları' chapters. A new chapter, name 'İzleme' were prepared and added to the prototype and 'Orman Ekolojsi', 'Fonksiyonel Planlama', 'Orman Ekosistemi Hizmetleri' and 'Diğer' chapters were distributed into those three new chapters accordingly. Finally, a demographic survey under 'Ön Değerlendirme Anketi' topic at beginning and an evaluation questionnaire under 'Çevrimiçi Biyoçeşitlilik Eğitimi Aracı Değerlendirme Anketi' topic at the end have been added.

After re-categorization, course content is divided into five main categories: 'Orman Biyolojik Çeşitliliği ve Ekosistemi', 'Orman Ekosisteminin Parçaları', 'Sürdürülebilir Ormancılık', 'İzleme', and 'Colloborative Study' according to workshop. Each category was representing the each day of workshop.

As it is seen in Biodiversity Workshops Report (see APEENDIX M), there is a logical flow in lecture sessions. According to objectives, workshop is divided into two sections. First two days aims to cover the objective for increasing awareness of biodiversity in forestry applications. And the last three days focuses on the second objective planning / applying forestry applications with respect to biodiversity. For example; first day, introduction part, provides big picture of ecology and biodiversity, in second day more detailed information were given third day and fifth day included applications which were designed to be given after the first two day lectures.

At the beginning a demographic survey has been added in order to get information of trainees and learn their perceptions. It will be discussed at chapter four in detail. In biodiversity workshops, there is a session called general view of course in which, objectives of the course were mentioned and expectations of trainees and trainers were

discussed. To implement in OBTT, a discussion board is created as a first activity of introduction part. In Biodiversity Workshops, each day had an approximately half an hour closing session for evaluation of that day by discussion and questioning. Due to lack of these activities in current design, it is decided to add practice activity and discussion board in the end of each part.

All content of this session were previously created and embedded to OBTT. Now it is rearranged and presented under topic Elements of Forest. Practice activity and discussion board are decided to be added in the end of this section.

Figure 3.11 Screenshot of 1st Part Discussion Board

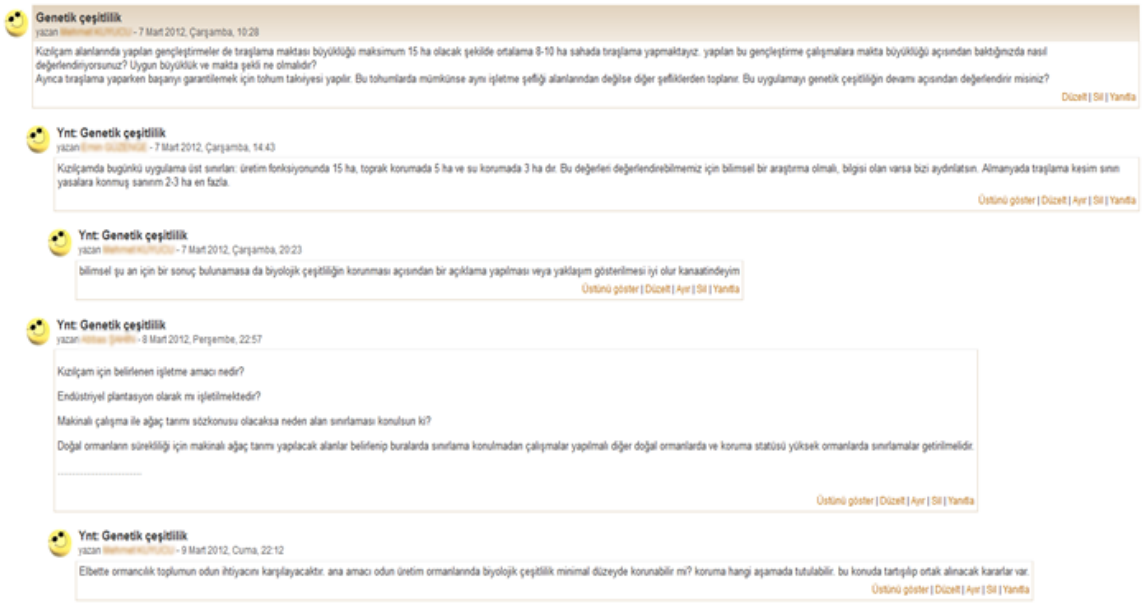

Figure 3.12 Screenshot of a Popular Topic

Third day of workshops consist of a field study in which trainers and trainees went to the application forest to observe and evaluate forestry applications in terms of biodiversity. It consists of demonstrating samples of the concepts mentioned in previous days, the importance of the area for species, requirements of the habitat for the species to survive etc. in forest. It enables trainees to observe the concepts given in their working area. This application is decided to be adapted as a session including demonstration of video sessions of third day field study recorded in workshops.

Fourth day consists of lecturer sessions about relationships and processes in forest ecosystem in terms of disturbance, and surveillance. It is started to evaluate materials to form content of this section. It is decided to present surveillance content under 'İzleme' main menu item and to move disturbance part under 'Orman Biyolojik Çeşitliliği ve Ekosistemi' title. Practice activity and discussion board are decided to be added in the end of this section.

In the 5th day of workshops a collaborative study had been conducted. Trainees were grouped according to their work areas. Groups had been requested to review and evaluate current forest management plans. Then, what can be done to improve those plans in terms of biodiversity was discussed. How to simulate this method in OBTT is still in discussion. Integrating a video conference system is the candidate that focused on. But it is decided to get a conclusion after it is discussed with General Directory of Forestry. Researcher did not try to design this study through first cycle.

Delivery Diagnose and Re-Development

According to pilot study implementation and evaluation phases, the OBTT was brought to its mature state by researcher both for content and delivery. After content analysis was applied, the researcher made some changes and additions in delivery as well. Parameters of DDLM and the results of pilot study evaluation were taken as a baseline for changes and additions.

First of all, the tool has been migrated to biyocesitlilik.com from local domain. Server and utilization independency was provided to the tool. Formerly, external links were given for the videos hosted in Vcasmo, and it was working but later some streaming speed problems causing inaccuracy to reach the files were encountered. So it has been decided to migrate those video files from Vcasmo to the server hosting the Online Biodiversity Training Tool server.

In pilot study development process, practice activities parts for each content category have been added at the end of each chapter. However, according to evaluation results, those practice questions were evaluated as insufficient. Thus, more practice questions were prepared and question pools formed for each chapter. For any practice event, questions are randomly pulled from related chapters' question pool. Another change accordingly was addition of Discussion boards at the end of each chapter to encourage an interactive and collaborative platform for participants. NCC members will be moderator

of the discussion boards as subject-matter experts and a brief training had been given to them about discussion boards.

When characteristics of subjects of the research are considered, using more learner-centred / non-linear structure has been decided and applied on OBTT since first design. But it is decided to add instructional elements such as general view of the course activity, practice in the course. To guarantee that those activities are accomplished by trainees and activity lock module had been added to OBTT. In addition to that, activity lock system is considered to be used as a facilitator for users to follow up the course with a recommended path without restricting navigation between course materials.

Table 3.1 Dependency List of OBTT parts

Parts of Course	Dependencies
Orman Biyolojik Çeşitliliği ve Ekosistemi	Kursa Genel Bakış
Orman Ekosisteminin Parçaları	Kursa Genel Bakış Practice for 'Orman Biyolojik Çeşitliliği ve Ekosistem'
Sürdürülebilir Ormancılık	Kursa Genel Bakış Practice for 'Orman Biyolojik Çeşitliliği ve Ekosistem' Practice for 'Orman Ekosisteminin Parçaları'
İzleme	Kursa Genel Bakış Practice for 'Orman Biyolojik Çeşitliliği ve Ekosistem' Practice for 'Orman Ekosisteminin Parçaları' Practice for 'Sürdürülebilir Ormancılık'
Grup Çalışması	KursaGenelBakış Practice for 'Orman Biyolojik Çeşitliliği ve

Table 3.1 Dependency List of OBTT parts (cont'd)

	Ekosistem'
	Practice for 'Orman Ekosisteminin Parçaları'
	Practice for 'Sürdürülebilir Ormancılık'
	Practice for 'İzleme'

A homepage including links to all content is added and drop-down java menu removed in OBTT to facilitate to show the flow of content more clearly.

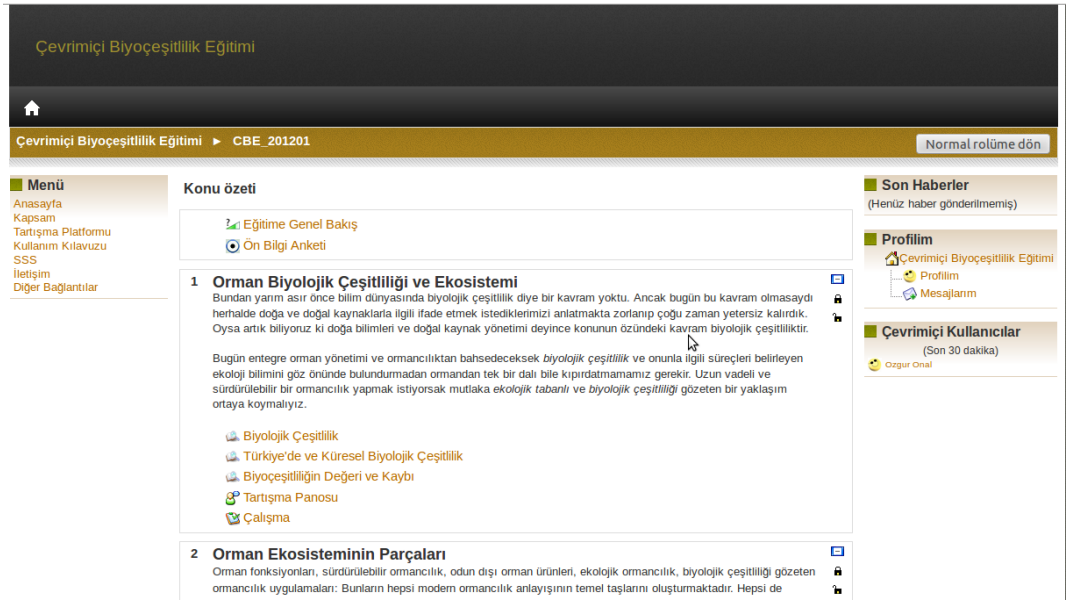

Figure 3.13 View of homepage with new categorization

Service Diagnose and Re-Development

Since NCC experts were the subjects of the pilot study evaluation phase, there were not too many considerations about service development. However, NCC experts were experienced of being user in the OBTT that makes them understand the possible user problems could be encountered. During whole development process, both NCC experts,

whom will be responsible to answer the forum questions asked by forest engineers, and the researcher, advanced themselves in order to meet consumers, forest engineers, demands.

Another changes made in service development was associating the tool with biyocesitlilik.com domain and migrating the video files from Vcasmo server to the server hosting the OBTT. Usability and independency of the tool was provided.

3.5.2.2 Evaluation

Researcher send invitation letter to 40 forest engineers, however, only 15 responded and started to training program after implementation. Unfortunately, only six of them were able to finish the program. All six engineers evaluated the program according to two data sets, assessment survey and interview questions. The results presented in chapter four. Each participant fills the assessment survey at the end of the training program according to their experiences in order to reveal their perceptions about program for another prototyping. The considerations that came out according to the results can be listed as:

- More examples should be added that must be relevant with forest management planning situations
- Skill developing examples should be added
- Interactivity of the tool should be increased by adding more graphic based examples
- Activity lock module should be removed. There should be no time limitations
- Service responsiveness should be increased. Faster links between trainees and experts.

3.5.3 Final Study

Final study was spread out to a long time period due to researcher's choice. After evaluation of first cycle, researcher started to make small changes according to the considerations and he decided to finish rapid prototyping. Final study includes the phases

of final design and development and implementation of the tool. At the end, he tried to validate whether online training material fulfils the requirements of forest engineers about biodiversity.

First of all, he made a research of finding skill developing samples for forest engineers. He asked help of NCC experts for this matter. After a cooperative work with experts, researcher add more samples from the pool that cover the needs of developing skills of forest engineers, which NCC experts prepared. However, after reviews with experts, he decided to constitute a new chapter covering authentic workplace examples. He implemented this new chapter to the tool immediately after.

After that, researcher tried to design a collaborative study about forming forest management plans, which would be parallel to the one that NCC experts conduct through their workshop. However, he wasn't able to implement this study to the OBTT. It was hard to capture the class atmosphere online.

Following this small changes, researcher implemented the tool online. From April 2013 to September 2013 invitation letter sent three times to the engineers which were determined by GDF. Unlike previous invitation letters, second cycle invitation letter do not include time and activity prerequisite to pass the sections and accomplish the course (see APEENDIX J). But due to lack of participation (see Figure 4.15) and insufficient data provided for tool evaluation, it is decided to conduct a second cycle. In this second period, researcher did not send invitation letters for this time. He arranged meetings with GDF administrators and took permission and fifteen names after those meetings. He contacted with those fifteen engineers personally. In addition to those engineers, five engineers attended first iteration and eight engineers participated in first period of second cycle were also invited.

Seven of new invitees, two of first iteration former participants and three of second cycle first period participants agreed to attend this training program voluntarily. Researcher gave brief information about OBTT to the new attendees and shared results of first

iteration with former ones. Guidelines to help participants about accessing and using the training tool and unique username and passwords were also provided.

Firstly, new attendees filled the demographic survey at the beginning. Then, researcher asked all of the participants to finish the training program within one month period. There was no time limitation and subject preference this time. All participants were able to finish the program in one month. After evaluating the program, researcher requested appointment with 12 participants. Finally Researcher conducted interview with that ten participants.

3.6 Data Collection

This study was conducted by using Design and Development Research involving qualitative and quantitative components as interview, demographic survey questions, and cooperated with DDLM involving tool assessment survey questions. Each data collection strategy "makes the world visible in a different way" (Denzin and Lincoln, 2000, p. 4). Characteristics of each five main concept of DDLM as content, delivery, service, superior structure and outcomes are selected as themes for related research questions. Summary of data collection instruments, research questions of the study and the related themes were presented in Table 3.2.

Table 3.2 Data Collection Instruments

Research Questions	Themes	Instruments
What are the factors that facilitate or undermine effective online biodiversity training for forest engineers in Turkey?	biodiversity and biodiversity training, technology and online training, time	interview questions, demographic survey, system logs
What are the perceptions of forest engineers about content of online biodiversity training tool?	comprehensive, authentic / industry driven	OBTT evaluation survey, interview questions
What are the perceptions of forest engineers about delivery of online biodiversity training tool?	usability, interactivity, tools	OBTT evaluation survey, interview questions
What are the perceptions of forest engineers about service of online biodiversity training tool?	administrative and technical support, staff, accessibility, responsiveness	OBTT evaluation survey, interview questions
What are the outcomes of the online biodiversity training according to the forest engineers' perceptions?	lower costs for learner and employer, personal advantages for learner, superior learning outcomes	OBTT evaluation survey, interview questions

3.6.1 Interview

Interview is one of the most effective methods for qualitative studies when the goal of the research is to gather subjective insights of interviewees. There are several ways of performing an interview. Firstly, face to face manner which has advantages like following the impressions and gestures of the interviewee. Secondly, an interview can be done by phone. Finally, thanks to the technological improvements, it can be done by online communication technologies like skype, etc. These manners of performing an interview can be conducted either one by one or as a group format according to purpose of the study.

As MacDonald (2001) stated that the interviews allowed researchers to gather deeper and supplementary data obtained through other research instruments such as program records,

temperature check, etc. Depth of detail from interviewee is possibly the greatest advantage of interviewing that is interviewing provides opportunity to figure out lived realities of the participants and perspective to the related event. Thus, when it is considered as a method to conduct qualitative research, interview is a technique that is used to understand the experiences of subjects, which makes it different from other methods of data collection in terms of exploratory and flexible structure (Seidman I, 1998).

There are four types of interviews, which are classified as general interview, conversational interview, open-ended interview and fixed-response interview. General interview aims to guarantee same information is gathered from each interviewee providing a significant focus and besides, allowing a degree of freedom and adaptability in getting the information from them. Conversational interview, which is also called informal interview, has no predetermined questions to focus interviewee's nature and priorities more. In open-ended interview, which is also called standardized interview, the open-ended questions are asked to all interviewees providing fast analysis and interpretation of results. Finally, in fixed-response interview, also called closed interview, same questions are asked to the all interviewees and answers from among the same set of alternatives are given to them for choosing. It is suggested for those having lack of experience in interviewing.

In this study, semi-structured interview has been used, which is a type of open-ended / standardized interview. Semi-structured interview is one of the most commonly used interview type in social sciences providing researcher an open medium in which new ideas may be brought up with respect to response of the interviewees during the interview. The interview questions of this study were chosen from the interview questions of DDLM study since it is the theoretical framework of this study. MacDonald et al. (2001) formed a team to develop those questions for focusing group in their study. This team was consisting of project manager, researcher, two research assistants, psychologist as content expert, and healthcare team manager. MacDonald et al. explained them the

goal of the interviews and provided guidelines for developing the interview questions. After the questions were developed, a telephone conference was conducted with the team to decide and select the questions and discuss the information should be collected via them. MacDonald (2001) explains the purpose of interviews as to discover experience of the participants with the program, specifically in terms of the elements of DDLM; content, delivery, service, structure, and outcomes (see APEENDIX D).

The interview questions proposed by MacDonald (2001) revised by researcher and field experts to adapt biodiversity training. After that, it is reviewed by thesis monitoring committee members. According to their reviews, first question 'What was your experience with the online biodiversity training tool? (probe with regards to content, delivery, service, and structure)' divided to separate questions to query the properties directly and individually. Also, questions 2, 6 and 13 were split into separate questions to be able to get answer to each of them. After revisions, interview schedule including 20 questions, translated into Turkish by researcher and checked accuracy by field experts and thesis monitoring committee members (see APEENDIX E).

3.6.2 Survey

According to Fink (1995), surveys are used for producing information to describe, compare, and predict attitudes, opinions, values, behaviour, and knowledge by collecting information from people. Converse (1987) defines the survey in her book as an instrument that serves as something of a social telescope in the social sciences. According to Converse (1987), that instrument serves some purposes of three constituencies: Elites, social scientists and the mass public and stated that "Social scientists use the sample survey for gathering descriptive data, for making inferences to populations, for building blocks of social theory, and for advancing their own disciplinary and intellectual career interests" (p. 1).

Beniger (1983) defined survey research as simply speak one's mind whether they would like to speak or not. He also emphasized the importance of survey research in business

and government to communicate with audience and receiving feedback from them in order to control their behaviors better.

You can clearly observe four main methods of survey research: mail surveys, in-person interviews, telephone interviews, and internet surveys. During this research, the researcher made use internet surveys. With the help of wide spread internet usage, it has been very common to distribute surveys cheaply and easily. Getting many responses from a number of various demographic which fits to a certain profile has been easier. On the other hand, the necessary access to the internet is not sufficient enough that has been an obstacle. For the time being taking a random sample of the internet users is impossible. In addition to it the other problem is that the researchers are not able to control the environment of the survey, it's not possible to make clear if all the participants are taking the survey seriously or not. It is challenging to answer the questions of confused participants and to be sure if a single individual is not taking the survey more than once.

In this study, the audience is forest engineers interested in the potential exploitation of this study, which is an online training program about biodiversity. Thus, a survey research was done by researcher both at the beginning and at the end of the study. Firstly, researcher put a demographic survey at the beginning of the training program in order to reveal the demographics of the participants. In biodiversity workshops, there was a session called general view of course in which aim, objectives of the course were mentioned and expectations of trainees and trainers were discussed. To apply this in web platform, this practice was added as a discussion board however afterwards it has been decided to add it under the demographic survey to ensure to collect data from all participants. As Alexander (2001) emphasized student profiles help to identify their needs and expectations in terms of age, gender, culture, work experience, prior knowledge, prior experience with e-learning, goals and motivation, attitude towards e-learning, learning patterns and styles, computer literacy, etc. Therefore demographic survey was extended to 16 questions at total to get that information from the participants.

The second category of survey questions were put at the end of program, which was called assessment survey questions. The purpose of those questions was to reveal the perceptions of the participants towards the characteristics of each element in OBTT according to DDLM parameters. There were five sub-categories under the assessment survey. They were content, delivery and service development as well as superior structure and learner outcomes of the study. Since the theoretical framework was DDLM, and the purpose of the questions were to reveal the perceptions towards the elements of the tool according to parameters of DDLM, the assessment survey questions were adopted from the DDLM interview schedule prepared by MacDonald et al. (2001). Researcher made no revisions in assessment survey through the study. Survey questions translated into Turkish by researcher and checked accuracy by thesis monitoring committee members.

MacDonald et al. (2001) stated that the aim of preparation of the survey questions was to query all DDLM variables. Moreover, their main objective was to develop an evaluation method applicable to any web based studies.

As reported in MacDonald's study (2002), final version of the survey derived from the original version including 196 items. The short survey included 59 questions in five scales: Superior Structure, Delivery, Service, Content, and learner Outcome with number of items 24, 10, 8, 8, 9 respectively (see APEENDIX B). Questions on each scale were accompanied by five response options: never, rarely, sometimes, often, or always. Positive responses indicated with high scores such as strongly agree=5, strongly disagree=1. MacDonald et al. (2002) reported the internal consistency of scales for content, service, structure, delivery, outcomes have high internal consistency reliability and meet tests of construct validity based on the DDLM framework as .93, n=77; .93, n=56; .97, n=63; .96, n=54; and .95, n=65 respectively. In this study, internal consistency of scales were recalculated and found high internal consistency for content, service, structure, delivery as reported in MacDonald et al.'s study with Cronbach's alpha coefficient .86, .88, .85, .88, .87 with n=22 respectively.

3.7 Participants of the Study

It is almost always impossible to study the entire population that you are interested in when conducting a research. That would be extremely both timely and costly. Thus, researchers generally use samples for gathering data. There are two types of selection of samples. First one is probability sampling. In this type, samples are selected in order to represent the whole population. Random sample, systematic sample, stratified sample and cluster sample are types of probability sampling, in which all the individuals have equal chance to be selected with a specific process of gathering samples. Because of this very reason, this sampling reflects the characteristics of the population from which they have been selected and by this way, it provides valid and credible results.. Second type of sampling is non-probability sampling that is divided into reliance on available subjects, purposive or judgmental sample, snowball sample and quota sample. In non-probability sampling, not all individuals have same chances to be selected. Thus, they are not truly representative. However, they are chosen according to some specific characteristics. Researcher can define these characteristics according to the needs of his/her project. This property makes non-probability sampling very suitable for qualitative research that researcher will not generalize his/her findings to whole population. Another advantage is obviously less time and cost dependency of this sampling method (Babbie, 2001).

Judging according to their properties, purposive sample type of non-probability sampling will be conducted in this research. Purposive sampling is constructed to serve a very specific need or purpose and based on knowledge of a population (Miles and Huberman, 1994). The aim of this process is not to generalize conclusions but represent wide range of experiences related to the study. Thus, due to the structure of the study, researcher defined some prerequisites for participants. Selecting participant criterion is: having basic computer / Internet usage skills, having personal computers with Internet connection or able to access computers having Internet connection.

Population of this research is forest engineers that work within GDF that have lack of biodiversity knowledge. However, since the laboured forest engineers in the GDF organization are dispersed through all over the country, it was not possible to reach whole population. Thus, first, researcher aimed to reach the forest engineers that work in Ankara since it is capital city of Turkey, where all ministries are gathered together that includes Forest and environmental ministry and GDF. Researcher aimed to reach the forest engineers that work within GDF and have duty of forest development planning. Moreover, most of the forest engineers are computer literate. Thus, the specific sample selection purpose of the researcher will be accomplished since he has high variety of options.

Sampling for Pilot study

After designing and developing the first prototype, researcher implemented it in spring semester 2010-2011. He requested NCC experts to be the participants of pilot study evaluation. The aim of the researcher was to bring the prototype to the closest state of its superior structure before evaluating with forest engineers. Four NCC experts agreed with that purpose and voluntarily accepted to attend to the study. One out of four experts was female. All four experts were conducting PhD during the study. They were all very experienced about biodiversity and biodiversity training since they were conducting a workshop about biodiversity training. They were also familiar with the requirements of forest engineers.

Sampling for First iteration

After detailed analysis made with NCC experts collaboratively according to the considerations of pilot study, researcher improved the diagnosed issues and redeveloped the tool. After implementing the tool online in spring semester of 2011-2012, researcher send invitation to 40 forest engineers from a list that was given to him by NCC experts through their connections via GDF. Since NCC experts conducted a biodiversity workshop, they had connections with the administrators of GDF. 15 engineers returned to

the invitation letter and started to the program. Nine engineers quit the program because of workload on their jobs. Six of the engineers were able to finish the program and evaluate it through assessment survey.

Sampling for Final study

After redesign and development of the tool with respect to first iteration findings, researcher conducted a final study to validate if OBTT is appropriate tool to train forest engineers about biodiversity. Researcher implemented final prototype at fall semester of 2013-2014 to understand whether OBTT works or not. He contacted with the administrator of GDF that he met by means of first iteration in order to take a list for selection of final study participants. During the time period between April to September 2013, invitation letters were sent to forest engineers for three times. However due to lack of response, researcher decided to contact subjects directly. 28 forest engineers were contacted via phone and email. Five of the invited engineers were the participants attended first iteration and eight of them were the participants attended in first period of second cycle but were not able to finish the course. Three former trainees of second cycle first period and two of first iteration participants accepted to join. Second period of final iteration ended with 12 forest engineers' participation.

3.8 Researcher's Role

In means of a qualified study, the researcher uses the crucial tools for gathering, analysing and interpreting data (Merriam, 1998). On the contrary, in many studies, researcher has no impact on study and results. S/he cannot communicate with participants but s/he can only collect the data that participants have provided. Therefore, the researcher is the main tool in order to collect data for a study. According to the paradigm, the existence of the researcher in the participant's life is vital. (Marshall & Rossman, 1999). Throughout the whole study, this part of the study will focus on the researcher's role on the research.

According to Merriam (1998), the qualitative researcher needs to have a huge tolerance for ambiguity, to be reasonable to the context, all variables within it and biases, to be a good communicator. For both qualitative and quantitative research methods the researcher had a background. During this research, for all stages of the study he chose to use both quantitative and qualitative data collection and analysis methods. He had a pragmatic perspective in data collection. He participated in all stages of preparation, collection, transcription and analysis stages. During all processes he tried to be objective. The researcher was sensitive throughout the whole data collection procedures. He allowed silence from time to time and changed the direction of the interview whenever needed. In every step of the study, the researcher was a successful listener. He made use of the data recording device in all interviews as he received the permission of the participants so as not to miss any words or ideas of the participants. He also paid attention to the transcription of interview data in order not to make mistakes. Nvivo qualitative data analysis tool was used for transcribing the interview data.

In addition, researcher graduated from department of computer education and instructional technologies. He participated in both projects and lessons that involve learning objects and online materials. After graduation, he worked as technical support at biological sciences department. He had a lot of experiences for developing and managing online materials through this working experience. Also, he got the idea of developing such an online material from his social environment that he gained while he was working at biology department. He met NCC experts there. Thus he had a daily basis communication with the NCC experts, which made an active cooperative work possible with them as collaborative manner.

3.9 Ethics

Ethics is an essential put out to be given the necessary importance according to the studies. As Kimmel (2007) states ethical issues had been involved to research process initially since research questions were shaped.

In order to check for availability for regarding ethical issues of this specific research study, ethics committee of the university has been consulted by researcher. He gave detailed information to the chosen committee members about aim of the study, research questions and participants of the study, method of the research, consent form and the data collection instruments., Receiving the permission from the committee, the researcher communicates with the GDF administers for getting permission and contact information of the candidate participants. Having collected the data from the forest engineers that work within GDF permission had been given by the commission, the researcher made a presentation to the GDF administers and forest engineers before he implemented the study.

During the implementation of OBTT the researcher had given information to all the participants about the research carefully. He had informed them on interview sessions and the survey questions before the introduction of the study. Prior to the interview sessions the researcher got permission from the participants in order to record on digital audio tape. It was the participants' own will to quit the interview and evaluation sessions unless they wish to. In addition to it the data which was collected was not to be used apart from this research. The interviewer was to the researcher himself. Accordingly, he tried to be objective and avoid any interventions which might affect the participants' responses. Moreover, participants were given the right to know about the results of the study. In case of an understanding that the results were misused or misunderstood, results would immediately change accordingly. The consent form had been read, agreed upon and signed by both parties. Researcher tried to protect his objectivity during entire interview sessions and other steps of the study.

3.10 Trustworthiness

Validity and reliability issues are very important in order to have a valuable study which can result in realistic outputs. In general, validity means whether findings correspond to reality in research studies. Anastasi and Urbina (1997) stated that, in social science, validity can be described as measuring the right things, whereas reliability can be described as measuring the things right. A survey, an interview or any other instrument are said to be valid if they actually measures what they are supposed to measure. On the other hand, any instrument for data collection is said to be reliable if they are able to produce the same results when measured at different times or by different participants. Furthermore, Creswell and Miller (2000) stated that a researchers' perception about validity affects the validity of research directly. The trustworthiness of this study will be examined under three topics. These are internal validity, reliability and external validity.

3.10.1 Internal Validity

Different strategies were used to deal with the validity issue by the researcher. In order to obtain the validity and reflection of these strategies the types of the strategies which are used are listed as;

- **Triangulation;** Triangulation is one of the important strengths of case studies which is the possibility of collecting several sources of data. (Yin, 2003). This is a procedure which the researcher tries to find the common points between the results by using multiple investigators, various sources and several methods (Cresswell & Miller, 2000; Miller, 1998; Patton, 1990; Shenton, 2004). Researcher conducted both qualitative results by interview sessions and quantitative results by survey questions. The consistency of the answers of the participants was checked throughout the study by comparising the interview and survey results. These both instruments were purposed to reveal the perceptions and attitudes of forest engineers about OBTT.

- ***Member Checks;*** This process includes collaboratively work with the participants for interpretation of raw data and drafts. Merriam (1998) defines the process as 'researcher asks whether raw data and explanations are accurate or not'. Thus, researcher sent interview data to interviewees in order to get their approval. He sent e-mails to interviewees that have attached raw data file, which is transcribed into MS word format with Nvivo program. Each participant responded back for conformation. Finally, feedback for plausibility was obtained by participants.
- ***Peer Examination;*** Peer examination is one of the strategies to increase validity of a research study (Merriam, 1998). Researcher asked his colleagues, members of Graduate School of Education, and NCC experts to comment on findings as they came out.
- ***Data Record;*** Researcher used digital audio recorders during the interviews. Researcher informed all participants about recording and got their permissions before starting.

3.10.2 Reliability

Reliability basically means that consistency of results when study is repeated. Reliability is the term which "refers to the extent to which research findings can be replicated" (Merriam, 1998, p.205). If the findings of a study are same after replication of the study, the results can be said more valid. Thus, it is clear that there is link between internal validity and reliability. In order to ensure the reliability of the study, Merriam (1998) suggested three strategies that a researcher should use, which are investigator's position, triangulation and audit trail. Triangulation was defined above.

- ***The investigator's position;*** Subject selection criteria, description of the subjects and environment, assumptions should be provided by the researcher. Assumptions, theories and researcher's position in the study should also be given (Merriam, 1998). During the sections 3.7 and 3.8, the researcher made clear his

position at entire study and stated his assumptions for this particular study as well as gave information about the participants of the study. .

- ***Audit Trial;*** A researcher should explain the data collection and the data analysis phases as well as how he made his decisions throughout the inquiry (Merriam, 1998, p205). Firstly, information about data collection procedure in each phase of the study was provided (see section 3.6). Furthermore, how themes and categories were constructed is explained in results chapter. Finally, information about how interpretation of data was made is given throughout the last chapter in detail.

3.10.3 External Validity

External validity is defined as ability to generalize a research study. It is one of the most controversial issues of social science validity matter. Most of the authorities claim that it is impossible to generalize the results of a case study to a population. Yin (2003) stated thatthis claim is eligible for statistical approach, however, in case studies, a different generalization, 'analytical generalization' can be done. In analytical generalization, population is not the base for generalization, but theory itself is base of generalization (Miles & Huberman, 1994). In this study, researcher had worked with GDF, where embody almost all forest engineers in Turkey. Voluntary forest engineers have different, well distributed age and working experience range. Researcher chose engineers from different departments of GDF, which means that participants have different types of obligations and duties.

The strategies that should be used to enhance external validity were defined by Merriam (1998) as;

- ***Rich, Thick description;*** Obvious description of the stages of the research design was given by researcher in detail.
- ***Typicality or modal category;*** .Uniqueness of this particular training program was emphasized by researcher throughout describing the training program in detail and explain what it is unique in Turkey.

3.11 Data Analysis

According to Bogdan and Biklen (1992), "data analysis is the process of systematically searching and arranging the interview transcripts, field notes, and other materials that you accumulate to increase your own understanding of them and to enable you to present what you have discovered to others" (p. 153). Data was tried to be analysed simultaneously with data collection as Merriam (1998) suggested. Researcher collected data through quantitative and qualitative approaches using different data collection instruments that is distributed to a long time period between spring semester of 2009-2010 and fall semester of 2013-2014.

3.11.1 Quantitative Data Analysis

Researcher used descriptive statistics to analyse quantitative data gathered through this study. Frequency, minimum, maximum, mean, and standard deviation values obtained from assessment survey evaluation. The scores of each value were processed by using SPSS 20 software package. According to Meyer, Gamst and Guarino (2006), Missing value analysis module should located in SPSS software package to deal with missing values. However, researcher used activity lock module at survey questions. This module blocked the passage to the other evaluation questions. Thus, there were no missing values.

Researcher also used demographic survey at the beginning of the program in order to reveal the demographics of participants. This data was processed with SPSS in order to figurate the personal information of participants.

Moreover, frequencies of system activity logs as login, view, and post actions of trainees were collected and analyzed to figure out participation level of this study.

3.11.2 Qualitative Data Analysis

Qualitative data analysis had been briefly described by Marshall and Rosmann (1995) as the process of ordering, structuring and giving meaning to the mass of data collected. Five categories had been constructed by them as data analysis process, which are organizing the data, generating categories, testing emergent hypothesis, searching for alternative explanations and writing the report. Researcher used the strategies defined in previous section to increase validity and reliability of qualitative analysis.

By order, researcher organized the data by using Nvivo 7 software package. This software transcribed the recorded data into written data of MS word type. This let the researcher to hold intact, complete, organized and easily accessible and manageable data (Marshall & Rosmann, 1995).

Then, he generates the categories, themes and patterns of this data by using the module of Nvivo. With aid of this module, a researcher can define different themes to categorize the interview data into a specific pattern. This would help to increase the reliability of the patterns.

Thirdly, researcher tested the emergent hypothesis. In testing emergent hypothesis phase, he evaluated the validity and the reliability of these patterns and categories. The parameters of validity and the reliability of the data were defined at previous section.

After that, researcher searched for reasonable and valid alternative explanations. This phase would help to researcher to choose the most plausible one from the pool of these explanations. This also increased the validity of the analysis results

Finally, researcher presented the data gathered through interviews. Participants' perceptions towards OBTT constructed the framework of the final report

3.12 Summary of the chapter

In this chapter, the researcher described the methodology he used for the research conducted for the study. More specifically, the researcher has given details about the design of the study, procedures of the study, selection of participants, instruments of the study including questionnaire and interview, validity and reliability of the instruments, validity and reliability of the study and finally analysis of the data collected.

CHAPTER 4

RESULTS

The aim of this study was to design and develop and online material for forest engineers to fulfill their needs to understand biodiversity and to validate this material. In order to do that, three research questions were prepared. The outcomes of two out of three questions comprise the findings to evaluate the OBTT. Those questions are about the factors to facilitate an effective tool in order to design and develop it and perceptions of evaluation phase participants about that tool in order to reach a superior structure and fulfill the needs of forest engineers. For answering those questions in this research, both quantitative and qualitative data collection methods were used. In all phases, researcher collected data by conducting interviews and survey questions. Perceptions and expectations of forest engineers towards biodiversity training and online professional development in order to reveal the factors will be demonstrated by demographic survey and interview results as well as their perceptions towards training program of this research after attending will be demonstrated by interviews and DDLM assessment survey. Researcher divided this chapter according to the results of each question relatively by the order of time interval of design and development. Results of each question searched will be given under two approach that are qualitative, which will be according to interview and demographic survey results and quantitative, which will be according to demographic survey again and assessment survey.

4.1 Demographics of participants

In this part, demographics of participants attended in prototyping cycles will be presented according to the results of demographic survey questions. There were totally 20 participants in this study. Four of them were NCC experts, who evaluated the pilot study and 18 forest engineers, six of them attended to the first cycle and 12 of them attended to the second cycle. Two of them attended to both first and second cycles. The attendees were coded according to the cycle they attended by number order. For example, C1S1 was the first subject in first cycle or C2S1 was the first subject of the final study (second cycle) etc. No qualitative data were used in this part.

Pilot Study. Researcher worked with four NCC experts during prototyping procedure. Three experts were male and one of them was female. He worked with them through whole procedure collaboratively and after pilot study development, he asked them to evaluate the content, delivery, superior structure and outcomes. All experts had computer and internet access both at work and home. For pilot study, demographics of participants, the NCC experts, attended in prototyping cycle were not presented since they are not the target group but they are collaborators. However, brief information will be given to reveal the background of the experts. All four of them have PhD at biology department. Their background on biodiversity distributed to a long time period of education. They reported that their relation with NCC started during their undergraduate education. They stated that they are familiar with the requirements of forest engineers about biodiversity subject due to their workshop.

First Cycle. In this part, demographics of participants, forest engineers, attended in first iteration were presented. Researcher send invitation letter to 40 forest engineers. 15 of those forest engineers started to the training program by filling the questions of demographic survey. Unfortunately, only six of them were able to finish the program and fill the assessment survey. All of the 15 engineers that started to the program were male and had computer and internet access both at work and home. Participants' age ranged

from 30 to 70 that you can be seen in Figure 4.1, which is parallel to their working experience within GDF that ranged from 3 to 40 years that you can be seen in Figure 4.2. They all work within GDF in department of forest management and planning from several cities around Turkey.

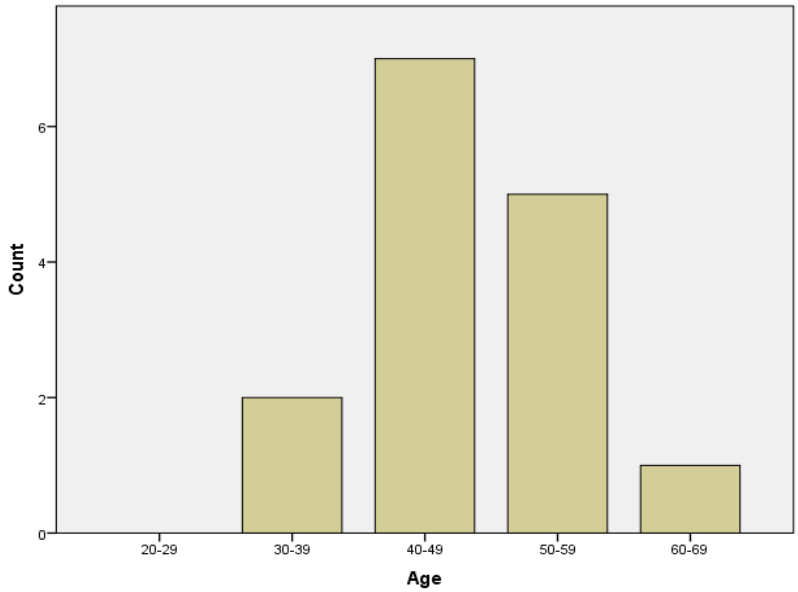

Figure 4.1 Distribution of participants according to ages

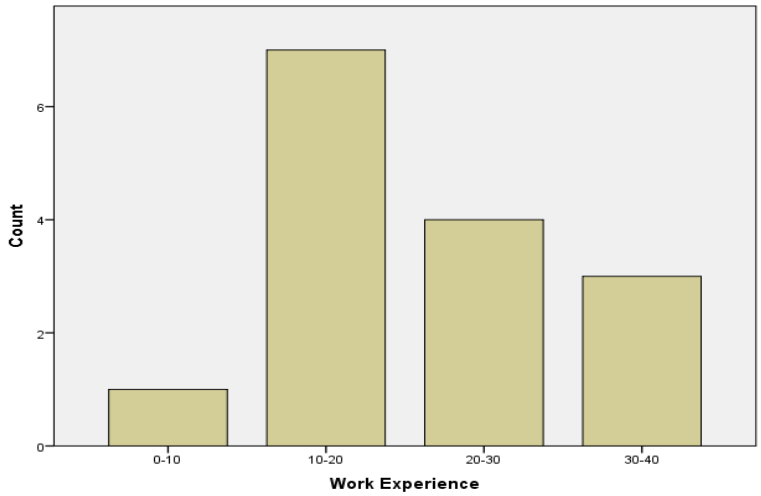

Figure 4.2 Distribution of participants according to working experience

Participants' perception towards computers was generally positive. Only three of them stated unbiased perception about computers. Figure 4.3 presents the perception of 15 participants towards computers, who began to the training program and fill the demographic survey. On the other hand, all of the participants reported that they are computer literate with the levels of elementary, intermediate and advanced.

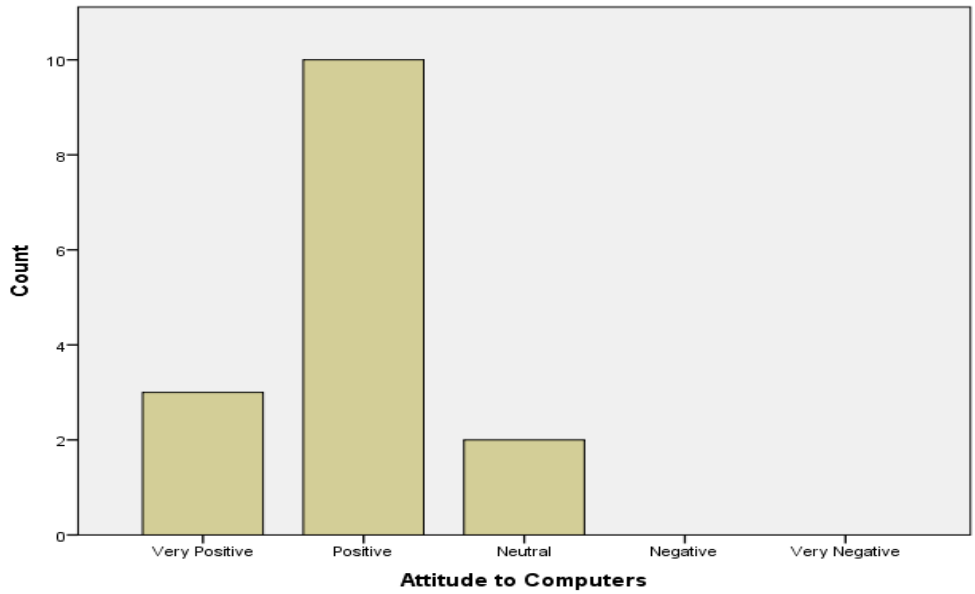

Figure 4.3 Perception of participants towards computers

Final Study. 12 forest engineers attended to the final study. Two of them were previous attendees. Those two were coded as C2S1 and C2S2. The rest of the participants filled the demographic survey. All 12 engineers that filled the demographic survey were males and had computer access both at home and work. Their age ranged between 30-70, which mostly distributed between 30-60, and only one of them was over 60 years old. Figure 4.4 presents the age distribution of participants. Accordingly, their working experience ranged parallel to their age, which was between 0-40. However, this time only one of

them was fairly new worker. The rest was experienced. Figure 4.5 presents the working experience of participants.

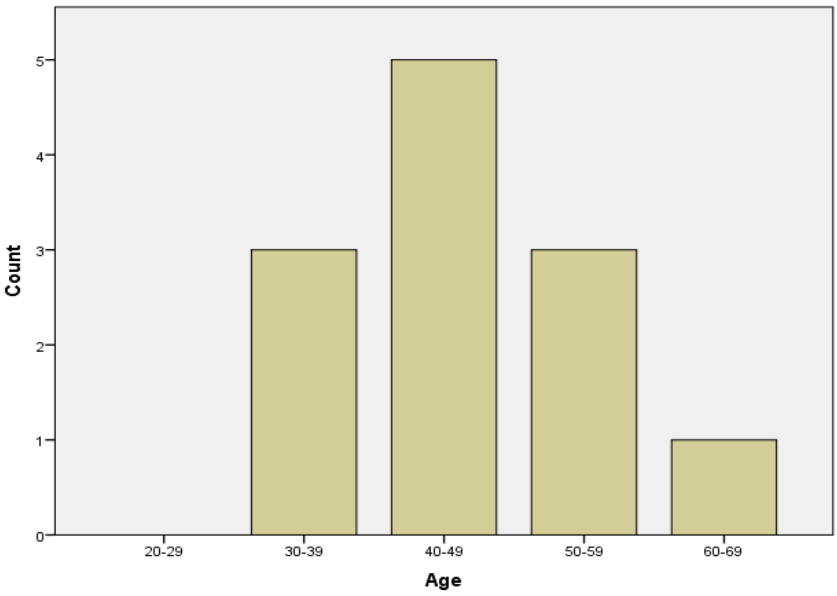

Figure 4.4 Distribution of participants according to age

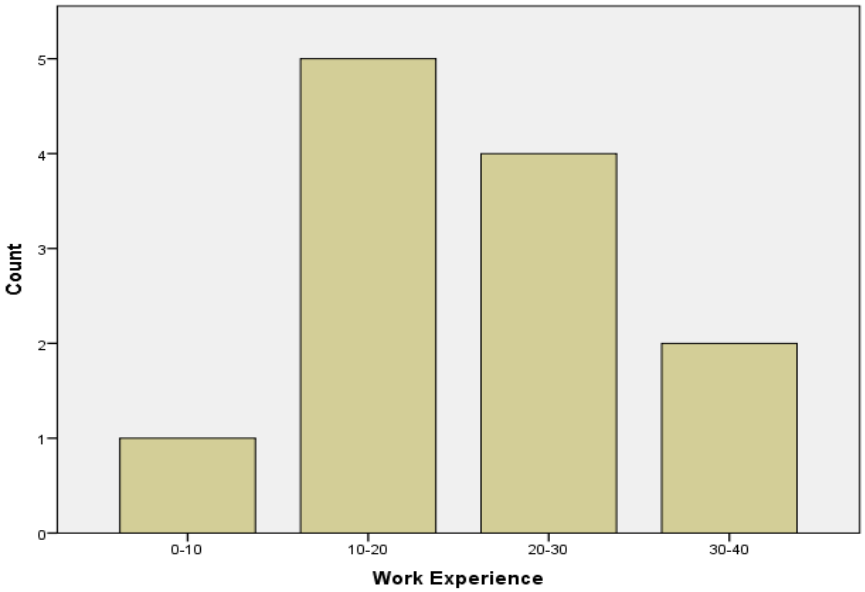

Figure 4.5 Distribution of participants according to working experience

Participants' attitudes towards computers at final study were generally positive. Four of them marked ‘Neutral’ to the attitude score. The other eight marked positive and highly positive for attitude score. Figure 4.6 presents the attitudes of participants towards computers.

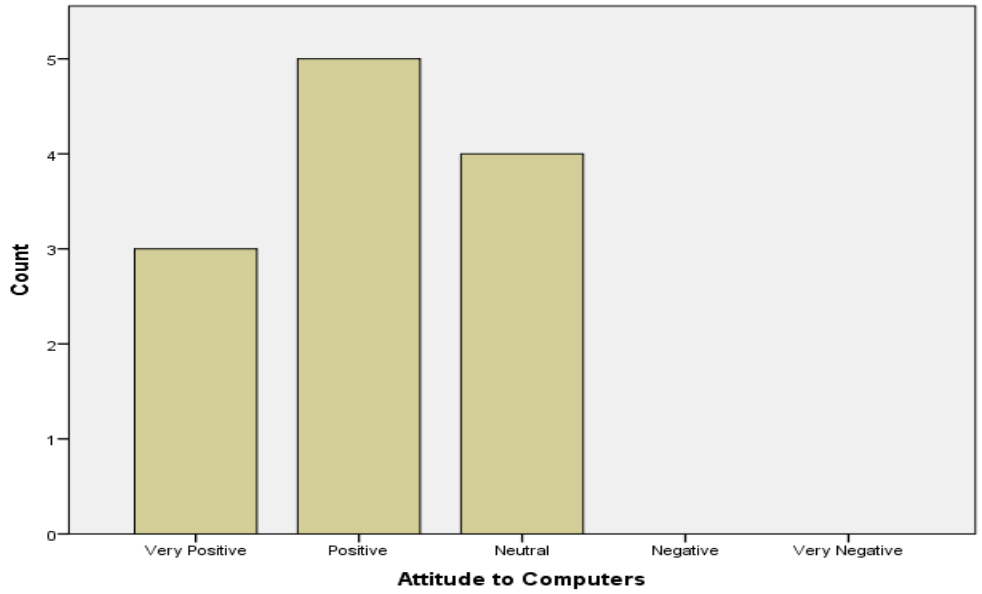

Figure 4.6 Perception of participants towards computers

4.2 Factors that facilitate or undermine effective Online Biodiversity Training

In order to reveal the factors that facilitate to design and develop an effective online biodiversity training tool, the researcher asked question to the participants in both demographic survey and interviews. Those questions are mostly purposed to understand the expectations of forest engineers from a biodiversity training program and what the perceptions of them towards biodiversity and online training programs are.

4.2.1 Perceptions about biodiversity and biodiversity training

These perceptions were revealed by asking direct questions like what do the engineers think about biodiversity or what will be the advantages or disadvantages of attending to a biodiversity training program. There were multiple questions both at demographic survey and interviews. There were no quantitative data gathered from those questions.

Pilot Study. Four NCC experts expressed their perceptions about biodiversity and biodiversity training very briefly through interview sessions. They reported that GDF is starting to cover the importance of biodiversity in their planning. All of the experts were agreed about the potential of transporting the training program to the virtual world. One of the experts pointed out that "Reaching to the online information from anywhere that has internet connection, carry the learning and usage of information to the places where we didn't have chance to carry before. According to that, for example, forest engineers can reach to their planning maps in fields and take notes. In terms of biodiversity, this [web] site that presented to the engineers about biodiversity delivers functions, like species introduction, that can be used in the field [1]".

First Cycle. 15 forest engineers expressed their perceptions about biodiversity and biodiversity training. First of all, they gave information about what they want to learn in this training and why they want to learn that by explaining the benefits of this training from their own perspective. All of them stated that they want to learn all subjects covered the forestry development planning of biodiversity inventory and integration of this planning into their work life. In addition, one of them stated that he wants to learn the importance of biodiversity. One of them also stated that he wants to gain different perspectives about forestry. They all, except one, reported that they will benefit from this training program with some aspects especially about applying what they learn into their forestry planning implementations. That one exception reported that he doesn't know if he will benefit from this training. Two of them also reported that after finishing this course, they will be able to create more ecosystem friendly forestry development plans. During interviews, which only conducted with the six of the forest engineers whom were

able to finish the program and fill the assessment survey, participants stated that they need to learn the context of biodiversity since their job, forestry, is of the subjects of that field. They pointed out that biodiversity is the academic concept that covers their job. One of them stated that "Biodiversity is a broad context. This context covers the forestry. Some subjects of this context have applications in our field. For example, we use the part related with the old and dead trees, natural old trees within our planning. We may beneficially use several new subjects that we learn during this program in the field [2]".

Secondly, they gave information about what will be the advantages and disadvantages of taking biodiversity training online. All of the participants were in agreement of one common advantage that is accessibility of the tool without any restriction, especially during field trips, which is related with the time issue. One of the participants stated that "Like all other issues, we can't allocate time for biodiversity except seminars. At least we will have the opportunity of following the subjects from here. Although we can't attend to the discussions, we can benefit what we read and learn from what we have online. So it is more advantageous to have this information online that is easily accessible and without storage problems like publications or journals do have [3]". On the other hand, participants had some concerns about taking this online course. For example, two of them marked that spending too much time in front of computer is harmful. Also five of them reported that mutual communication is essential for better understanding. Moreover, three of them were concerned about lack of applicability of training to the field. A 14 years experienced engineer pointed out that "Reading from a computer screen is not same with reading from a journal. Focusing is hard online since it is more boring. Because of that, short explanation notes may be introduced with visual elements in order for focusing and getting attention [4]".

Final Study. In this part, researcher asked the new attendees to give their expectations from this course. Also their perceptions towards biodiversity training were asked via interview. The results were similar with the previous iteration. First of all, the new attendees explained why they want to learn biodiversity. All new attendees expect to

learn the necessary subjects of biodiversity, which is related to their job like inventory and feasibility of biodiversity. One of them stated regardless of working life requirements; he wants to learn everything about biodiversity, the world of all living organisms. Interviews were done with only the eight of new attendees. They were quite enthusiastic about biodiversity training. One of them stated that "Now I am aware of the fact that biodiversity is main essence for us, for my job. I love my job. Since people love their jobs, they want to make contributions as much as they can. In order to do that, I am aware of that I need to learn biodiversity well. This [web] site is a good chance for me, for us [5]".

Secondly, they gave their opinions about the possible advantages and disadvantages of taking biodiversity course online. The results were parallel with first cycle. They all agreed that accessibility is a critical point of this program. C2S8 emphasized this as "I think most satisfactory part…for instance; there have been meetings and conferences about this kind of information seminars at various cities of our country. Reaching all of these through internet gladdened me [6]". During survey questions, they all marked the time issue. Six of them reported that they can arrange their own schedule to study biodiversity. Moreover they gave their opinions via interviews as well. One of them stated at the interview that "…for example this was very good. Whenever I wonder something about any subject [about biodiversity], related with my job, I can go online and check for it even with my mobile phone…this was quite interesting and exciting experience [7]".

4.2.2 Perceptions about technology usage and online training programs

This part includes both qualitative and quantitative data. Direct questions were asked by researcher like what do they think about online training programs or whether have they been satisfied or not, etc. These data were gathered through both interview and demographic survey questions. Findings were given below.

Pilot Study. Perceptions about technology usage and online training programs were examined through demographic survey mostly. Experts have not filled those questions. However, there were two questions at interview as well. Thus, the only perception impression of experts gained was from the answer to those questions qualitatively. No quantitative data gathered at pilot study. Their attitudes were all positive against online training programs. However, they have some concerns about interactivity and sustainability of these programs. One of them pointed out that "It is quite essential that trainees to follow information from anywhere at any time. But there are some inconveniences about online training programs, which is they can't provide interactivity as well as face to face programs and their sustainability is questionable [8]".

First Cycle. Since engineers filled the demographic survey, both quantitative and qualitative data were gathered at first cycle. They were given respectively;

All 15 engineers who started to the training program and all six who were able to finish the program stated that they use computer and internet both at work and at home between the level range between elementary to advanced. Figure 4.7 presents the technology usage level of participants. They stated that, they use the internet daily to search for useful information in their normal and work life. However, only one of the engineers reported that he took online training program once for diving course. He stated that he learned too much useful information from that online course. 14 engineers reported that they have never taken an online training program. Figure 4.8 presents online course usage of forest engineers.

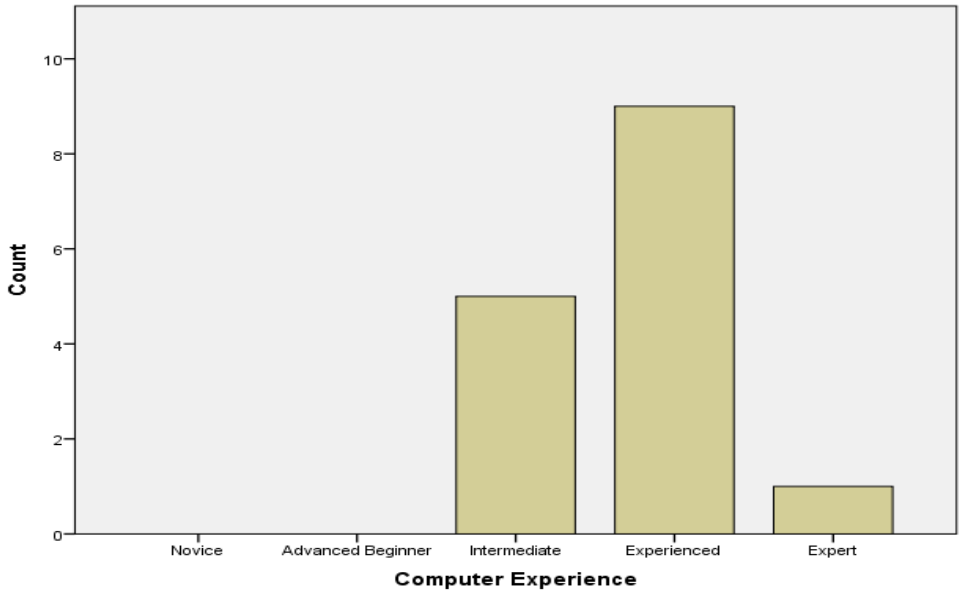

Figure 4.7 Computer usage level of participants

Figure 4.8 Online training experience of participants

As it was mentioned, only six of the beginners to the program were able to finish it. Thus, researcher conduct interviews with only those six participants. Two of the interview questions were related to the online training programs. Perceptions towards e-learning of all six of the interviewees were positive. Furthermore, all six interviewees stated that they would suggest e-learning to their colleagues. C1S5 stated that he already suggested the e-learning and OBTT to his friends. However, he pointed out that "I already did [recommend the training]. People are lazy. Very few of them are curious. They are not negatively approach when they hear from you but there is high level of indifference among them [9]". Furthermore, they were all responded positively to the question that asked 'How is your attitude towards online training programs, which is a newly developing area?' C1S3 pointed out that "as it allows sharing…sometimes it is hard for people to hear from each other in order to get involved in certain subjects with phone, mailing etc., whereas it is easier to communicate in this [online] way. Nevertheless, to be asked of some questions or interpreted by someone else is quite beneficial for somebody, who doesn't have the courage to ask that sort of questions [10]".

Final study. The new attendees declared that they have internet access both at work and home, as well as three of them indicated at their smart phones. The responses to the related question in demographic survey present the level of the computer usage of attendees between elementary and advanced. Figure 4.9 shows the level of engineers about computer and internet usage. They stated that they use internet on a daily basis in order to check e-mails and contacts as well as search for information and daily news. However, only one of the new attendees reported that he has used internet to take online courses before for learning English language. He indicated that, he came to elementary level at English after the course. Also one old trainee stated that he took online course as he stated at first cycle. Figure 4.10 presents the previously taken online course of attendees.

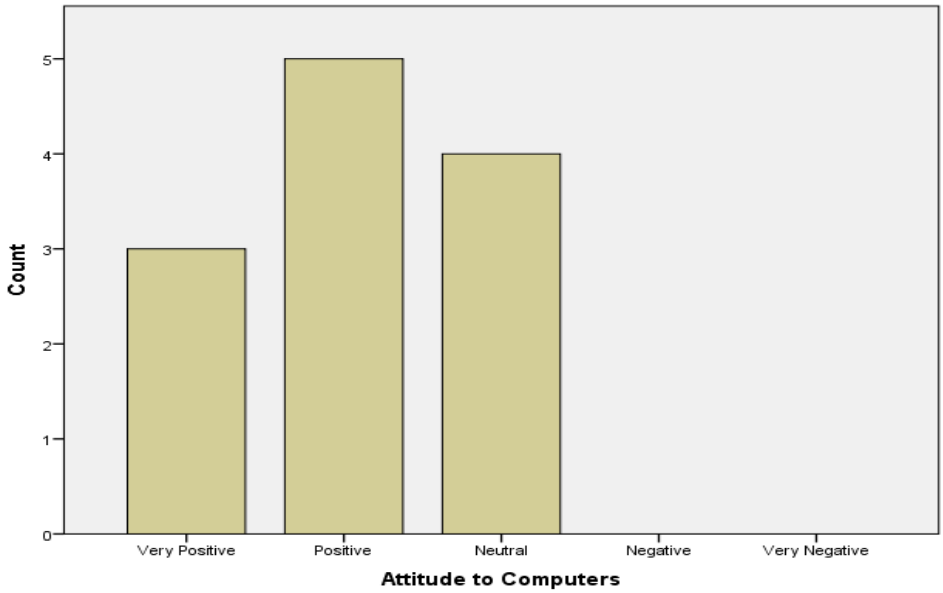

Figure 4.9 Computer usage level of participants

Figure 4.10 Online training experience of participants

Ten of the engineers were asked what they think about online courses during interview by researcher. Their responses to the related two questions were fairly positive. Ten of them stated that they would suggest the e-learning to their colleagues. C2S1 stated that "Definitely. I believe that this kind of programs can be spread by advising to the others. And I think this kind of tools would be more useful with higher disposal [11]". Another engineer noted that "Yes, I would. Because, it is hard to learn subjects, important subjects, while you are busy as in ours jobs [12]". On the other hand, one of them pointed out that he thinks it would be pointless to suggest because of his perception towards his colleagues. C2S6 pointed out that "It is not about this program. When there is anything about personal development people ignore the advice. However, when it is about magazine, they immediately check out what you see that news. It is a general problem of our country. Because of that I didn't advise it [13]".

4.2.3 Overview of Iterations

First Cycle. An invitation letter was sent to 40 forest engineers selected from General Directory of Forestry. Unlike the starting time planned, OBTT implementation time were rescheduled and started on 05/03/2012 (see APEENDIX G for the announcement).

In the first week, participants attended to course with 89 logins, 899 views, and 64 posts. Second week, participants attended to course with 35 logins, 257 views, 24 posts. Two announcements were sent to participants via email as a reminder on 14/03/2012 (see APEENDIX H) and one to announce one week course extension on 20/03/2012 (see APEENDIX İ) to accomplish missing goals. For third and fourth week, it was 20 logins, 373 views, 21 posts and 11 logins, 131 views, 15 posts respectively.

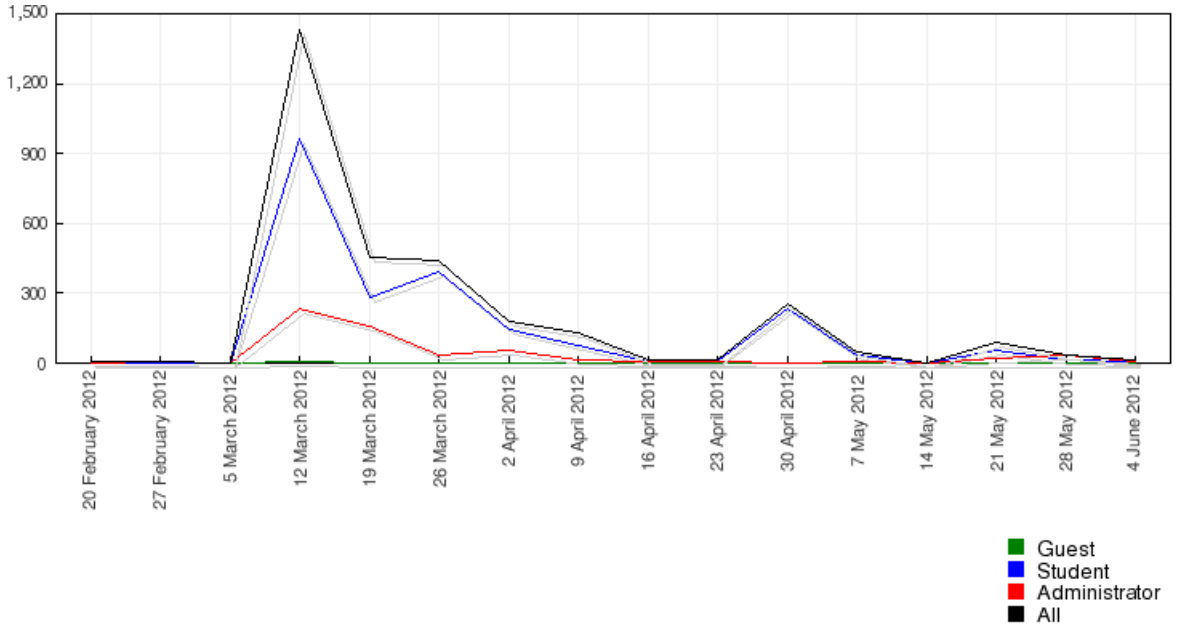

Figure 4.11 OBTT 1st Iteration: All Activities

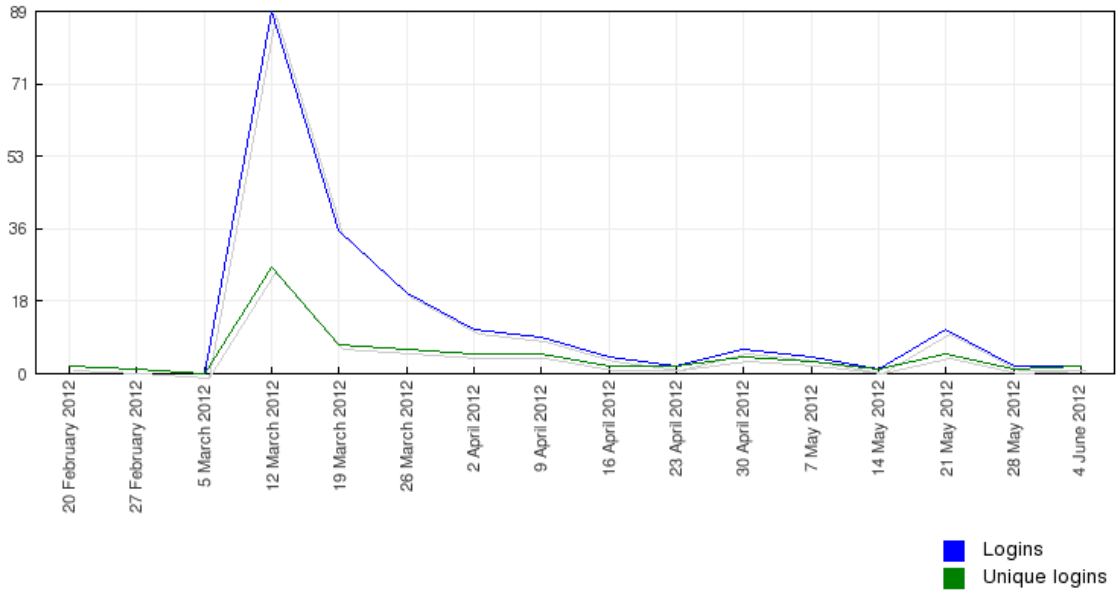

Figure 4.12 OBTT 1st Iteration: Login Activities

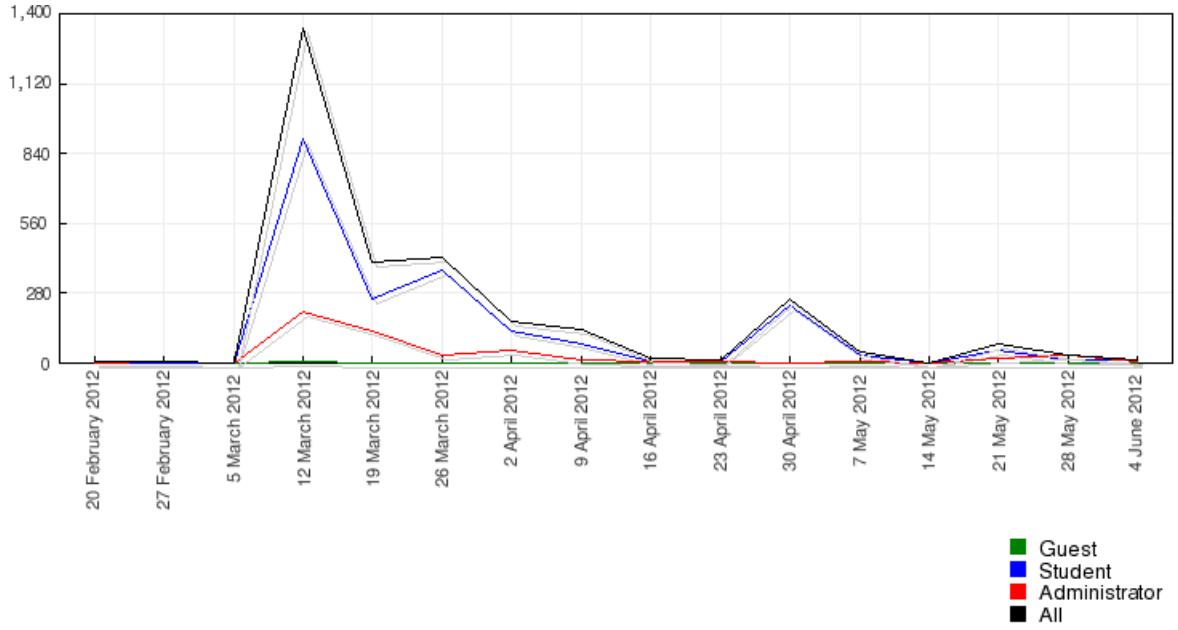

Figure 4.13 OBTT 1st Iteration: Views activities

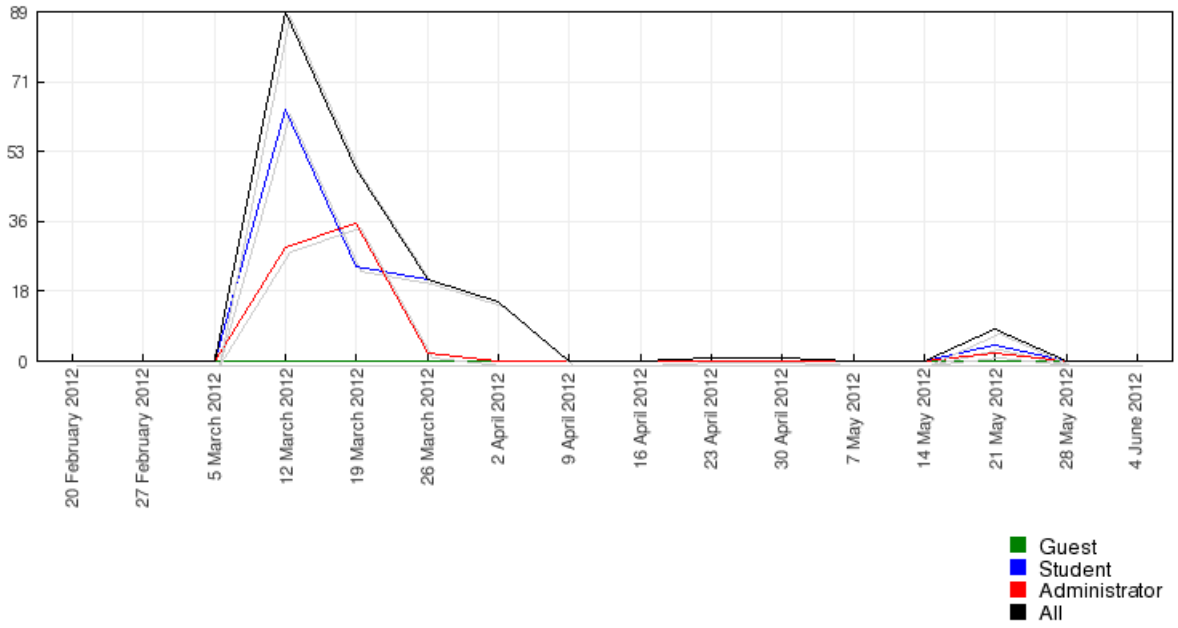

Figure 4.14 OBTT 1st Iteration: Post activities

As it was clearly stated in the invitation letter (see APEENDIX G) that it was expected to accomplish the demographic survey, all practice activities end of each three part, OBTT evaluation form and contribute to discussions in each part. To guarantee that those activities are accomplished by trainees and activity lock system had been added to OBTT. Participants had to complete prerequisite tasks to go to next steps.

15 attendees completed the demographic survey. In first part of the course, 20 topics with 37 posts were submitted in discussion board and seven forest engineers completed the practice activity. In second part, six topics with nine posts were submitted in discussion board and three forest engineers completed the practice activity. In third part, six topics with nine posts were submitted and three forest engineers completed the practice activity. Finally, six participants filled up OBTT evaluation form and finish the course.

Final Study. During the time period 15/04/2013 to 15/09/2013, invitation letters were sent to forest engineers for three times. These invitation letters derived from first cycle invitation letter excluding prerequisites and time limitations to accomplish the parts (see APEENDIX J). On the period between 15/04/2013 – 15/09/2013, participants attended to course with 231 logins, 1509 views, and 55 posts.

Due to lack of interview and survey data, on 15/09/2013, researcher started to contact forest engineers by phone and invite them directly to the course. 28 forest engineers were invited. Five of the invited engineers were the participants attended first iteration and eight of them were the participants attended in first period of second cycle but were not able to finish the course. At this period, forest engineers were participated the course with 293 logins, 1947 views, and 70 posts at overall. 12 of them finished the training by filling up the OBTT evaluation survey.

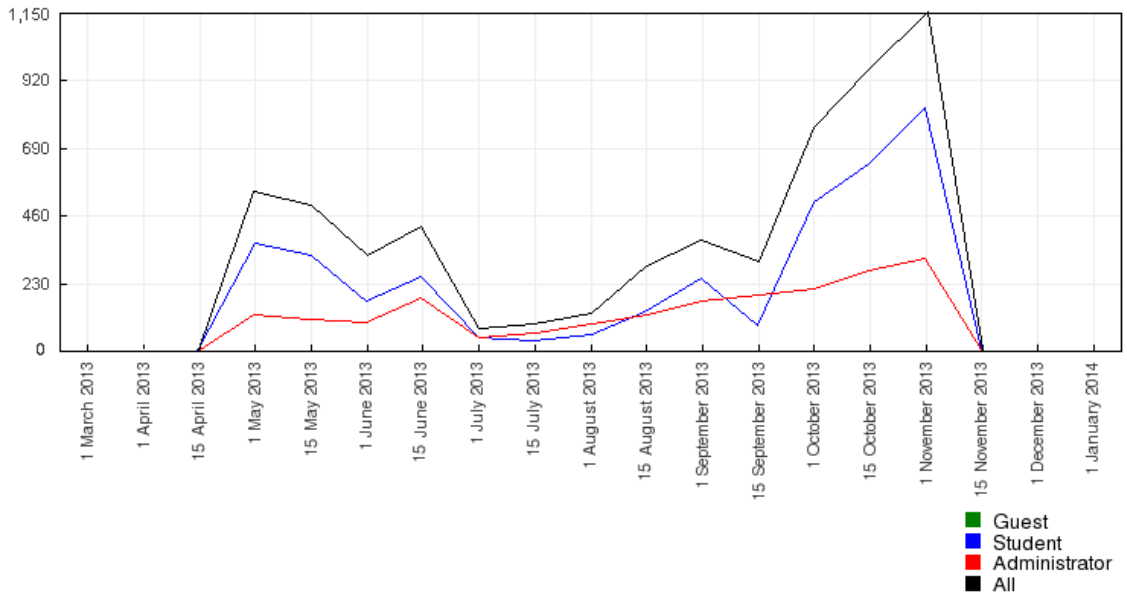

Figure 4.15 OBTT 2nd Iteration: All Activities

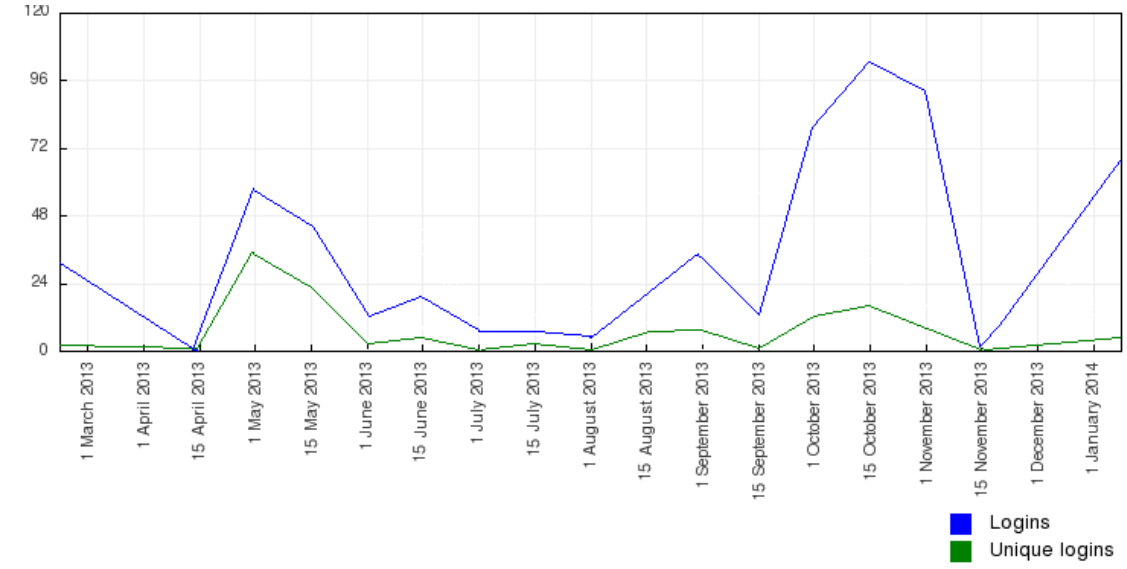

Figure 4.16 OBTT 2nd Iteration: Login Activities

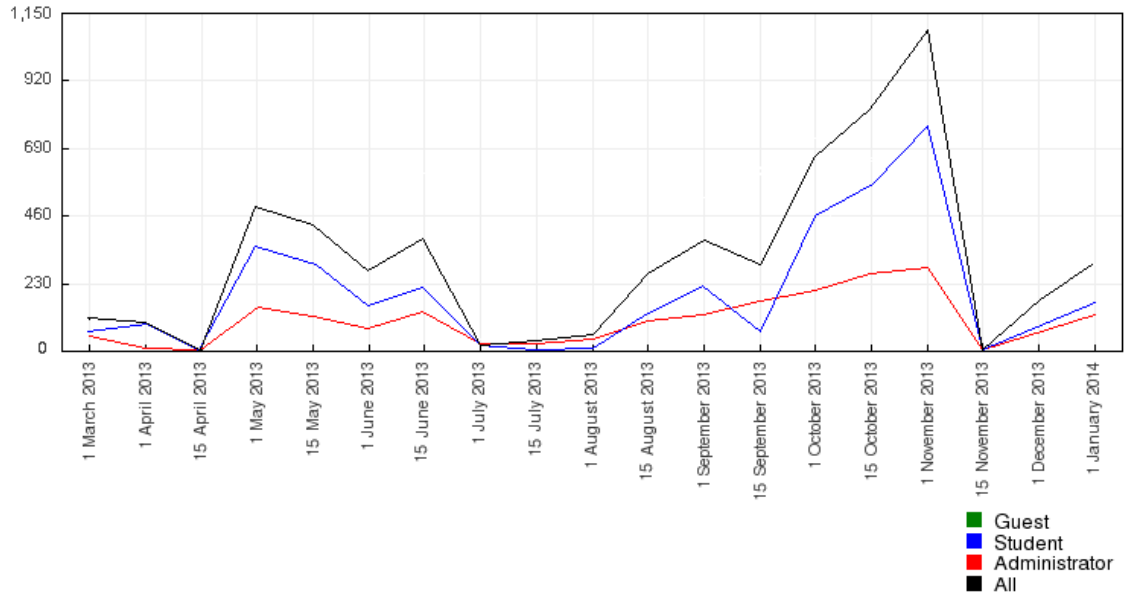

Figure 4.17 OBTT 2nd Iteration: Views activities

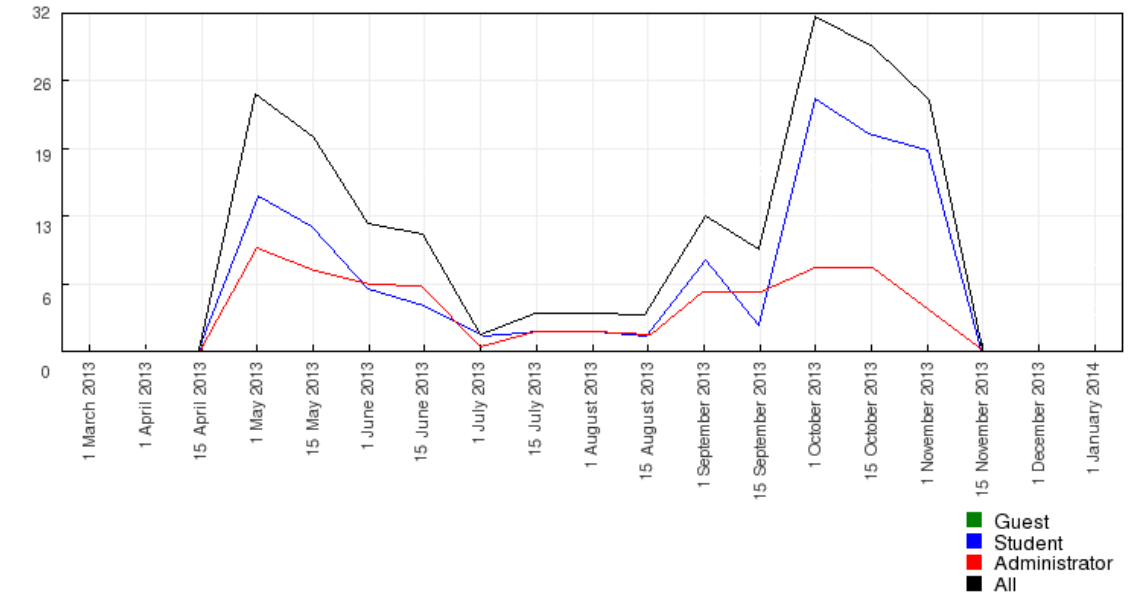

Figure 4.18 OBTT 2nd Iteration: Post activities

4.3 Perceptions about OBTT

After filling the demographic survey and completing the training program, participants were asked to fill an assessment survey, which prepared according to the parameters of DDLM in order to evaluate the tool by the aspects of content, delivery, service developments as well as superior structure and learner outcomes. That survey comprised the quantitative approach for data collection about the tool. Each aspect was evaluated according to its own characteristic themes. After assessment survey, researcher interviewed with the participants, which comprised the qualitative approach of data collection. Each approach was given below accordingly.

4.3.1 Perceptions about content development of OBTT

There were eight questions about content of the tool in the survey, which was adapted from the questions pool of the project conducted by MacDonald et al. (2001). Those questions were researched by her team and deducted.

Pilot study. All four experts, who attended to the pilot study, were interviewed and they all evaluated the course via assessment survey.

Content was the first part of the survey. Experts expressed their attitudes towards OBTT on a five point scale (1 = Strongly Disagreed, 2 = Disagreed, 3 = Neutral, 4 = Agreed, 5 = Strongly Agreed). Table 4.1 presents raw data of assessment survey for pilot study evaluations about content. All scores were ‘Agree’ and ‘Strongly Agree’ representing NCC members’ positive attitude towards content of this tool.

Table 4.1 Results of survey questions about content delivery at Pilot Study

OBTT_ES - PS Content

	n/a	strongly disagree	disagree	undecided	agree	strongly agree	Total
	Count	Count	Count	Count	Count	Count	Count
Q1.1	0	0	0	0	1	3	4
Q1.2	0	0	0	0	0	4	4
Q1.3	0	0	0	0	1	3	4
Q1.4	0	0	0	0	2	2	4
Q1.5	0	0	0	0	1	3	4
Q1.6	0	0	0	0	3	1	4
Q1.7	0	0	0	0	1	3	4
Q1.8	0	0	0	0	3	1	4

Two main themes were seek through both interview and assessment survey questions. First theme was comprehensiveness. Q1.1, Q1.3 and Q1.7 were the questions, which cover the issues related with being broad scope and depth, had positive scores. The other theme was authenticity/industrial driven perspective of the content. The remaining questions were examining this theme. All the attitudes towards other characteristic, authenticity, of content were positive.

There was also one question about comprehensiveness at interview questions, in which all experts agreed about dividing content into smaller chunks. One of the experts, CPS1, marked that “The content seems quite enough with the main lines; however, it would be more beneficial to cut it into smaller chunks. Content seems to lost the depth and some topics get irrelevant with dome other topics [14]”. For authenticity theme, all four experts responded ‘Yes’ to the question that asked whether the content of the tool applied to your work life or not.

First Cycle. All six forest engineers, who were able to complete the training program, evaluated it via assessment survey and they gave interview to the researcher.

Evaluation standards were same with the pilot study. Table 4.2 present the raw data of this evaluation via survey questions. The mean values distributed to the interval of 3.0 and 4.5, mostly close to 4.5. Standard deviations were mostly gathered around 0.5.

Table 4.2 Results of survey questions about content development at 1st Cycle

OBTT_ES - 1st Iteration Content

	N	Minimum	Maximum	Mean	Std. Deviation
Q1.1	6	4.00	5.00	4.50	.55
Q1.2	6	4.00	5.00	4.50	.55
Q1.3	6	2.00	4.00	3.67	.82
Q1.4	6	3.00	4.00	3.83	.41
Q1.5	6	2.00	4.00	3.00	1.10
Q1.6	6	4.00	5.00	4.33	.52
Q1.7	6	4.00	5.00	4.33	.52
Q1.8	6	3.00	5.00	4.17	.75
Valid N (listwise)	6				

The attitudes of forest engineers towards comprehensiveness characteristic were generally positive, which was evaluated by Q1.1, Q1.3 and Q1.7. Only one forest engineer marked 'Not Agreed' for Q1.3, which is about rather the tool comprehend skill teaching or not. The attitudes of the rest were positive. On the other hand, there were more neutral and negative attitudes towards authenticity of the tool. For example, half of the survey participants marked 'Not Agreed' to the Q1.5, which had 'Neutral' response from experts as well. Also, one engineer marked 'Neutral' to the Q1.4 and another to the Q1.8, which were both about the relation between examples and work field.

All the interviewed participants stated that the given context of the content was appropriate and comprehensive for biodiversity training and applicable to the work field. C1S5 stated that "Yes...it was sufficient for now [this level], even more than enough. If we apply %50 percent that was given, it would be great acquisition for us. However, it

might be insufficient for future years [15]". Also C1S3 stated that "It was very good. Especially supporting [the training] with videos was highly positive. Personally, I can say that I liked it very much [16]". The engineers were also asked about what can be done to improve comprehensiveness. There were certain related responses to that question as well. Two of the participants pointed out the importance of discussion board. They stated that it can be improved. C1S1 reported that "What we did at forum [discussion board] in April was very good. Coming of different comments from different engineers were more educational for me [16]". Also two of them mentioned the sample numbers. They said, sample numbers should be increased and diversified.

Furthermore, engineers mentioned the same concerns through interviews about the authenticity as they reflected via survey. Three of them marked that applicable examples should be increased. C1S4 stated that "...I think, an example of forest management plan should be prepared that is parallel to ours and placed to the tool [18]". There was also one engineer, C1S3, marked a different point that "…information can be applied while it is improved. Personally, I couldn't find the opportunity to apply what I learned from training. Because I am not a forest management planner, but a supervisor in that field. Also, I haven't worked in an application team before. If I were a planner at forest management, I would commend this question differently of course [19]". There were also positive answers as well. One of them came from C1S4 as "It [information] is applicable.... Education and data that we get from computer was related the work we are doing. I am a forest management planning applier. Recently, I open and use it [information] that I learned in this program in my plans. So, it [program] added new things to my work [20]". Another came from C1S2. He said that "Now, in 'Şavşat' planning, we are already trying these subjects. We are trying hard to make it applicable. There are zones in these plans, like zone 1 and zone 2. We apply this [biodiversity] in forest management plan…try to make it applicable [in plans] [21]".

Final Study. The last improvement was spread to a long time period. The concerns about sample numbers and relation with the work fields tried to be solved. Evaluation standards

were same with the other cycles. All 12 engineers completed the program and evaluated the tool via assessment survey and ten of them were interviewed by researcher. Two of them were former attendees who were participated in first iteration. They were called CFS1 and CFS2.

Table 4.3 presents the raw data of assessment survey evaluation filled by all 12 engineers. The mean values were between 4.5 and 5.0. Majority of the standard variation values were '0' except for three questions, which were 0.5 for two and 0.3 for one.

Table 4.3 Results of survey questions about content development at Final Study OBTT_ES –2nd Iteration Content

	N	Minimum	Maximum	Mean	Std. Deviation
Q1.1	12	5.00	5.00	5.00	.00
Q1.2	12	5.00	5.00	5.00	.00
Q1.3	12	4.00	5.00	4.42	.51
Q1.4	12	4.00	5.00	4.92	.29
Q1.5	12	5.00	5.00	5.00	.00
Q1.6	12	4.00	5.00	4.58	.51
Q1.7	12	5.00	5.00	5.00	.00
Q1.8	12	4.00	5.00	4.17	.39
Valid N (listwise)	12				

All attitudes of second cycle results were positive against the tool content for all themes. The perceptions of two previous attendees towards the content of the tool improved to positive after final study implementation. They stated during interview that neutral and negative attitudes of them towards the tool have been changed. One of them, CFS2, reported that "I liked the new samples very much. They made me visualize this [field] work in my mind. I would like to use them in my work and I will strive to use them [22]". The attitudes of new attendees were positive towards all characteristics of content. All of them respond 'Yes' to the interview question that asked whether the content of OBTT was appropriate or not. The respond for comprehensiveness of the content were positive as well. They all responded 'Yes' to the question related with the comprehensiveness. Three of the engineers, whom were new attendees, indicated that they expected a regular

update of information given. C2S4 stated that “I can declare the content of the program was appropriate enough. However, we cannot ignore the fact that what we learned here will be replaced with new data in time. Web format [platform] is important in this manner, because new additions to content can be done quickly... I think, new additions to the content should be fast [23]”. C2S9 pointed out a parallel opinion as “The content was rich but biodiversity is a loose end topic… in my opinion, new information should be added to the [web] site regularly [24]”.

The perceptions towards authenticity were positive for new attendees as well as the changed perceptions of old attendees. They all responded that they agree with the statement of whether the given information during program was applicable to your works or not. C2S4 noted that “There were different sorts of information that we can use during planning. For example, trees and shrubs important for wild life topics were good listed. These lists can be used, can be benefitted from here [25]”. Another one, C2S5 pointed out that “Although the context didnot go too deep in the subject, I think it was sufficient source for beginning [26]”.

4.3.2 Perceptions about delivery development of OBTT

Pilot Study. The evaluation results of delivery development examined in two data sets, which are assessment survey and interviews as quantitatively and qualitatively. The standards for score scale were given above. There were 10 questions to evaluate delivery development according to each characteristic themes assigned in DDLM, which were usability, interactivity and tools. The raw data of mean value and standard deviation was given below in Table 4.4. In addition to mainly positive scores, there were neutral and negative responses.

Table 4.4 Results of survey questions about delivery development at Pilot Study OBTT_ES–PS Delivery

	n/a	strongly disagree	disagree	undecided	agree	strongly agree	Total
	Count	Count	Count	Count	Count	Count	Count
Q2.1	0	0	0	0	3	1	4
Q2.2	0	0	0	0	2	2	4
Q2.3	0	0	0	1	0	3	4
Q2.4	0	0	0	1	1	2	4
Q2.5	0	0	0	0	2	2	4
Q2.6	0	0	2	1	1	0	4
Q2.7	0	0	0	0	1	3	4
Q2.8	0	0	0	1	1	2	4
Q2.9	0	0	0	1	0	3	4
Q2.10	0	0	0	1	1	2	4

There were no negative attitude towards usability characteristic of OBTT, which were revealed with the questions Q2.1, Q2.2 and Q2.3. There was one expert, C1S4, marked the ‘Neutral’ score for usability according to fast download speed. On the other hand, interactivity, which was examined by Q2.6, Q2.7 and Q2.8 and Q2.10, and tool, which was examined through Q2.4, Q2.5 and Q2.9, characteristics of the tool were not welcomed by experts. Interactivity characteristic was examined in more detail at superior structure evaluation. However, the results of Q2.6 presents that two of the experts, CPS1 and CPS3, didn't like the order in the content. They marked ‘Not Agreed’ score for that question. For tool characteristic of the OBTT, CPS4 was ‘Neutral’ towards it. He scored three for both Q2.4 and Q2.9.

During interview, three experts stated that usability of the tool is quite appropriate and easily understandable. CPS2 pointed out that “According to me, content and delivery of the education was quite appropriate and step by step defined. Each newly opened page includes information that is appropriately enough to not become boring [27]”.

During interviews, the same two experts, CPS1 and CPS3, agreed on same concern, which stated that the content should be divided into smaller chunks. CPS1 reported that

"…the content lost its order with long scrolling pages [28]". CPS4, who marked 'Neutral' during survey, stated during interview that "main target group is forest engineers. When you started to get feedback from them, the graphic design will be much better in time [29]".

First Cycle. After dealing with the concerns of the pilot study, diagnose and re-development of the delivery was performed and given to the main target group, forest engineers for evaluation.

The results of the evaluation phase according to survey results were given in Table 4.5 as mean values and standard deviations raw data. The majority of the mean values were around 4.0 and the standard deviation values were mostly between 0.5 and 1.0.

Table 4.5 Results of survey questions about delivery development at 1st Cycle

OBTT_ES - 1st Iteration Delivery

	N	Minimum	Maximum	Mean	Std. Deviation
Q2.1	6	4.00	5.00	4.50	.55
Q2.2	6	4.00	5.00	4.50	.55
Q2.3	6	4.00	5.00	4.33	.52
Q2.4	6	2.00	4.00	3.33	.82
Q2.5	6	3.00	5.00	3.83	.75
Q2.6	6	4.00	5.00	4.50	.55
Q2.7	6	4.00	4.00	4.00	.00
Q2.8	6	4.00	4.00	4.00	.00
Q2.9	6	2.00	4.00	3.33	.82
Q2.10	6	3.00	5.00	4.17	.75
Valid N (listwise)	6				

The scores for usability theme were all positive. They were all marked 'Agreed' and 'Strongly Agreed' for usability. Likewise, the scores of the interactivity theme were mostly positive as well. Only one of the engineers, C1S2, marked 'Neutral' to one question solely, the Q2.10. On the other hand, there were negative and neutral perceptions about the tool characteristic. One of the engineers responded all 'Neutral' to the three questions that examine the tool characteristic. Another one scored again

‘Neutral’ at Q2.4 and Q2.5. Further, one engineer scored ‘Not Agreed’ to the Q2.4 and Q2.5. The mean values for those three questions were the lowest ones and the standard deviations were the highest among 10 questions.

All quotations were positive towards usability of the tool. All of the participants of interview responded ‘Yes’ to the question, whether the tool was usable or not. Participants didn't make further quotes for usability. They solely answered that question. Moreover, for interactivity theme, two of the engineers quoted that the interactivity of the tool would develop self-regulated in time. Also, three of the engineers were pointed out that the most satisfying aspect of the tool was problem discussions at the board. The attitudes against tool theme were not as positive as the others at the survey. However, they all responded positive to the interview question that asked whether the presentation of the tools were appropriate or not. C1S2 also stated that “Presentation format was very very nice. At one side, the presenter was explaining the subject and at the other side, slides were passing. It was like I was in a regular seminar. That was lovely [30]”.

Final Study. There were not too many changes for delivery development at final study.

The 10 new attendees evaluated the delivery development of OBTT as well as the two old trainees. Table 4.6 presents the raw data as mean value and standard deviation scores. The majority of the mean values were between 4.5 and 5.0 and the majority of the standard deviation values were between 0 and 0.5.

Table 4.6 Results of survey questions about delivery development at Final Study OBTT_ES –2nd Iteration Delivery

	N	Minimum	Maximum	Mean	Std. Deviation
Q2.1S	12	5.00	5.00	5.00	.00
Q2.2	12	5.00	5.00	5.00	.00
Q2.3	12	5.00	5.00	5.00	.00
Q2.4	12	4.00	5.00	4.25	.45
Q2.5	12	4.00	5.00	4.83	.39
Q2.6	12	5.00	5.00	5.00	.00
Q2.7	12	4.00	5.00	4.67	.49
Q2.8	12	4.00	5.00	4.67	.49
Q2.9	12	4.00	5.00	4.67	.49
Q2.10	12	3.00	5.00	4.25	.62
Valid N (listwise)	12				

Majority of the assessment survey scores were positive towards all three themes of delivery development characteristic. Only 'not positive' attitude here was a 'Neutral' respond to the Q2.10 from one of the new trainees. The new trainee that marked 'Neutral' to Q2.10 did not respond to the appointment request. On the other hand, the conducted interview results were all positive. One of the old trainees quoted that "Application samples part attracted my notice…. I enjoyed while watching the videos [31]". The responds of the new attendees were similar as well. They were all agreeable with the usability and interactivity of the tool. C2S4 remarked that "I think you form a user friendly site. I want tosay that, it might be used easily by those who don't have too much technology usage capacity [32]".

The attitudes towards tool theme were positive as well as the others. The most used tool was videos like first cycle. C2S7 answered the question that asked which part did you used most in the program as "I tried to interest all of them time to time. However, I enjoyed videos most… It was not same as learning in classroom but videos were very close to that [33]". On the other hand, a different perspective came from C2S4 to the question that asked which part of the tool did compel you the most as "… I could not download the text. I wanted to use same data presented in the tool at my own studies, however, I could not. Firstly I thought writings [content] have restrictive properties, but

then figured out that it wasnot...only videos and species data were not permitted to be downloaded [34]".

4.3.3 Perceptions about service development of OBTT

Pilot Study. Perceptions of experts about service development were not evaluated since they were part of the service.

First Cycle. Six forest engineers explained their perceptions towards the service development of the tool. This was the first service development evaluation of the study. There are three main themes for evaluating service development, which are qualification of technical support and staff, ease of accessibility and responsiveness.

There were seven questions within assessment survey about service development. First two questions were about the qualification of the support and staff. Q3.4 and Q3.5 were about ease of accessibility and finally Q3.3, Q3.6 and Q3.7 were about the responsiveness. The mean values and standard deviation values are presented in Table 4.7. The majority of the data were around 4.0 for mean values and half around 0, half around 0.8 for standard deviation values.

Table 4.7 Results of the survey questions about service development in 1st Cycle

OBTT_ES - 1st Iteration Service

	N	Minimum	Maximum	Mean	Std. Deviation
Q3.1	6	4.00	4.00	4.00	.00
Q3.2	6	4.00	4.00	4.00	.00
Q3.3	6	3.00	5.00	4.33	.82
Q3.4	6	4.00	4.00	4.00	.00
Q3.5	6	3.00	5.00	3.50	.84
Q3.6	6	3.00	5.00	4.16	.75
Q3.7	6	3.00	5.00	4.00	.63
Valid N (listwise)	6				

The responses to first two questions, the mean values and standard deviation values of exact 4 and 0 by order, show that the participants are all 'Agreed' with appropriateness

and qualified staff. For the other two themes, responsiveness and ease of accessibility, there were some 'Neutral' scores at survey evaluation. Five out six engineers scored 'Neutral' for at least one item in the survey for service development.

All six participants responded 'Yes' to the interview question, whether the administrative was adequate or not. One of them pointed out that "Everything [technical support] was quite adequate for us at this moment. However, to investigate detailly… when we start to use biodiversity as function in forest management planning in a place of Turkey, then it will be more proper to make comments. But, like I said, it was fairly enough for this moment [35]". On the other hand, during interview sessions, four of the engineers respond 'Yes' to the question that examine whether the response to your proposal and questions were quick or not, which they marked 'Neutral' at survey. The other two engineers stated that, they had no questions or proposals at all. C1S2 stated reported that "For me, the administrative support was sufficient for creating awareness [36]". C1S3 touched on a different point that "In fact, with more developed computers and a better internet access, it would be healthier. For example, most of our computers were at low hardware and weak. Thus, sometimes the visuals [videos] were not clear. And there were some other difficulties as well. Internet accesses are also crucial. When internet access is not good, there are interruptions. It would get better according to that manner [37]".

Final Study. 12 Forest engineers evaluated the service development of the OBTT. Parameters and characteristics were defined at first cycle.

Table 4.8 gives the descriptive statistics of the evaluation. Majority of mean values were 5.0, whereas those values were 0 for standard deviation.

Table 4.8 Result of survey questions about service development at Final Study OBTT_ES –2nd Iteration Service

	N	Minimum	Maximum	Mean	Std. Deviation
Q3.1	12	5.00	5.00	5.00	.00
Q3.2	12	5.00	5.00	5.00	.00
Q3.3	12	5.00	5.00	5.00	.00
Q3.4	12	3.00	5.00	4.17	.72
Q3.5	12	3.00	5.00	4.58	.79
Q3.6	12	5.00	5.00	5.00	.00
Q3.7	12	5.00	5.00	5.00	.00
Valid N (listwise)	12				

Participants were all 'Agreed' with the administrative and the quality of staff characteristics of the service development, since both the mean values were 5.0 and the standard deviation values 0 for the first three question that were examining that characteristics. However, there were 'Neutral' scores for Q3.4 and Q3.5, which were related with ease of accessibility. All of them also responded 'Yes' to the question that asked whether the administrative was adequate or not. One of the new attendees quoted that "I had no trouble with this [service]. Especially, respond to the forum, open forums [discussion boards] topics were very good and quick. However, for my personal opinion, to be objective, the attendance was not as much as I expected. More attendance would be better for forum discussions [38]".

On the other hand, there were 'Neutral' scores for ease of accessibility questions no 3.4 and 3.5. During interviews, two trainees that scored 'Neutral', C2S5 and C2S7 reported to the question that asked whether your proposals been responded or not, as he made no proposals. On the other hand, C2S4 reported that "…until now, I need the technical support only once related with my user name issue. And they responded me very quickly [39]".

4.3.4 Perceptions about superior structure of OBTT

There were 24 survey questions to reveal the attitudes about superior structure. All of the questions were examining how the training program affects them.

Pilot Study. All four NCC experts evaluated the superior structure of the tool, except the last three questions of the survey, which were about assignments that they didn't responsible for.

However, researcher didn't evaluate all 24 of them. The themes wanted to be revealed for superior structure were learner needs, learner convenience, learner motivation, learning environment and program goal. Each of these themes was somehow related with content, delivery and service in substance. Q4.1, Q4.4, Q4.14, Q4.17, Q4.18, Q4.19 and 4.20 were related with the theme of learner needs. Q4.2, Q4.3, Q4.5, Q4.10, Q4.11, and Q4.15 were asked to revealed learner convenience of OBTT. Q4.13, Q4.16, Q4.22 and Q4.24 belonged to learning environment perceptions. Q4.6, Q4.12 and Q4.21 were asked to reveal learner motivation attitude. And finally, Q4.7, Q4.8, Q4.9 and Q4.23 were related with the program goal. The frequencies were given below in Table 4.9.

Table 4.9 Results of survey questions about superior structure at Pilot Study
OBTT_ES – PS Superior Structure

	n/a	strongly disagree	disagree	undecided	agree	strongly agree	Total
	Count	Count	Count	Count	Count	Count	Count
Q4.1	0	0	0	0	1	3	4
Q4.2	0	0	0	0	1	3	4
Q4.3	0	0	0	0	1	3	4
Q4.4	0	0	0	0	1	3	4
Q4.5	0	0	0	0	1	3	4
Q4.6	0	0	0	1	1	2	4
Q4.7	0	0	0	0	3	1	4
Q4.8	0	0	0	1	3	0	4
Q4.9	0	0	0	2	2	0	4
Q4.10	0	0	0	0	1	3	4
Q4.11	0	0	0	0	1	3	4
Q4.12	0	0	0	1	0	3	4

Table 4.9 Results of survey questions about superior structure at Pilot Study (cont'd)

Q4.13	0	0	0	0	2	2	4
Q4.14	0	0	0	0	1	3	4
Q4.15	0	0	0	1	0	3	4
Q4.16	0	0	0	1	0	3	4
Q4.17	0	0	1	1	2	0	4
Q4.18	0	0	1	1	2	0	4
Q4.19	0	0	0	0	4	0	4
Q4.20	0	0	2	1	0	1	4
Q4.21	0	0	0	3	0	1	4
Q4.22	2	0	1	0	0	1	4
Q4.23	2	0	1	0	1	0	4
Q4.24	2	0	1	1	0	0	4

Perceptions of the NCC experts towards superior structure were mostly positive. Only CPS1 marked 'Not Agreed' for Q4.17, Q4.18 and Q4.20. All three questions were about learner needs. All experts were marked 'Agreed' or 'Strongly Agreed' for learner convenience. On the other hand, for learner motivation there were mainly 'undecided' scores. Moreover, experts evaluated two questions out of four for learning environment since they are partially included in learning environment. They responded to the two questions Q4.6 and Q4.12. The results were exactly same with learner motivation results. Finally, most of the experts were 'Neutral' towards program goal.

Interview results of experts for superior structure were mostly positive for themes. Learning environment theme was mostly related with content and delivery development, its interview results were given at those sections. There was one question examining the learner needs theme at interview. That question was about which parts of the tool you were interested. Three of experts gave similar responds to that question. They stated that they were interested in discussion problem preparation and answering the problems that asked by others at discussion board. CPS4 expressed that "I was interested in preparation of questions and replying questions in discussions mostly [40]".

Three of the experts indicated some concerns about the theme, learner motivation during interview sessions. CPS1 answered the question that asked what reduced your motivation

most during study with “For example, the training session time was long. The subjects were too long instead of dividing into little chunks [41]”. The responds of CPS3 and CPS4 were similar to CPS1. CPS2 didn't state any concern about motivation. On the other hand, they all stated positive things about what motivated them most. CPS2 pointed out that “with [spreading] usage of this tool, there will be a meeting point for country wide forest engineers, where they can learn basic information about biodiversity [42]”.

The other theme examined was program goal. Three questions were asked to reveal perceptions about that theme. The responds for those questions of each expert were similar with their responds to learner motivation questions. For example, CPS1 answered the question that asked which was the most successful part of the program with “…giving a complex and wide subject as biodiversity, to foresters in a practical but also meaningful manner. It succesfully summarized the structure that may become boring and turn into chaos easily and presented in a smoothly readable format [43]”. Again CPS2 replied the same question as “Most of the foresters consider that biodiversity subject is out of their application area...This training module has been engaged in the right time to fill the gap in functional planning process. Especially in the further period, this module is going to be an important supplementary resource for applying large size projects about this subject and fulfill the requirements of international processes [44]”.

The last theme examined was learner convenience. There were two questions about this theme. Perceptions of experts were positive about that forest engineers will be convenient about the tool. CPS2 stated that “There is lots of information gathered… since that information is related with their work life; they keep easily in their mind. Especially watching videos and working on presentations are creating the same effect with direct education [face-to-face learning] affect, which is much more different than reading a book [45]”. Another expert, CPS1, pointed out that “This training module includes information about what forest engineers have least knowledge. Because of this reason, this module fills a huge gap. The engineers that will finish this program would take a big step in that area [46]”.

First Cycle. All six participants evaluated the questions for superior structure examining.

The parameters of evaluation and relation of questions with each theme were given above. The descriptive statistics for the evaluations scores of first cycle were given in Table 4.10.

Table 4.10 Results of survey questions about superior structure at 1st Cycle

OBTT_ES - 1st Iteration Superior Structure

	N	Minimum	Maximum	Mean	Std. Deviation
Q4.1	6	4.00	4.00	4.00	.00
Q4.2	6	3.00	5.00	4.17	.75
Q4.3	6	4.00	5.00	4.50	.55
Q4.4	6	4.00	5.00	4.50	.55
Q4.5	6	4.00	4.00	4.00	.00
Q4.6	6	2.00	5.00	3.50	1.22
Q4.7	6	4.00	4.00	4.00	.00
Q4.8	6	4.00	4.00	4.00	.00
Q4.9	6	3.00	5.00	4.17	.75
Q4.10	6	3.00	5.00	4.17	.75
Q4.11	6	3.00	5.00	3.83	.98
Q4.12	6	3.00	5.00	4.33	.82
Q4.13	6	4.00	5.00	4.17	.41
Q4.14	6	4.00	5.00	4.17	.41
Q4.15	6	4.00	4.00	4.00	.00
Q4.16	6	2.00	4.00	3.33	.82
Q4.17	6	2.00	4.00	2.83	.98
Q4.18	6	2.00	4.00	3.50	.84
Q4.19	6	3.00	5.00	4.17	.75
Q4.20	6	3.00	5.00	4.33	.82
Q4.21	6	4.00	4.00	4.00	.00
Q4.22	6	4.00	5.00	4.83	.41
Q4.23	6	4.00	4.00	4.00	.00
Q4.24	6	4.00	4.00	4.00	.00
Valid N (listwise)	6				

There were negative attitudes towards three themes of superior structure at first cycle. Especially, four engineers marked ‘Not Agreed’ to the Q4.17, which was related with learner convenience that asked whether researcher let attendees of program to choose the way of training or not. Mean value for that question was 2.8. There were also single ‘Not

Agreed' scores for Q4.6, Q4.16 and Q4.18, which were related by order with learner motivation, learning environment and learner needs. There were also 'Neutral' scores for Q4.19 and Q4.20 of learner needs, Q4.2, Q4.10 and Q4.11 questions of learner convenience and Q4.12 question of learner motivation. However, the standard deviation values for those questions were high, between 0.75 and 1.0.

The negative approach at survey results towards learner was not quoted at interview questions. All participants gave positive answers to the two questions related to that theme. Those two questions were examining different aspects from Q4.17. One of them was asking whether time period they spend for program was enough or not. All of them reported that they spent average of one hour at each session. And all of them stated that it was suitable for that kind of training. The other question was asking whether the program changed their attitudes towards forestry issues or not. The responds to that question were highly positive. They all noted they had great acquisitions from the program. C1S5 stated that "I strongly believed [that this program changed my attitude]. Regardless of the fact that my work is about forestry, this program affiliated too many things to me [47]". Another engineer, C1S3 pointed out that "As I said before, I am highly interested in this subject. I think the program was highly beneficial and useful. It is a successful program. I hope my colleagues will give attention to this program as well [48]". Another anecdote came from C1S4 as "Absolutely. Definitely my attitude was changed. However, as I said it will be more concrete when we transfer this knowledge to application [49]".

Final Study. All 12 engineers participated to the final study evaluation.

The related questions and parameters were given above. Table 4.12 demonstrates the minimum and maximum values, mean score and standard deviation values of assessment survey scores. The majority of mean value scores ranged between 4.0 and 5.0 for final study, whereas the standard deviation values ranged mostly between 0 and 0.5.

Table 4.11 Result of survey questions about superior structure at Final Study OBTT_ES –2nd Iteration Superior Structure

	N	Minimum	Maximum	Mean	Std. Deviation
Q4.1	12	4.00	5.00	4.83	.39
Q4.2	12	5.00	5.00	5.00	.00
Q4.3	12	4.00	5.00	4.33	.49
Q4.4	12	4.00	5.00	4.25	.45
Q4.5	12	4.00	5.00	4.25	.45
Q4.6	12	4.00	5.00	4.17	.39
Q4.7	12	4.00	5.00	4.50	.52
Q4.8	12	3.00	5.00	4.17	.72
Q4.9	12	4.00	5.00	4.08	.29
Q4.10	12	4.00	4.00	4.00	.00
Q4.11	12	4.00	5.00	4.67	.49
Q4.12	12	5.00	5.00	5.00	.00
Q4.13	12	4.00	5.00	4.92	.29
Q4.14	12	4.00	5.00	4.75	.45
Q4.15	12	4.00	5.00	4.92	.29
Q4.16	12	4.00	5.00	4.83	.39
Q4.17	12	3.00	4.00	3.25	.45
Q4.18	12	4.00	5.00	4.75	.45
Q4.19	12	5.00	5.00	5.00	.00
Q4.20	12	4.00	5.00	4.58	.51
Q4.21	12	4.00	4.00	4.00	.00
Q4.22	12	5.00	5.00	5.00	.00
Q4.23	12	5.00	5.00	5.00	.00
Q4.24	12	4.00	5.00	4.67	.49
Valid N (listwise)	12				

The perceptions towards superior structure were mostly positive. However, there were some 'Neutral' scores for Q4.8 and Q4.17, which are related with program goal and learner convenience by order.

As it was mentioned at previous part, learner convenience theme was examined with two questions at interview. The average session times were one hour again for new attendees. The two old trainees indicated that it took 15-20 minutes less from first cycle to finish each session. They added to the same question that session times are fairly appropriate for online time spending. C2S5 stated that "One hour is reasonable for following this training

[50]". The responds to the other question were somehow both 'not positive' and 'not negative' manner. All ten of them reported increase in knowledge but not change in attitude. C2S4 stated that "Actually, I can't say that my perspective completely changed, but I can state that my knowledge base has been improved. I fully learned some issues that previously I knew sloppy [51]".

There were different aspects mentioned through final study interview for learner motivation theme of superior structure. C2S4 reported that he was motivated most from content of the tool. He added that "the part that motivated me mostly was…while watching the videos; I searched in internet in order to find further information about related topics. I think it was really a good thing [52]". Moreover C2S7 reported the same perspective as "I was motivated most from that the tool includes useful information for my job [53]". On the other hand, C2S5 stated parallel with previous cycles that "in my opinion, forums [discussion boards] were very good for my motivation. I like this part of this study most [54]". Furthermore, C2S4 and C2S6 pointed out that "I cannot say demotivated but disappointed from the user number of the tool. Personally, I expected much more interest and participation on this [program] [55]".

There were 'Neutral' scores marked to Q4.8 for program goal theme of superior structure at assessment survey, which asked whether the tool was interactive or not. However, during interview sessions, all eight new trainees responded to the question that asked which was the most successful part of the program as 'interactivity'. C2S6 reported for that question as "Definitely forums [discussion boards]. I learned new things and I spend enjoyable time on forums [56]". On the other hand, C2S4 pointed out that "normally, there have been meetings and conferences about this kind of information seminars at various cities of our country. Reaching all of these through internet gladdened me [57]". Again most of the new trainees agreed on least successful aspect of the program as 'lack of widespread use'.

4.3.5 Perceptions about learner outcomes of OBTT

Pilot Study. Perceptions of experts about learner outcomes were not presented since they are not the target group of this study.

First Cycle. The learner outcomes were not seen as a research goal for this study. However, there are important aspects of the questions that reveal perceptions towards the important themes related with further studies. These themes are listed as lower costs, personal benefits and learning outcomes.

There were nine questions at assessment survey to assess the learning outcomes of this characteristic. The descriptive data were given below at Table 4.12.

Table 4.12 Results of survey questions about learner outcomes at 1st Cycle

OBTT_ES - 1st Iteration Outcomes

	N	Minimum	Maximum	Mean	Std. Deviation
Q5.1	6	4.00	5.00	4.83	.41
Q5.2	6	4.00	5.00	4.17	.41
Q5.3	6	5.00	5.00	5.00	.00
Q5.4	6	4.00	5.00	4.17	.41
Q5.5	6	4.00	5.00	4.17	.41
Q5.6	6	2.00	5.00	3.83	.98
Q5.7	6	2.00	4.00	3.67	.82
Q5.8	6	2.00	5.00	3.67	1.37
Q5.9	6	4.00	5.00	4.17	.41
Valid N (listwise)	6				

The results were mostly positive towards this theme. Q5.6, Q5.7 and Q5.8 got 'Not Agreed' scored single time from two different engineers. The other questions were all responded as 'Agreed' or 'Strongly Agreed'.

There were two questions asked to reveal the perceptions about learning outcomes. Those same questions were purposed under superior structure as well. The goals were extensions of each other. Those questions were examined under learner convenience theme of superior structure in previous part.

Final Study. Table 4.13 presents the statistical data of final study assessment survey results. All scores were quite high. All of the participants agreed with positive attitude towards learning outcomes theme of the last characteristic of the tool. The mean value scores were between 4.5 and 5.0 whereas standard deviation values were between 0 and 0.5.

Table 4.13 Result of survey questions about learner outcomes at Final Study

OBTT_ES –2nd Iteration Outcomes

	N	Minimum	Maximum	Mean	Std. Deviation
Q5.1	12	5.00	5.00	5.00	.00
Q5.2	12	5.00	5.00	5.00	.00
Q5.3	12	5.00	5.00	5.00	.00
Q5.4	12	4.00	5.00	4.75	.45
Q5.5	12	4.00	5.00	4.75	.45
Q5.6	12	4.00	5.00	4.50	.52
Q5.7	12	4.00	5.00	4.75	.45
Q5.8	12	4.00	5.00	4.42	.51
Q5.9	12	5.00	5.00	5.00	.00
Valid N (listwise)	12				

The only theme of learner outcomes characteristic, learning outcomes, were examined at superior structure examination of final study. All participants noted positive attitudes and changes in the attitudes towards learning outcomes. One of the new attandees, C2S8 stated that “It is not possible to say that my aspect [about biodiversity] has been totally changed. However, I can definetely say that, I learned some concepts that I am interested but not have time to investigate or I used to know skethcy. Thus, this surely causes positive change in my attitude [58]”.

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter discusses the findings of the prototyping cycles. The results of each research questions will be examined through survey and interview results analysis among demographics of participants. Also web server login data will be examined. In addition, suggestions for further practices and future studies will be given. The main goal of this study was designing and developing an online biodiversity training tool for professional development of forest engineers. Qualitative and quantitative data collection methods were conducted by researcher, of those results would reveal the perceptions of forest engineers towards biodiversity training, technology usage in education and OBTT. Researcher will also evaluate these findings in order to make assumptions for further practices and future studies. This whole examination of findings and assumptions will be done parallel to literature reviews.

5.1 Major findings for factors that facilitate or undermine effective online biodiversity training

This section contains forest engineers' beliefs towards computers and online training programs as well as biodiversity and biodiversity training. In first part of this section, researcher will examine the perceptions of forest engineers about technology and its usage in education. In the second part, he will examine the perceptions of engineers towards biodiversity and biodiversity training.

5.1.1 Major findings about technology usage in education

The results of demographic survey and interviews show that forest engineers have positive attitudes towards computers. Most of the participants stated that they use computer for search of information. However, among eighteen engineers totally participated to this study, only two of them, 12.5% took online course before. Although online course experience was low, they have enough computer usage skills to follow the course, and they did not report any difficulties encountered. Nevertheless, after finishing OBTT, all participants through all cycles responded to the interview question about online training program positively. Moreover, 15 participants responded that they would suggest e-learning to their colleagues. One exception revealed his negative attitude about not suggesting e-learning was about his belief of disappointment for his colleagues. Tynjala and Hakkinen (2005) concluded in their review about this situation that e-learning environments should support the ability to reach mutual understanding through shared values and goals by collaborative knowledge building or epistemic social practices. Thus, a researcher should collaboratively bring the adult learners together to dissipate space for misunderstandings.

Furthermore, the results show a positively increased attitude towards online training program usage among forest engineers. Before study, only two of engineers had taken one online course. After study, almost all of them responded online courses are beneficial. These findings are similar with the findings of a previous study done by Chuang & Tsai (2005) that stated the more experience on the Internet, the higher the scores attained on confirmatory factors analysis scales of e-learning.

5.1.2 Major findings about biodiversity and biodiversity training

Attitudes of forest engineers towards biodiversity and biodiversity training were highly positive. They all stated that they want to learn all aspects of biodiversity inventory on forestry. Haury (1998) argued in his review of teaching biodiversity that “Biodiversity education must go beyond an academic study of biological relationships, structural and

functional diversity, and the processes of evolution and extinction" (p. 4). He also stated that people will understand the connection between biodiversity and ecological sustainability. The results of this study are like an evidence of that statement. All forest engineers that participated to this study work in forest management and planning, which is an important role for ecological sustainability. The responses they gave in demographic survey and interviews reveal that they are eager to learn the aspects of biodiversity.

5.1.3 Overview of the study

In this section, an overlook to the findings will be evaluated according to the results of web server logins. Knowles (1990) stated that one of the troubles that an adult educator encountered is high dropout rate. The login data that were given at results are parallel to that statement. There is sharp decrease at both first and second cycles after first week. 89 logins and almost 900 views at first week of first cycle decreased to 35 logins and 257 views. Moreover, 15 forest engineers started to the first cycle, where only six of them finished. There were negative scores for the questions related with the time limitations and prerequisites. Researcher related that drop to the time limitation and removed the activity lock of the tool. However, there were still dropouts. This time researcher communicated with the participants via phones and emails. He sent a reminder email to the engineers and he also informed them about time extension. A previous study done by Ersoy (2003) suggested that learners expect an encouragement from instructors such as contacting with email or personally communicate for the reasons of dropout. Also Graham, Cagiltay, Craner, Lim and Duffy (2000) reported a similar assumption as an instructor should contact with the learners that fall from program. Also Graham et al. (2000) stated that "because there are not frequent face-to-face meetings, it is easy for students in an online course to fall through the cracks and to be forgotten if they do not participate in asynchronous conferencing or make contact by e-mail" (p. 9). However, the findings of this study were not parallel to those assumptions. Even though the researcher contacted with the forest engineers that fall from the course with emails and personally with phone calls, they still didn't return to the program. This might be a motivation

problem that is generally encountered during adult learning programs. One of the six concepts that Knowles (1990) stated was motivation. He pointed out that adult learners would respond to extrinsic motivators such as wage raise, promotions etc. In order to solve the dropout problem of this study might be an encouragement from GDF itself that may lead increase in voluntary participations. Furthermore, forest engineers tasked to attend by GDF to the workshop done by NCC. So, they were assigned to attend the workshop at those days. However, such appointments were not done by GDF for OBTT. They had to spare their personal time for attending OBTT. Knowles (1990) stated that adult learning must be voluntarily. However, this voluntary attendance might increase the dropout rate in a research level program. There may also be another reason as well. Most of the forest engineers are charged with field duties during a year. And this fact makes it hard to finish a program if the time of that program crosses with the field work, even if the engineer started to the program when he was still at the city.

5.2 Perception of forest engineers towards OBTT

In this section, researcher examined the findings about perceptions of forest engineers towards the content, delivery and the service of the OBTT.

Content: MacKeracher (1996) pointed out that direct relevancy of the content with some aspects of what they currently do, learners are more likely to be motivated to look for connections and develop new meanings (p. 256). Majority of the forest engineers that participated to this biodiversity training program reported that they liked and enjoyed the content and found it relevant during interview sessions. However, there were negative attitudes towards the content of the tool at survey from two forest engineers to questions Q1.3 and Q1.5 in first iteration. Those questions were related about authenticity of the content. Mean values of those questions were under 3.5 and standard deviation values were 0.5. Questions were asking about whether content cover real life situation examples or not. Herrington, Oliver & Reeves (2003) concluded during their studies that disposal

of disbelief and enabling students' willing can be supplied by setting up the content of online tool authentic, with motivating and encouraging aspects. Taking into considerations of those scores and comments, researcher added new practices collaboratively with NCC experts. After implementing the second cycle prototype, the results shift to positive way. The scores of the same questions were around 4.5 as mean score and 0 for standard deviation values. This reveals a good recovery handled by researcher. Also all participants respond 'Yes' to the related questions during interview sessions. The previous trainees that attended to the first cycle as well, stated that the new practices were better. However, it is not unrealistic to expect all of the participants of an online training program to like the content of that training. This can be concluded from the fact that the results of this study are not parallel to the results of the study done by MacDonald et al. (2004). During their study, her team encountered negative perceptions towards content. The reason for that is probably because of the most important limitation of this study, which is sample number. While there were only 18 forest engineers attended to this study, there were much more learners in MacDonald et al.'s study which may cause variant in perceptions and lead negative ones towards content.

Delivery: The research findings indicate that delivery of the tool has been improved during prototyping cycle. Both at pilot study, and first cycle, attendees reported negative attitudes towards tool. At pilot study, experts were concerning about the interactivity of the tool. Two NCC experts scored 'Not Agreed' to the Q2.6, which was related with the interactivity. Their concern was about the length of the context. They reported during interview that content should be divided into little chunks. About this matter, Curtis and Lawson (2000) argued in their exploration of collaborative online learning article that "The lone student scrolling through pages of on-line text is a step backward in terms of quality of teaching and learning" (p. 21). Researcher took that review into consideration and enhanced collaborative activities in the tool such as discussion boards and practices facilitating learner-tool, learner-learner, and learner-instructor interactions. As a result, there were no negative score at survey or comment during interview about the interactivity of the tool at the end of the final study. On the other hand, there were

negative scores for tool characteristic of delivery development. Two engineers scores ‘Not Agreed’ for Q2.4 and Q2.9. Those questions were about graphics used at tool. However, one of the interview questions was asking about least successful part of the tool and there were no negative comments about graphics. Also all engineers at both cycles responded 'Yes' to the interview question that asked whether the delivery of the tool was appropriate or not. They might comment about graphics at that question either, but no one made a comment. In addition, three of the first cycle participants and six of the second cycle participants specifically indicate that they enjoyed the discussion board section. They added that it might be improved further. Moreover, majority of participants reported that videos synched with power point presentations were successful. Furthermore, all the participants responded ‘Yes’ to the question that asked whether the tool was usable or not. In general, the attendees were selected by purposive sampling. Thus, they were all computer literate. Because of that reason, they did not encounter any problem since researcher designed the user friendly. Consequently, it can be concluded from findings that the final prototype of OBTT satisfied the interactivity, usability and tool characteristics of DDLM.

Service: Stodel (2004) pointed out that support and encouragement has been found as social aspect of learning. Thus, service development has an important role for motivation of online learning. It can be concluded by the findings that service development of the tool was adequate. There were no negative scores for the service questions during cycles. There were only few neutral scores for service development. Those neutral scores reported at interview that they didn't need to use that service at all. The reason for positive attitude for service development is consequence of designing the tool technically fine, paying attention to the ability of working in multiple platforms instead of adhering to a single platform, having a user friendly interface, introducing how to use manuals and tested carefully before iterations. Moreover, the support team that was composed of experts quickly responded to the field/content related questions from participants. During interviews, forest engineers marked that they greatly valued the service provided them. They also stated that service plays important role in their learning.

Again, there was a limitation for the service development evaluation of this study. The results may not be this much promising with a high number of participation. However, the findings of this study were parallel to the findings of the study done by MacDonald et al. (2004).

5.3 Contributions of OBTT experience by forest engineers

Superior structure: Flexibility of e-learning that allows trainees to schedule the learning according to their timeline is indeed the reason why e-learning is such an attractive medium (MacDonald et al. 2001, Stodel & Farres, 2002). Superior structure characteristic of DDLM was purposed to reveal the perspective of learner motivation, learner convenience, learner needs and learning environment to assure quality of the content, delivery and service development. There was a significant dropout rate for this study. This shows that there were some drawbacks that decrease motivation. For instance, a certificate given cooperatively by GDF and research team after successful completion, may lead increase in participation. However, majority of the survey scores towards superior structure was positive, especially for final study. There were three negative attitudes about superior structure which were consistent with the related questions that asked through interviews and survey questions of other characteristics. For example there was a question about examples at content section, which was also asked about superior structure. The same engineers marked 'Not Agreed' to the related questions at first cycle. On the other hand, that attitude changed during evaluation of final study. The mean value score of the Q4.18 increased to 3.3 from 2.8, whereas the standard deviation value dropped to 0.5 from 1.0. In addition, two engineers scored 'Not Agreed' the Q4.18, which was asking whether the instructor allow making their own choice or not. This attitude changed at final study since researcher removed the activity lock module, which brought prerequisites to the chapters. Furthermore, the interview results were more promising. Four engineers at first cycle and nine engineers at second cycle responded positively to the question that what drop your motivation during program. They indicate

that there were nothing drops their motivation. Also, all of the participants responded to the question that asked what motivated you must at least with an aspect. 10 of the engineers during both studies specified content and four of them specified discussion boards, whereas last two of them specified videos. In addition, all of the engineers responded ‘Yes’ to the question that asked whether OBTT was convenient or not. One of the engineers, whom were new attendee of second cycle, asked to the researcher at the end of the interview session that whether this program will resume or not.

To sum up, increase of scores towards superior structure in a positive manner during the study indicate improvement in quality of design and development of the tool respectively.

Learner outcomes: The results of this study revealed that attendees enjoyed the training program and they gained novel knowledge about biodiversity concept as well as this program changed their attitudes toward online professional development materials. In addition, majority of the participants reported at interview sessions that their perspective against forestry changed in the light of what they acquired from this training. Positive outcomes indicate that the knowledge they obtained from this training will reflect to their forest management planning. Two of the engineers had already reported during interview sessions that they started to use what they learned. Nevertheless, there were some negative scores during first cycle evaluation. The questions that marked as "Not Agreed" were asking whether they acquired novel knowledge that they can apply to their work life. Only one engineer marked ‘Not Agreed’ to that question. Same engineer indicate at the interview session that he is not a forest management planner but a supervisor. He reported that this training program brought him some new knowledge that he did not use to know, however, he could not apply that knowledge to his job. All other engineers that participate both first cycle and final study responded positively to the question that asked whether their attitude toward forestry has changed or not. Moreover, increased values of mean value scores of survey analysis show that OBTT has been positively improved during prototyping process. Especially, the values of those two questions marked negatively has raised from 3.5 to 4.5. Also, standard deviation values decreased from 1.0

to 0.5. These values indicate that the responds to survey questions improved positively with a less distributed manner.

Hereby, it can be concluded that, the outcomes of the learners that finished the program indicates that OBTT satisfied the attendees.

5.4 Implications for practices

Implications of the results of this study can be categorized into three topics, which are implications about andragogy, implications about designing and developing issues related with online professional development, and implications about policies of institutions and private organizations.

Andragogical implications are not as fit as pedagogical ones. There have been much more studies for pedagogical implication over many years. On the other hand, the number is relatively low for andragogy. Adult learners are much more complicated learners than children and youth learners. This study was purposed to create an online professional development tool for forest engineers, whom are adults. Results of this study indicates that forest engineers find training programs diffused into technological environment ease to access, time and place independent efficient and easily updated. Moreover, majority of adults, forest engineers in this case, are working individuals, whom also have familial responsibilities. Thus, no matter how effective face-to-face learning methods are, they might not have time to spare to those activities. Nevertheless, findings of this study showed that forest engineers benefit from this tool by designing their own planning that would help their work life.

Moreover, the findings of this study reveals that application of six concepts that Knowles (1990) pointed out, which are need to know, self-concept, foundation, readiness, orientation and motivation, were good guide for preparing a training program for forest engineers. In this study, researcher couldn't benefit all these concepts, however, the ones

he followed, which are need to know, self-concept, readiness and orientation, gave good results. Scrutinization of these concepts should be further covered. For need to know concept, researcher chose biodiversity that comprise forestry. Thus, each forest engineers believed that he/she should know the concept. Furthermore, this need to know awareness of forest engineers formed self-direction consciousness among forest engineers. Self-concept was followed with this consciousness. During first and second prototyping, researcher used problem centered examples in order to make the forest engineers feel that they should dedicate themselves to this training program. Those examples made the study to benefit from readiness and orientation concepts. Additionally, for forest engineers' professional development, the whole biodiversity inventory should be narrowed down to the context that is related about forest management. Forest engineers should specifically be given information about how and where they can use the given context. They also should be informed about which subject should be considered in which planning.

Second implication is about designing and developing an online professional development material for forest engineers. First of all, content is crucial for capturing attention of learners. The content length should be well arranged. It should be short enough for not getting the learners bored and long enough to sufficiently inform the learner. A researcher should definitely work with a team composed of an authority and experts of the content. Authenticity is also an important issue, which has to be finely tuned. Too many examples would generate a pressure on learners, whereas very few examples would cause the learners not well prepared to real life situations. Also, a researcher should work with the associated institution, GDF in this case, collaboratively while preparing content. According to this cooperation with the institution, the online tool should include not only solid information but also practice samples that are related with real life. In this case, forest engineers should be able to apply what they learned to the field work. Nevertheless, the content should be clear and easily understandable. The multimedia tools that are used should be well established with the related theoretical information and should be supportive. Furthermore, the need analysis should be carefully done. Researcher should know what forest engineers need most and highlight it during

program in order to gain better attention and motivate the learners well enough. In addition, practitioner that would conduct a similar research should prepare a collaborative study example in detail before starting to prototyping cycles. Collaborative examples are hard to conduct in virtual environment. A practitioner should be well prepared for that type of examples. Finally, the sample number for this study was limited. Thus, a researcher should prepare the content with broader scope that would please the learner, even there are too many learners attend to the study.

For delivery development, a researcher should design attractable elements. The findings of this study show that, even the forest engineers are enthusiastic about learning biodiversity, which means there is a 'need to know' for learners of this case, there is still a high dropout rate. This might be a reason for dropout from course even if they did not mention it during interviews. Thus, a researcher should motivate the learners more via an attractive design to keep them resume to the program. A researcher should use unique design with elite visual characteristics. This means that the design elements should not remind the users any other program or website as well as they should please the design taste of users. However, the design elements should also be plain with plain colors. Another implication of the findings of this study might be time limitation. The results show that, forest engineers should not be given a limited time. Also there should not be prerequisites. They should conduct the program whenever they feel ready for it. Readiness is important. Thus, a researcher should spread his/her study to a long period. He/she has to make his/her time schedule flexible for possible time extensions. Moreover, user-user and user-instructor interactions are important for online professional development materials. Discussion boards and bulletins should be generated and used in an online professional development material for forest engineers. Nevertheless, in order to keep motivation and attention high, there should not be a usability problem related with training tool. A learner should use the tool with a straight order, without having an ambiguity issue.

A large set of attendees is necessary to generalize service development. However, interview comments revealed that, a researcher should also be well prepared for service as well. It is an important part of learning by increasing motivation and encouragement.

Last implications are about the policies of institutions and private organizations. There are some private organizations that employed forest engineers within. Those organizations and certainly Forest and Environmental Ministry, especially GDF department of that ministry, might use this online professional to train their employers according to their needs. Especially GDF doesn't have such an online program within. When this OBTT would develop with respect to evaluation considerations, it would be a good opportunity for GDF to reach this training to its engineers across the country. In addition to that, GDF should better motivate the engineers with promotions or wage raises like motivators in order to increase attention to such programs. Another implication might be to blend this online professional development material with face-to-face materials. Furthermore, any policy change in forestry can be applied with online professional development material with real life practices to high number of forest engineers with small cost and time.

5.5 Implications for further studies

When the lack of studies considered in the literature about online biodiversity training, this study is unique and the very first in Turkey. Findings of this study provide an initial foundation for designing and developing online professional development tool to instruct forest engineers about concepts of biodiversity. However there is a definite need for further studies to fill this gap in the literature.

The results of this study was purposed to reveal the perception of forest engineers, whom are adult learners, towards online professional development material and its components as well as biodiversity. This program showed that, there is a huge need for online training programs for adults at their professions. The findings of this study might be extended to

the further studies that targeted both forest engineers again and other adults from other professions. Majority of the participants of this program revealed that they would suggest this program to their colleagues. This shows that this program should be improved and applied with more developed manner. It is certain from findings that this e-learning program fulfilled some of the expectations of forest engineers. Moreover, taken as a baseline, this program may lead to further studies that would try to solve professional development problem for other professions. Nevertheless, the participants of this study were limited and they were selected by purposive sampling. Future studies might reach to much more participants with random sampling, which would lead to generalize the findings for further professional development materials.

Also, this study was designed and developed for web environment. In further studies, this kind of professional development materials might be transferred into new platforms as applications for nowadays popular technologies such as tablets, smart phones etc., which may lead to increase mobility of such training programs.

Finally, this program was designed and developed to cover the biodiversity related issues. However, forest engineers may also have other needs that would be beneficial for forestry like climatology, forest botanic etc. This study may be baseline for further studies that would be an online professional development for other expertise.

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APEENDIX A

Biodiversity Course Programme

1. Gün
Giriş
9:00 – 9:15 Kayıt
9:30 – 10:00 Açılış Konuşmaları

Konu	Içerik	Saat	Eğitmen
Kaçkar Projesinin Tanıtımı	Kaçkar projesinin kısa bir tanıtımı	10:00 10:20	Atilla Küçükala
Kursa Genel Bakış	Kursun amacı, yöntemi. Katılımcıların ve eğitmenlerin beklentileri.	10:20 10:40	Hüma Ülgen
Biyolojik Çeşitlilik Nedir? Artvin ve Kaçkarların Biyolojik Çeşitlilik açısından Önemi	Biyolojik çeşitlilik kavramı nedir, neden önemlidir? Proje alanının biyolojik Çeşitlilik açısından dünyadaki ve Türkiye'deki önemi.	10:40 11:10	Uğur Zeydanlı
Kahve Arası		11:10 11:40	
Artvin'in Zengin Yaban Hayatı	Artvin bölgesinin yaban hayatı açısından önemi.	11:40 12:00	Temel Göktürk
Orman Ekosistemi ve Ekolojik Süreçler (1)	Ekoloji Nedir. Genel hatlarıyla ekolojik süreçler, ilişkiler, ormandaki besin döngüsü, karbon döngüsü, su döngüsü besin zinciri.	12:00 12:40	Uğur Zeydanlı

Öğle Yemeği 12:40 – 14:00

Konu	Içerik	Saat	Eğitmen
Orman Ekosistemi	Orman ekosistemi ve karmaşık	14:00	Oğuz

ve Ekolojik Süreçler (2)	orman yapısı.	14:45	Kurdoğlu
Türkiye'de Ekosistem Tabanlı Fonksiyonel Planlama Dönemi	Orman'ın sunduğu hizmet ve değerleri korumak için OGM'nin fonksiyonlara göre planlama çalışmaları	14:45 15:15	Mustafa Yurdaer Ayhan Çağatay
Kahve Arası		15:15 15:45	
Orman Ekosistemi Hizmet ve Değerleri	Orman ekosisteminin sunduğu çeşitli hizmet ve değerler	15:45 16:15	Hüma Ülgen
Ormanın Sosyo-Ekonomik Faydaları	Ekoturizm başta olmak üzere, ormandan gelir elde etmenin başka yöntemleri.	16:15 17:00	Oğuz Kurdoğlu
Tartışma	Hüma Ülgen, Mustafa Yurdaer, Ayhan Çağatay, Mehmet Demir, Tansu Gürpınar, Atilla Küçükala, Uğur Zeydanlı, Oğuz Kurdoğlu, Temel Göktürk	17:00 17:30	

2. Gün

Orman Unsurları

Konu	Içerik	Saat	Eğitmen
Kuş ve Yarasalar	Orman döngüsündeki yerleri.	9:00 9:45	Süleyman Ekşioğlu
Küçük ve büyük memeliler	Ormanda yaşayan küçük ve büyük memeliler ve bunların ormandaki fonksiyonları	09:45 10:30	Deniz Özüt
Mantar ve Likenler	Ekolojik rolleri nedir? Ne işe yararlar? Ağaçlara zarar verirler mi?	10:30 11:00	Tansu Gürpınar
Kahve Arası		11:00 11:30	
Kelebek	Ormandaki kelebekler	11:30 12:00	Süleyman Ekşioğlu

Öğle Yemeği 12:00 – 13:30

Konu	Içerik	Saat	Eğitmen
Meyve ağaçları	Meyve ağaçlarının orman ekosistemi ve yaban hayatı için önemi	13:30 14:00	Deniz Özüt Uğur Zeydanlı

Ölü Ağaçlar ve yaşlı ağaçlar	Dikili Kuru, devrikler ve yaşlı ağaçların orman ekosistemindeki önemi	14:00 15:00	Oğuz Kurdoğlu
Kahve Arası		15:00 15:30	
Böcek	Böceklerin orman ekosistemindeki rolleri. Böcekler zararlı mıdır? Böcek istilasında böcekli ağaçların alımının faydaları ve zararları.	15:30 16:30	Temel Göktürk
Tartışma	Günün önemli konuları hakkında tartışma ve günün değerlendirmesi: Hüma Ülgen, Tansu Gürpınar, Uğur Zeydanlı, Oğuz Kurdoğlu, Temel Göktürk, Atilla Küçükala, Deniz Özüt	16:30 17:30	

Doğa Fotoğrafçılığı (seçmeli)

Konu	Içerik	Saat	Eğitmen
Doğa Fotoğrafçılığı		20:00 21:30	Tansu Gürpınar

3. Gün

Sürdürülebilir Ormancılık Teknikleri (Arazi Çalışması)

Konu	Içerik	Saat	Eğitmen
Sürdürülebilir Ormancılık Teknikleri	Ormancılık uygulamalarının biyolojik çeşitlilik açısından değerlendirilmesi ile ilgili saha çalışması	09:00 17:00	Oğuz Kurdoğlu Uğur Zeydanlı, Tansu Gürpınar Temel Göktürk Hüma Ülgen Deniz Özüt Süleyman Ekşioğlu

Saat 9:00 da ormana gitmek üzere otobüslerle yola çıkılacaktır.

4. Gün

Konu	Içerik	Saat	Eğitmen
Doğal Yıkımlar	Bazı tahribat veya doğal afetlerin orman ekosistemindeki yerleri: Yangın, fırtına, böcek, iklim değişikliği vs…	9:00 10:00	Can Bilgin
Orman ve İklim Değişikliği	Orman'daki uygulamaların iklim değişikliğine etkileri	10:00 10:45	Hüma Ülgen

Kahve Arası		10:45 11:15	
Coğrafi Bilgi Sistemleri (Seçmeli)	CBS'den doğal kaynak yönetiminde nasıl yararlanabiliriz, nasıl harita yapabiliriz?	11:15 12:30	Deniz Özüt

Öğle Yemeği 12:30 – 14:00

Konu	Içerik	Saat	Eğitmen
İzleme	Biyolojik çeşitliliğin neden izlenmesi faydalıdır. Biyolojik zenginliklerimizi korumada izlemenin önemi.	14:00 14:45	Hüma Ülgen
Kuş izlemesi	Kuşlar açısından ormanın durumunu gösteren basit bir izleme programını nasıl hazırlayıp uygulayabiliriz?	14:45 15:15	Süleyman Ekşioğlu
Kahve Arası		15:15 15:45	
Memeli izlemesi	Fotokapanla memeli izlemesi. Nerelere yerleştirilir, nasıl kullanılır, avantajı nedir?	15:45 16:15	Can Bilgin
Endemik bitki / Odun dışı orman ürünü izlemesi	Bütün bitkiler önemlidir ancak hangisini izlemeliyiz? Nasıl izleyebiliriz?	16:15 16:45	Uğur Zeydanlı
Tartışma	Günün önemli konuları hakkında tartışma ve günün değerlendirmesi: Hüma Ülgen, Can Bilgin, Tansu Gürpınar, Uğur Zeydanlı, Süleyman Ekşioğlu, Deniz Özüt	16:45 17:30	

5. Gün

Grup Çalışmaları

Konu	Içerik	Saat	Eğitmen
Grup Çalışması	Halihazırda var olan orman amenajman uygulamalarında bu kursta öğrenilenler doğrultusunda ne tür değişiklikler öngörülebilir	09:00 12:00	Hüma Ülgen Atilla Küçükala Uğur Zeydanlı Tansu Gürpınar Can Bilgin Deniz Özüt
Değerlendirme	Kursun değerlendirmesi	12:00 12:30	Hüma Ülgen

APEENDIX B

DDLM Survey

Content

Q1.1. The content is of appropriate depth and breadth.
Q1.2. The content includes readings which are relevant to the workplace.
Q1.3. The content includes the teaching of skills necessary to deal with authentic workplace problems.
Q1.4. The content includes strong links between business theory and workplace practice.
Q1.5. The content includes current industry problems.
Q1.6. The content includes realistically complex learning tasks which are similar to those faced in the workplace.
Q1.7. The content includes information which is applicable and adaptable to new situations.
Q1.8. The content includes current best industrial practices.

Delivery

Q2.1. The Web-based learning management system provides tasks in a guided sequence (options, choices, inputs).
Q2.2. The Web-based learning management system provides relevant and appropriate use of technology.
Q2.3. The Web-based learning management system provides reasonably fast download of images.
Q2.4. Presentation of material on the site features aesthetically pleasing graphics.
Q2.5. Presentation of material on the site features effective styles and displays.
Q2.6. Presentation of material on the site features uncluttered and concise presentation.
Q2.7. Presentation of material on the site features captions, labels and/or legends for all visuals.
Q2.8. Presentation of material on the site features easy to find and use screen elements.
Q2.9. Presentation of material on the site features appropriate use of graphics.
Q2.10. Presentation of material on the site features information that stimulates imagination and curiosity.

Service

Q3.1. Administrative and technical support is provided by competent individuals.

Q3.2. Administrative and technical support is provided expediently.
Q3.3. E-mails are responded to within a reasonable amount of time.
Q3.4. Suggestions are quickly handled and responded to.
Q3.5. Complaints are quickly handled by professors/learning facilitators.
Q3.6. Suggestions are quickly responded to by professors/learning facilitators.
Q3.7. Feedback is provided promptly by professors/learning facilitators.

Structure

Q4.1. The course meets my needs with respect to content.
Q4.2. The course employs suitable technological applications.
Q4.3. The course respects my experience and current knowledge.
Q4.4. The course meets my learning objectives.
Q4.5. The course engages me in the learning experience.
Q4.6. The course builds my confidence in problem solving and planning.
Q4.7. The course uses interactive technology.
Q4.8. The course is interactive.
Q4.9. In the course the learning facilitators are partners in the learning experience.
Q4.10. In the course my opinions are considered.
Q4.11. In the course, the professors/learning facilitators are empathetic to my needs.
Q4.12. In the course, the professors/learning facilitators are effective in creating a positive learning environment.
Q4.13. In the course the content and learning activities support the course goals.
Q4.14. The professor/learning facilitator facilitates self-directed learning.
Q4.15. The professor/learning facilitator makes his/her expectations clear.
Q4.16. The professor/learning facilitator embeds learning in realistic and relevant contexts.
Q4.17. The professor/learning facilitator allows me to make choices with regards to my learning.
Q4.18. The professor/learning facilitator provides sufficient practice opportunities.
Q4.19. The professor/learning facilitator provides opportunities for support and self-reflection.
Q4.20. The professor/learning facilitator provides opportunities for self-evaluation.
Q4.21. The professor/learning facilitator supports exploratory learning.
Q4.22. The assignments, tests, and evaluation exercises enhance my learning.
Q4.23. The assignments, tests, and evaluation exercises highlight the steps I need to take to further my learning.
Q4.24. The assignments, tests, and evaluation exercises there is access to online resources.

Outcomes

Q5.1. The course is interesting.
Q5.2. The course is in line with my expectations.
Q5.3. As a result of my participation in this course I have gained more knowledge.

Q5.4. As a result of my participation in this course I have acquired proficiency in new techniques.
Q5.5. As a result of my participation in this course I have developed new skills.
Q5.6. As a result of my participation in this course my attitude has changed.
Q5.7. As a result of my participation in this course, I have applied new skills in the workplace.
Q5.8. As a result of my participation in this course, I have applied new knowledge in the workplace.
Q5.9. As a result of my participation in this course, I have initiated new ideas and/or projects.

APEENDIX C

DDLM Survey (in Turkish)

İcerik

Q1.1. Sunulan içerik yeterlidir.
Q1.2. Sunulan içerik, çalışma sahası ile ilişkilidir.
Q1.3. Çalışma sahasına özgün problemleri çözmek için gerekli olan becerilerin öğretimini içermektedir.
Q1.4. Alan bilgisi ile çalışma sahası uygulaması arasında güçlü bir bağ içermektedir.
Q1.5. Mevcut uygulama / gerçek yaşam problemleri içermektedir.
Q1.6. Çalışma sahasında karşılaşılan sorunlara benzer karmaşık öğrenme görevleri içermektedir.
Q1.7. Yeni durumlara uygulanabilir ve uyarlanabilir bilgi içermektedir.
Q1.8. Mevcut en iyi alan uygulamaları içermektedir.

Sunum

Q2.1. Web tabanlı öğrenim yönetim sisteminde, anlatılanlar takip edilebilir bir sırada verilmiştir.
Q2.2. Web tabanlı öğrenim yönetim sisteminde, uygun teknoloji kullanımı sağlanmıştır.
Q2.3. Web tabanlı öğrenim yönetim sisteminde, resimlerin hızlı bir şekilde indirilmesi sağlanmıştır.
Q2.4. Materyallerin sunumu, estetik açıdan tatmin edici grafikler içermektedir.
Q2.5. Materyallerin sunumu, etkili görüntü ve stil kullanımını içermektedir.
Q2.6. Materyallerin sunumu, az, öz ve düzenli bir sunum içermektedir.
Q2.7. Materyallerin sunumu, bütün görseller başlık veya açıklama içermektedir.
Q2.8. Materyallerin sunumu, kolay bulunur ve kullanılabilir ekran öğeleri içermektedir.
Q2.9. Materyallerin sunumu, grafiklerin uygun şekilde kullanımını içermektedir.
Q2.10. Materyallerin sunumu, merak uyandıracak ve hayal gücünü uyaracak bilgi içermektedir.

Destek

Q3.1. İdari ve teknik destek, yetkili kişiler tarafından sağlanmaktadır.
Q3.2. İdari ve teknik destek, uygun bir şekilde verilmektedir.
Q3.3. E-postalara makul zamanda cevap verilmektedir.
Q3.4. Öneriler hızlı bir şekilde değerlendirilmektedir ve yanıtlandırılmaktadır.
Q3.5. Şikayetler hızlıca ele alınmaktadır.
Q3.6. Öneriler hızlı bir şekilde uzmanlar tarafından yanıtlandırılmaktadır.
Q3.7. Geribildirimler vakit kaybetmeden verilmektedir.

Yapı

Q4.1. İçerik göze alındığında, eğitim ihtiyaçlarımı karşılamaktadır.
Q4.2. Eğitim, uygun teknolojik uygulamalar kullanmaktadır.
Q4.3. Eğitim, deneyimlerimle ve mevcut bilgimle ilgilidir /alakalıdır.
Q4.4. Eğitim, öğrenme amaçlarım ile örtüşmektedir.
Q4.5. Eğitim, öğrenme deneyimim ile örtüşmektedir.
Q4.6. Eğitim, problem çözme ve planlamadaki güvenimi arttırır.
Q4.7. Eğitimde, interaktif / etkileşimli teknoloji kullanmaktadır.
Q4.8. Eğitim, etkileşimlidir.
Q4.9. Eğitimlerde, eğitmenler öğrenme deneyimine ortaktırlar.
Q4.10. Eğitimlerde, görüşlerim dikkate alınmaktadır.
Q4.11. Eğitimlerde, eğitmenler ihtiyaçlarımı anlayabilmektedir.
Q4.12. Eğitimlerde, eğitmenler pozitif öğrenme ortamı yaratmaktadır.
Q4.13. Eğitimlerde, içerik ve öğrenme aktiviteleri eğitim amacını desteklemektedir.
Q4.14. Eğitmenler, bireysel öğrenmeye olanak tanımaktadır.
Q4.15. Eğitmenler, beklentilerini açıkça belirtmektedir.
Q4.16. Eğitmenler, öğrenmeyi gerçekçi ve uygun ortam ile birleştirmektedir.
Q4.17. Eğitmenler, öğrenmemle ilgili tercih yapmama olanak tanımaktadır.
Q4.18. Eğitmenler, yeterli alıştırma olanakları sunmaktadır.
Q4.19. Eğitmenler, destek için olanaklar sunmaktadır.
Q4.20. Eğitmenler, kendini değerlendirme için olanaklar sunmaktadır.
Q4.21. Eğitmenler, araştırmacı öğrenmeyi desteklemektedir.
Q4.22. Ödevler, testler ve değerlendirme alıştırmaları; öğrenmemi geliştirmektedir.
Q4.23. Ödevler, testler ve değerlendirme alıştırmaları; öğrenmemi ilerletebilmem için sonraki adımları vurgulamaktadır.
Q4.24. Ödevler, testler ve değerlendirme alıştırmalarında; çevrim içi kaynaklara erişim vardır.

Çıktı

Q5.1. Eğitim, ilgi çekiciydi.
Q5.2. Eğitim, beklentilerim doğrultusundaydı.
Q5.3. Bu eğitime katılımım sonucunda, daha fazla bilgi edindim.
Q5.4. Bu eğitime katılımım sonucunda, yeni tekniklerde/ yöntemlerde beceri kazandım.
Q5.5. Bu eğitime katılımım sonucunda, yeni beceriler geliştirdim.
Q5.6. Bu eğitime katılımım sonucunda, tutumum değişti.
Q5.7. Bu eğitime katılımım sonucunda, çalışma alanımda yeni beceriler edindim.
Q5.8. Bu eğitime katılımım sonucunda, çalışma alanımda yeni bilgiler uyguladım.
Q5.9. Bu eğitime katılımım sonucunda, çalışma alanımda yeni fikirler oluşturdum.

APEENDIX D

Interview Schedule

1. Do you think that the new knowledge is applicable at work? If so, can you give me an example of this?
2. Is there anything that you learned from the course and would like to appy it but couldn't. If yes, why?
3. Do you think, content of the course appropriate enough for biodiversity training? What can be done to improve it?
4. Do you think this tool is usable enough and user-friendly?
5. Do you think presentation of materials is appropriate? How can it be improved?
6. Where were you when you logged on to the program? (e.g., at home, at work, where at work). Did you establish a routine for how you approached this learning program?
7. On average, how long was each of your learning sessions?
8. Was this an optimal amount of time?
9. What did you tend to do in each session (e.g., logging on, reading text based material, reflecting etc)?
10. Do you think technical and administrative support enough? What can be done to provide better support?
11. Do your suggestions quickly evaluated and responded?
12. What motivated you to do the course activities?
13. What held you back from doing the course activities?
14. What was the most rewarding or satisfying aspect of the program?
15. What was the least rewarding or satisfying aspect of the program? How could it be improved? If you could change one thing about the program, what would it be?

16. What was the most challenging aspect of the program?
17. Would you recommend e-learning to your colleagues?
18. Online programs are still fairly new. Do you have any comments in general about online courses and programs?
19. Do you think your attitude / aspect changed towards forest conservation after the training?
20. Did you share what you learned in the program with your co-workers? If yes, how? If no, why?

APEENDIX E

Interview Schedule (in Turkish)

1. Sizce sunulan bilgi işinizde uygulanabilir mi? Eğer evetse, bir örnek verebilir misiniz?
2. Bu eğitimde öğrendiğiniz ve uygulamak istediğiniz ama uygulayamadığınız bir şey var mı? Eğer varsa, nedeni nedir?
3. Sunulan içeriği Biyoçeşitlilik eğitimi için yeterli, uygun buluyor musunuz? Sizce içeriği geliştirmek için neler yapilabilir?
4. Sizce eğitim aracı yeterince kullanılabilir / kullanıcı dostu olduğunu düşünüyor musunuz?
5. Materyallerin sunumu sizce uygun muydu? Nasıl geliştirilebilir?
6. Bu programı genelde nereden takip edebildiniz (iş, ev, vb.)? Programı takip edebilmek için kendinize belirli bir düzen oluşturdunuz mu?
7. Bir oturumunuz yaklaşık ne kadar sürdü?
8. Sizce bu oturum süreniz, çevrimiçi eğitimi takip etmek için ideal bir zaman mıydı?
9. Oturumlarınızda en çok hangi kısımlarla ilgilendiniz (yazıları okumak, videoları izlemek, tartışmalara katılmak)? Oturumda yaptıklarınızı anla
10. Sizce idari ve teknik destek yeterli mi? Daha iyi destek verilebilmesi icin neler yapilabilir?
11. Önerileriniz hızlı bir şekilde değerlendirildi / yanıtlandırıldı mı?
12. Eğitimin takibi sırasında sizi neler motive etti?
13. Eğitimin takibi sırasında sizi neler zorladı / motivasyonunuzu düşürdü?
14. Sizce bu programın en başarılı ve tatmin edici yanları nelerdir?

15. Sizce bu programın en az başarılı ve en az tatmin edici yanları nelerdir? Bunlar nasıl düzeltilebilir? Bu programda bir şey değiştirecek olsanız, neyi / neleri değiştirirdiniz?
16. Sizin için programın en zorlayıcı yönü neydi?
17. Elektronik öğrenmeyi iş arkadaşlarınıza tavsiye eder misiniz?
18. Çevrimiçi programlar oldukça yeni sayılır. Genel olarak çevrimiçi programı ile ilgili yorumunuz var mı?
19. Bu eğitim ile orman koruma konusunda tutumunuzun / bakış açınızın değiştiğine inanıyor musunuz?
20. Bu eğitimde öğrendiklerinizi iş arkadaşlarınızla paylaştınız mı? Eğer evetse, nasıl? Hayırsa neden?

APEENDIX F

Outline of OBTT

Çevrim içi Biyolojik Çeşitlilik Eğitimi

E-posta: biodiversitytraining@gmail.com

Web sitesi: http://www.biyocesitlilik.com

Kurs Tanımı:

Doğal kaynakların korunması ve sürdürülebilir kullanılması temel yönetim yaklaşımı olarak kabul edilmektedir. Yararlanma kelimesi bütün dünyadaki doğal kaynak yöneticileri için sürdürülebilir kullanma ve korumayı da içermektedir.

Orman Genel Müdürlüğü'nün 2004 yılında "Ekosistem Tabanlı Çok Amaçlı Amenajman Planları" (ETÇAP) bu sürecin önemli adımlarından biridir. Bu planlama yaklaşımı ile biyolojik çeşitliliğin orman yönetimine entegrasyonu ile ilgili önemli adımlar atılmıştır. Ancak ETÇAP yaklaşımının verimli bir şekilde uygulanması için biyolojik çeşitlilik, koruma biyolojisi ve ekoloji konularında teşkilatın bilgi altyapısının geliştirilmesi gerekmektedir.

Bu çalışma Çevre ve Orman Bakanlığı'ndaki bu konudaki girişimleri desteklemeyi hedeflemektedir. Eğitimde, temel olarak orman yönetimine biraz daha ekoloji temelli bir yönetim yaklaşımı ile bakılabilmesi ve biyolojik çeşitliliğin bir amaç olarak orman yönetimi içerisinde yerini nasıl alabileceği gibi konular irdelenmeye çalışılmıştır.

Kurs Amaçları:

Ormanda var olan her türlü biyolojik çeşitliliğin farkında olmak

Biyolojik çeşitliliğin faydasının ne olduğunu anlamak / anlamış olmak

İşletmelerini daha biyoçeşitlilik dostu / destekler hale getirmeye hazır olmak

Biyolojik çeşitlilik hakkında ne yapabileceğinin temel bilgilerini edinmiş olmak

Ormancılık uygulamalarında biyoçeşitlilik unsurlarını dikkate almak

Kurs İçeriği:

Orman Biyolojik Çeşitliliği ve Ekosistemi

Biyolojik Çeşitlilik

Türkiye'de ve Küresel Biyolojik Çeşitlilik

Biyoçeşitliliğin Değeri ve Kaybı

Orman Ekosisteminin Parçaları

Kuşlar ve Yarasalar

Mantarlar ve Likenler

Memeliler

Böcekler

Meyve Ağaçları

Yaban Hayatı

Doğal Yaşlı Ormanlar

Yaşlı ve Ölü Ağaçlar

Sürdürülebilir Ormancılık (geliştirilme aşamasında)

İzleme

Neden İzliyoruz?

Neyi İzleyeceğimize Karar Vermek

Neyi İzleyeceğimizi Nasıl Seçeceğiz?

İzlemenin Altın Kuralları

Verileri Toplamak ve Analiz Etmek

Grup Çalışması (geliştirilme aşamasında)

Kursun Tamamlanabilmesi için Beklenenler

Ön Bilgi Anketinin doldurulması

Kurs içeriğinin okunması ve ilgili tartışma panolarına katılımın sağlanması

Her bölümün sonunda yer alan "Çalışma" aktivitelerinin tamamlanması

Kurs sonunda "Çevrim içi Biyoçeşitlilik Eğitim Aracı Değerlendirme Anketi" nin doldurulması

APEENDIX G

Invitation Letter for OBTT

Değerli Katılımcılar,

Katılmakta olduğunuz çalışma Çevre ve Orman Bakanlığı'ndaki biyolojik çeşitlilik, koruma biyolojisi ve ekoloji konularındaki girişimleri desteklemeyi hedeflemektedir.

Eğitimde temel olarak orman yönetimine biraz daha ekoloji temelli bir yönetim yaklaşımı ile bakılabilmesi ve biyolojik çeşitliliğin bir amaç olarak orman yönetimi içerisinde yerini nasıl alabileceği gibi konular irdelenmiştir.

Kursun Tamamlanabilmesi için;

Kurs başlangıcında "Ön Bilgi Anketi"'nin doldurulması

23 - 29 Ocak tarihleri arası (1 hafta) "Orman Biyolojik Çeşitliliği ve Ekosistemi" bölümünün tamamlanması

Bölüm içeriğinin okunması ve ilgili tartışma panolarına katılımın sağlanması

Bölümün sonunda yer alan "Çalışma" aktivitelerinin tamamlanması

30 Ocak – 5 Şubat tarihleri arası (1 hafta) "Orman Ekosisteminin Parçaları" bölümünün tamamlanması

Bölüm içeriğinin okunması ve ilgili tartışma panolarına katılımın sağlanması

Bölümün sonunda yer alan "Çalışma" aktivitelerinin tamamlanması

6 - 12 Şubat tarihleri arası (1 hafta) "İzleme" bölümünün tamamlanması

Bölüm içeriğinin okunması ve ilgili tartışma panolarına katılımın sağlanması

Bölümün sonunda yer alan “Çalışma” aktivitelerinin tamamlanması

Kurs sonunda (15 Şubat tarihine kadar) “Çevrim içi Biyoçeşitlilik Eğitim Aracı Değerlendirme Anketi” nin doldurulması beklenmektedir.

Kursa; http://www.biyocesitlilik.com adresinden size gönderilmiş olan kullanıcı adı ve şifreyi kullanarak giriş yapabilirsiniz.

Web sitesinin kullanımı hakkında daha fazla bilgi edinmek için, ekte yer alan cbe_kullanim_kilavuzu.pdf dosyasini ya da web sayfasının sol menüsünde yer alan “Kullanım Kılavuzu” bağlantısını kullanabilirsiniz.

Vakit ayırdığınız için teşekkür ederim.

Saygılarımla,

Özgür Önal

APEENDIX H

Reminder Letter

Değerli Katılımcılar,

Kursun ilk bölümü olan "Orman Biyolojik Çeşitliliği ve Ekosistemi" bölümü tamamlanmış ve hafta başı itibariyle “Orman Ekosisteminin Parçaları” bölümüne başlanmıştır. Bu yoğun çalışma döneminizde katılımda bulunan tüm kursiyerlere zaman ayırdıkları ve gösterdikleri ilgi için teşekkür ederiz.

İlk bölümün tamamlanması için okunması / doldurulması gerekli olan kısımlarda eksikleri bulunan katılımcıların en kısa zamanda biraz vakit ayırarak bunları tamamlamaları ve sonraki bölüme devam etmelerini rica ediyoruz. Çalışmanın verimli olabilmesi ve katılımcılardan gelen geribeslemelerin değerlendirilebilmesi için her katılımcının katkısı çok önemli. İşbirliğiniz ve anlayışınız için teşekkür eder, iyi çalışmalar dileriz.

Saygılarımızla,

ÇBE Destek Ekibi

İlk bölümde yer alan ve kursun tamamlanabilmesi için gerekli olan gereksinimler:

“Ön Bilgi Anketi”nin doldurulması

“Orman Biyolojik Çeşitliliği ve Ekosistemi” bölümünün tamamlanması

Bölüm içeriğinin okunması ve ilgili tartışma panolarına katılımın sağlanması

Bölümün sonunda yer alan “Çalışma” aktivitesinin tamamlanması

İkinci bölümde yer alan ve kursun tamamlanabilmesi için gerekli olan gereksinimler:

“Orman Ekosisteminin Parçaları” bölümünün tamamlanması

Bölüm içeriğinin okunması ve ilgili tartışma panolarına katılımın sağlanması

Bölümün sonunda yer alan “Çalışma” aktivitelerinin tamamlanması

APEENDIX İ

Announcement Letter

Değerli Katılımcılar,

Üçüncü bölüme geçmeden önce, kursun birinci ve ikinci bölümüne yeterli katılım sağlanamadığı için okunması / doldurulması gerekli olan bölümlerin tamamlanabilmesi için süre 1 hafta uzatılmıştır. "İzleme" bölümüne 26 Mart 2012 tarihinde başlanacaktir.

Bu tarihe kadar katılımcıların biraz vakit ayırarak eksikleri tamamlamalarını rica ediyoruz. Çalışmanın verimli olabilmesi ve katılımcılardan gelen geribeslemelerin değerlendirilebilmesi için her katılımcının katkısı çok önemli. İşbirliğiniz ve anlayışınız için teşekkür eder, iyi çalışmalar dileriz.

Saygılarımızla,

ÇBE Destek Ekibi

İlk bölümde yer alan ve kursun tamamlanabilmesi için gerekli olan gereksinimler:

“Ön Bilgi Anketi”nin doldurulması

“Orman Biyolojik Çeşitliliği ve Ekosistemi” bölümünün tamamlanması

Bölüm içeriğinin okunması ve ilgili tartışma panolarına katılımın sağlanması

Bölümün sonunda yer alan “Çalışma” aktivitesinin tamamlanması

İkinci bölümde yer alan ve kursun tamamlanabilmesi için gerekli olan gereksinimler:

“Orman Ekosisteminin Parçaları” bölümünün tamamlanması

Bölüm içeriğinin okunması ve ilgili tartışma panolarına katılımın sağlanması

Bölümün sonunda yer alan “Çalışma” aktivitelerinin tamamlanması

APEENDIX J

Invitation Letter for OBTT (Final Iteration)

Değerli Katılımcılar,

Katılmakta olduğunuz çalışma Çevre ve Orman Bakanlığı'ndaki biyolojik çeşitlilik, koruma biyolojisi ve ekoloji konularındaki girişimleri desteklemeyi hedeflemektedir.

Eğitimde temel olarak orman yönetimine biraz daha ekoloji temelli bir yönetim yaklaşımı ile bakılabilmesi ve biyolojik çeşitliliğin bir amaç olarak orman yönetimi içerisinde yerini nasıl alabileceği gibi konular irdelenmiştir.

Kursun Tamamlanabilmesi için;

Kurs başlangıcında "Ön Bilgi Anketi"'nin doldurulması

"Orman Biyolojik Çeşitliliği ve Ekosistemi", "Orman Ekosisteminin Parçaları", "İzleme" ve "Uygulama Örnekleri" bölümlerinin ilgili tartışma panolarına ve çalışma aktivitelerine katılım sağlayarak tamamlanması

Kurs sonunda (15 Mayıs tarihine kadar) "Çevrim içi Biyoçeşitlilik Eğitim Aracı Değerlendirme Anketi" nin doldurulması beklenmektedir.

Kursa; http://www.biyocesitlilik.com adresinden size gönderilmiş olan kullanıcı adı ve şifreyi kullanarak giriş yapabilirsiniz.

Web sitesinin kullanımı hakkında daha fazla bilgi edinmek için, ekte yer alan cbe_kullanim_kilavuzu.pdf dosyasini ya da web sayfasının sol menüsünde yer alan "Kullanım Kılavuzu" bağlantısını kullanabilirsiniz.

Vakit ayırdığınız için teşekkür ederim.

Saygılarımla,

Özgür Önal

APEENDIX K

Demographic survey of OBTT

1. Cinsiyetiniz

2. Mesleğiniz

3. Uzmanlık Alanınız

4. Bağlı Olduğunuz Birim

5. Yaşınız

6. Ne kadar süredir OGM ye bağlı olarak çalışıyorsunuz?

7. Bilgisayar becerilerinizi nasıl tanımlarsınız?

Yeni Başlayan - Hiç bilgisayar kullanmadım

Acemi - Ara sıra bilgisayar kullanırım (örn: e-posta, kelime işlemcisi, oyunlar, internet kullanımı)

Orta düzey - Bilgisayarı her gün kullanırım (örn: e-posta, kelime işlemcisi, oyunlar, internet kullanımı)

Deneyimli - Bilgisayarı her gün iş yerimde kullanırım (örn: e-posta, kelime işlemcisi, oyunlar, internet kullanımı)

Çok Deneyimli - Bilgisayarı her gün iş yerimde kullanırım (örn: e-posta, kelime işlemcisi, oyunlar, internet kullanımı) ve bilgisayara yazılım kurabilir, bilgisayar ile ilgili problemleri çözebilir ve bilgisayar programlama hakkında bilgim vardır.

8. Bilgisayarlara karşı bakış açınızı nasıl tanımlarsınız?

Çok olumlu Olumlu Nötr / tarafsız Olumsuz Çok Olumsuz

9. Daha önce çevrim içi kurs aldınız mı? Evetse kurs ne içindi? Kursta ne tür aktiviteler yaptınız? Kısaca açıklar mısınız?

10. Sizce biyoçeşitlilik eğitmini çevrim içi (bilgisayar ile) almanın avantajları neler olabilir?

11. Sizce biyoçeşitlilik eğitmini çevrim içi (bilgisayar ile) almanın dezavantajları neler olabilir?

12. Bu eğitimde neleri öğrenmek istiyorsunuz?

13. Bu eğitimde öğrendiklerinizin, işinizde nasıl bir fayda sağlayacağını düşünüyorsunuz?

14. Bu kurs programında organizasyonunuzdan nasıl bir destek beklersiniz?

15. Kurstan genel beklentileriniz nelerdir? Kursun sonunda ne bekliyorsunuz?

16. Nasıl bir kurs istiyorsunuz? Kuralları nasıl olmalı?

APEENDIX L

Online Biodiversity Training Tool Release Notes

v0.0.01. ‘Less Known Parts of Forest Biodiversity’ content had been embedded to site

v0.0.02. New definitions and classes had been added in CSS

v0.0.03. Content had been recategorized to reduce long pages / scrolling problem

v0.0.04. Welcome page had added

v0.0.05. Autumn theme had been implemented and modified

v0.0.06. Redundant modules / blocks had been removed to eliminate redundancy

v0.0.07. Blocks had been rearranged: upcoming events block, online users had been added

v0.0.08. Content had been divided into 5 categories. Main menu items created as ‘Orman ve Biyolojik Çeşitlilik’, ‘Orman Ekolojsi’, ‘Fonksiyonel Planlama’, ‘Orman Ekosistemi Hizmetleri’ and ‘Diğer’

v0.0.09. Content of ‘Orman ve Biyolojik Çeşitlilik’ main chapter had been prepared and embedded

v0.0.010. Videos had been synchronized with the presentations and hosted via Vcasmo

v0.0.011. Javascript Drop down menu had been embedded

v0.0.012. Content of Scope, User Manual had been added

v0.0.013. My Profile block had been added

v0.0.014. Toggling script added to relevant pages to reduce long pages / scrolling problem

v0.0.015. Contact form had been added and arranged to be forwarded to the researcher and support team

v0.0.016. Javascript Lightbox hyperlink effect had been implemented to images

v0.0.017. ‘Ön Değerlendirme Anketi’ and ‘Çevrimiçi Biyoçeşitlilik Eğitimi Aracı Değerlendirme Anketi’ have been added

v0.0.018. Missing Turkish language translations had been completed in the modules added.

v1.0.01. Activity lock module has been added, dependency policy has been applied

v1.0.02. Drop-down menu items have been removed to support more structured environment

v1.0.03. Content of ‘İzleme’ main chapter had been prepared and embedded

v1.0.04. Course structure has been rearranged with respect to Biodiversity Workshops Report

v1.0.05. Course has been migrated to biyocesitlilik.com domain

v1.0.06. Content of ‘Orman ve Biyolojik Çeşitlilik’ main chapter have been divided and renamed as ‘Orman Biyolojik Çeşitliliği ve Ekosistemi’ and ‘Orman Ekosisteminin Parçaları’ chapters

v1.0.07. Discussion boards and practice activities have been added for ‘Orman Biyolojik Çeşitliliği ve Ekosistemi’, ‘Orman Ekosisteminin Parçaları’ and ‘İzleme’ chapters

v1.0.08. Videos hosted in Vcasmo server migrated to local host.

v1.0.09. Menu items were replaced with course outline page (homepage) links for more structured view.

v2.0.01. Activity lock module and dependency policy have been removed

v2.0.02. More practice questions were prepared; question pools were created for each chapter.

v2.0.03. A new chapter including authentic workplace examples has been added

v2.0.04. Collaborative Study has been designed about forming forest management plans.

APEENDIX M

Biodiversity Workshops Report

Objective: To increase awareness and understanding on biodiversity conservation among foresters for more efficient implementation of the ecosystem based multi-functional planning (EBMP)

Outcomes:

- Increase awareness of biodiversity in forestry applications
- planning / applying forestry applications with respect to biodiversity

First Day:

First day was the most important part of the program, especially the morning session where we try to design a participatory course process. Within the GDF participatory training programs or workshops is not accustom. Thus special attention has to be paid this issue to have the contribution of the participants.

In order to maintain the participation;

Opening speeches tried to be avoided, but if necessary kept very short,

Workshop room designed in a U shape format so everybody will be close to center,

Trainers and directors of GDF has set among the participants not in the front row, as much as possible,

Program rules were identified by the participants and written on the table without omitting any of the suggestions to show participants that how much their participation was valued.

Everybody introduced themselves in a same way, regardless of their position such as trainer, participant, director etc.

Ice breaking games helped to warm the workshop room and helped to move people from their seats and soft means of participation to the program.

These precautions have helped to attract the attention of the participants from the very beginning of the course. This was mentioned in the evaluation of the program by many of the participants.

Second point was to keep this atmosphere as it is during the presentation of the topics too. In order to maintain this regardless of the trainer, two people (organizers and the designers of the course) Hüma Ülgen and Uğur Zeydanlı, asked questions or encouraged the participants to ask questions, tried to make all the presentations less theoretical and enrich the subject with the examples relevant to participants. It can be said that to maintain the participation and to keep the atmosphere in the room there were two facilitators controlling and directing the overall process.

In addition all the trainers were asked to be careful about;

Not to prepare their presentation slides with long texts, instead they are asked to put explanatory photographs, diagrams, maps etc.,

To ask questions,

To promote participants to discuss the issues

Also in this part, aim, objectives of the course were mentioned and expectations of trainees and trainers were discussed. Importance / value of the working area of trainees with respect to biodiversity were mentioned

Second Part of the first day was to give background information about the biodiversity and ecology. These topics were very critical and rest of the topics had to be recognized within the framework of this two topics. Ecological information should form the basis of the forest planning and management and biodiversity is subject of the forest planning and management. However, biodiversity and ecology covers a very little place in the forestry curriculum in Turkey. Although, situation has improved in last ten years, it is still not enough especially when compared with the forestry education in Europe and US.

In this section general information about the ecology, ecological relationships and its importance in forest management is told with examples relevant to region. Biodiversity is told with definition of the term, history of the term, and examples from the region, why the region is important, what are the special values of the region.

Workshop starts with an introduction part in which aim, objectives of the course were mentioned and expectations of trainees and trainers were discussed. Importance / value of the working area of trainees with respect to biodiversity were mentioned.

Second Day:

After providing the big picture of ecology in the previous day, trainers gave lectures about elements of forest within the context of providing more detailed view in the second day. Information about the different aspects of forest biodiversity such as insects, large mammals, small mammals, birds, mushrooms, lichens, butterflies, dead trees etc. and their role in forest ecosystems were instructed.

All these topics were told with the same structure by different trainers;

General information about the taxa,

Ecological features of the taxa,

Their role in the forest ecosystems,

How to conceive them in forest management

Third Day: Sustainable Forestry Techniques

Aim of this part was to observe subjects instructed in first two days in the field such as roles in forest ecology, effects of forestry applications on different modules of forest ecosystem. Species, features of habitats, features of habitats necessary of species to survive, effects of different kind of forests on species had been examined in the field.

Main strategy was establishing the discussion when related samples were observed. Some of time was predetermined subjects and field selection was made in terms of them. However some ad hoc discussions also had been made when trainees came across with good samples.

In this activity binoculars and field guide were given to trainees to motivate and gain attention on the topic.

Forth Day:

Although disturbance has an important key position in modern ecology and natural resource management, there is lack of attention in Turkey. In fourth day, relationships and processes in forest ecosystem in terms of disturbance, effects of disturbance on ecosystems, and how should it be evaluated in forest management were mentioned. For example, insect epidemic is seen as most important problem in forestry and focused on how to terminate the insects. Controlling, rather than terminating, was fostered to participants.

Another topic of this day was surveillance. Importance of surveillance as a management tool had been emphasized. Importance of performing adaptive management with respect

to output of forestry applications' surveillance and how to develop a surveillance program were explained. Basic information was provided to trainees about collection and evaluation of surveillance data about different species.

Fifth Day:

Last day of the workshop based on a collaborative study that trainers grouped according to their work areas. Groups made discussion based on questions ‘what we learned?’, ‘how can we apply them?’, ‘what are the obstacles and opportunities of the implementation?’ And also they had been requested to review and evaluate current forest management plans. What can be done to improve those plans in terms of biodiversity was discussed.

APEENDIX N

Interview Responses in Turkish

[1] Bağlantı olan her yerden online [çevrimiçi] içeriğe ulaşılabiliyor olması öğrenme ve bilgi kullanımını daha önce deneyimleme şansımız olmayan mecralara taşıyor. Bununla ilgili olarak ormancılar mesela plan haritalarına araziden ulaşabiliyor ve notlar alabiliyorlar. Biyolojik çeşitlilik ile ilgili olarak da ormancılara sunulan bu site, mesela tür tanıtımı bölümü ile arazide kullanılabilecek özellikler de taşıyor.

[2] Şimdi biyolojik çeşitlilik geniş bir kavram. Bu kavramın içinde ormanla ilgili şeyler var. Bunlardan bazıları bizde uygulanabilir. Mesela, yaşlı ve ölü ağaçlarla, doğal yaşlı ormanlar ile ilgili kısmı biz planlamada kullanıyoruz. Buradaki bir takım yeni bilgileri de orada uygulayabiliriz.

[3] Bir çok konuya zaman ayıramadığımız gibi biyolojik çeşitliliğe de eğitim seminerleri hariç zaman ayıramıyoruz. En azından buradan takip etme imkanı bulacağız. Tartışmalara katılmasak bile okuduklarımızdan ve gördüklerimizden faydalanabiliriz. Bilgilerin sanal ortamda olması, kolay ulaşılabilir olması ve yayın, dergi gibi saklanma derdi olmadığından daha avantajlı yani.

[4] Bilgisayar ekranından okumak, bir yayından okumak gibi olmuyor. Daha sıkıcı olduğu için odaklanma daha zayıf oluyor. Bu nedenle konular anlatılırken görsel ögelerin yanında kısa açıklayıcı notlar konularak odaklanma ve dikkat çekilebilir.

[5] Ben şuan için şunun farkındayım, yani biyoçeşitlilik bizim için, benim işim için çok önemli bi konu. işin özü gibi mesela. Ve ben işimi gerçekten severek yapan bir insanım, seviyorum yani. Şimdi işini sevince insan, ona elinden gelen en iyi şekilde katkı yapmak istiyor. Yani bu yüzden, şunun farkındayım ki biyoçeşitlilik konusunu iyi bi şekilde öğrenmiliyim. İşte bu açıdan bu site benim için, aslında bizim için iyi bir fırsat.

[6] Yani bence...en çok tatmin eden kısmı, şu oldu, mesela normalde bu tür bilgilendirme seminerleri için çeşitli illerimizde toplantılar konferanslar düzenleniyor. Bütün bunlara internet üzerinden ulaşılabiliyor olması beni gerçekten sevindiren bir şey.

[7] ...mesela şu çok iyiydi.herhangi bi konuda,aklıma bişey takıldığı zaman,işle ilgili , ne zaman olursa olsun, cep telefonumdan bile online olup bakabiliyor olmak güzel... bence bu çok ilginç ve heyecan verici bi deneyimdi.

[8] Şimdi bu programları sürdürenlerin, programı istedikleri yerden takip etmeleri güzel bi olay. Ama tabi bu programların gelişmekte olan yanları önemli. interaktivite mesela önemli bi konu. yüzyüze eğitim kadar sürdürülebilir olmaları tartışma konusu şu anda.

[9] Ettim bile. Ama maalesef insanlar tembel. Çok az kişi merak ediyor. Dinlediklerinde hayır demiyorlar ama ilgisizlik yüksek.

[10] Paylaşıma olanak tanıdığı için...insanların birbirleriyle telefonla, yazışarak vesaireyle haberdar olmaları, konuya vakıf olmaları bazen zor oluyor ama bu şekilde iletişim daha iyi oluyor veyahutta şu da var. İnsanların bazen aklına gelipte sormayı çekindiği şeyleri bir başkası, o cesareti olan bir başkası sormuş oluyor veyahutta karşı taraf yorum getiriyor filan, bu tür şeyler çok yararlı diye düşünüyorum yani.

[11] Kesinlikle. Zaten bu tür sitelerin tavsiye yoluyla kullanımının artacağını düşünüyorum. Kullanıcı sayısı arttıkça da daha yararlı olacağını düşünüyorum.

[12] Ederim. Çünkü, şimdi bizim işimizdeki gibi yoğun olunca bazı şeyleri öğrenmek zor oluyor..bazı önemli şeyleri.

[13] Bu program ilgili değil ama sebebi. Mesela bi kişi kişisel gelişimle ilgili bişey tavsiye ettiğinde kimse dinlemiyor. ama,halbuki bi magazin haberi olsa,hemen bilmek istiyor. aslında bu ülkemizin genel problemi. yani bu programa özel bişey değil. ben bu yüzden tavsiye etmedim.

[14] İçerik ana hatları ile iyi görünüyor ancak konuları daha küçük parçalar halinde aktarmak faydalı olacaktır. Bu haliyle derinliğini kaybediyor ve bazı konular da bazıları ile ilişkisiz kalmaktadır.

[15] Evet...bu gün için yeterli ve hatta fazla bence. Biz sizin anlattıklarınızın %50 i uygulayabilsek bile büyük kazanç. Ama gelecek yıllar için yetersiz olabilir diye düşünüyorum.

[16] Ya çok güzel. Özellikle video uygulamaları ile desteklenmesi falan çok olumluydu yani. Kişisel olarak ben çok beğendiğimi söyleyebilirim.

[17] Mesela forum kısmında, nisan ayında yaptığım kadarıyla, bir problem ortaya konuluyor. Problem hakkında, biyolojik çeşitlilik eğitimine katılan insanlar farklı farklı görüşler ifade ederek değişik bir ortamda, değişik fikirler ortaya çıkması sağlanabiliyor yani problem odaklı çözümlü şeyler daha eğitici olduğu kanısındayım ben.

[18] ...yani bence bir biyoçeşitlilik planı örnek plan yapılıp, bizim yaptığımız planlara paralel olan bir plan eklense iyi olur.

[19] ...bilgiler geliştirilebildiği sürece uygulanabilir tabi. Ben kişisel olarak uygulama olanağı bulamadım. Plan yapıcısı değil, denetleyicisiyim ben. Ayrıca uygulama yapan bir ekipte de çalışamadığım için bir yorum yapma olanağım yok. Ama plan yapan bir baş mühendis olsaydım, daha değişik bir yorum da bulunabilirdim açıkcası.

[20] Uygulanabilir tabi ki.... O bilgisayardaki aldığımız eğitimler falan o bilgisayardaki verileri benim işimle alakalı zaten. yani ben amenajmancıyım. planlarımda zaten artık son zamanlarda açıyorum ve kullanıyorum bu programda öğrendiklerimi. Yeni şeyler kattı bana yani. Oralarda da hep kullanabiliyorum.

[21] Şimdi Şavşat planlarında biz bunu deniyoruz zaten. Uygulanabilir olması için de gayret gösteriyoruz. Orada biliyorsunuz zone lar var. 1. zone, 2. zone...biyolojik çeşitlilik ile ilgili. Onu amenajman planına aplike ediyoruz...yani uygulanabilir olması için büyük şey yapıyoruz, gayret gösteriyoruz.

[22] Yeni örnekleri ben çok sevdim. yani şu açından söylebilirim, şimdi bu yeni eklediğiniz örneklerle böyle ben gözümde canlandırabildim falan o işleri. Bunları mesela ben kullanmayı isterim ve çabalayacam kullanmak içinde bunları.

[23] Biyoçeşitlilik ile ilgili eğitimi ve yer alan içeriği yeterli bulduğumu söyleyebilirim. Fakat tabi ki öğrendiğimiz şeylerin zaman içinde yeni verilerle değişeceğini de göz

ardı etmemek lazım. Web formatı bu konuda önem arz ediyor çünkü içeriğe yeni eklemeler hızlıca yapılabilir.... Bence yeni eklemeler hızlıca yapılmalı yani.

[24] Yani şimdi biyoçeşitlilik çok zengin bi konu, yani başı var sonu yok bi konu. .. bu yeni şeyler düzenli bi şekilde siteye eklenmeli diye düşünüyorum ben.

[25] Planlamada kullanabileceğimiz farklı tip bilgiler vardı. Mesela yaban hayatı için önemli ağaçlar ve çalılar konuları iyi listelenmişti. Bu listeler kullanılabilir, faydalınalabilir buradan.

[26] Her ne kadar içerik konu üzerinde çok derinlere inmese de, başlangıç için yeterli bir kaynak bence.

[27] Bence eğitim içerik ve sunuş olarak gayet düzgün, adım adım bir şekilde verilmiş. Açılan her yeni sayfada sıkmadan okutacak kadar bilgi mevcut.

[28] ...yani o uzun sayfalar içeriğin düzenini bozmuş.

[29] Yani şimdi tabi ana hedef grubu bu çalışmanın orman mühendisleri. graphik tasarımları falan, onlardan bi feedback [geribildirim] aldığınızda daha da gelişecektir...zamanla gelişeceğini düşünüyorum.

[30] Çok çok güzel, sunuş biçimi güzeldi. Şöyle yan tarafta sunan kişi anlatıyor, sunu yansıdaki slaytlar yan taraftan geçiyor. Yani normal bir seminerde sunu dinler gibi dinledik, çok hoştu o haliyle.

[31] Uygulama örnekleri kısmı güzel olmuş...videoları izlerken keyif aldım.

[32] Bence gayet kullanıcı dostu bi site oluşturmuşsunuz. Yani şunu demek istiyorum, hani çok fazla teknolojiyle arası olmayan kişiler bile rahatlıkla kullanabilir diye düşünüyorum ben bu siteyi.

[33] Ben sırayla her uygulamayla yani elimden geldiğince uğraşmaya çalıştım. ama benim için videolar çok güzeldi. yani bence, her ne kadar yerini tutmasa şeyin, sınıfta öğrenmenin işte, ona yakın videolardı.

[34] ...yazılanları indiremedim. Yani kendi çalışma kullanmak istiyordum ama indiremedim. İlk başta şey diye düşündüm, yazılanlar indirmeye izinli değil ama sonra farkettim ki, öyle bi kısıtlama değilmiş..videoları ve tür bilgilerini indiremiyomuşum sadece.

[35] Yani, bizim için şuan her şey yeterli. Ama detay inceleme yapmamız gerektiği zaman mesela şimdi mesela biz herhangi bir şeyin Türkiye'nin bir yerinde plan yaparken, biyoçeşitliliği bu planlara katacaksak mesela, o zaman daha sağlıklı bi yorum yapılabilir. Ama dediğim gibi,şuan için gayet yeterli.

[36] Bence yani farkındalık oluşturmak konusunda,idari destek bence yeterliydi.

[37] Aslında daha gelişmiş bilgisayarlarla ve daha güzel bir internet ulaşımıyla daha sağlıklı bir şey olabilirdi. Yani şimdi bir çoğumuzun bilgisayarları, donanımları zayıf, alt düzeyde, alt seviyede. Onun için görüntüler belki zaman zaman iyi değil. Belki ne bileyim bazı diğer aksamalar oluyor. Bir de tabi internet erişimleri de çok önemli. Şimdi o internet erişimleri sağlıklı olmadığı zaman yine kesintiler oluyor, kopmalar oluyor falan. O anlamda daha geliştirilebilir.

[38] O konuda en ufak problem yok. Tabi zaten o forumla, açık forumlarda cevaplar çok iyi ve hızlıydı. Yalnız ben açıkcası objektif söylemem gerekirse, objektif olmak gerekirse, katılımın benim umduğum seviyede olduğunu zannetmiyorum. Daha çok katılım mesela daha iyi olabilirdi o forumlar için.

[39] ...benim şu ana kadar sadece bi sorum oldu teknik konularda, o da kullanıcı adımla iygiliydi. Mesela o soruya arkadaşlar çok hızlı cevap verdi.

[40] En çok soru hazırlamak ve tarışmalarda sorulara cevap vermekle ilgilendim.

[41] Sürenin uzun olması mesela, ayrıca konunun uzun bir şekilde ele alınmış olması ve küçük parçalara bölünmemiş olması diyebilirim.

[42] Yapılan bu sitenin kullanılması durumunda Türkiye genelinde ormancılara biyolojik çeşitlilik ile ilgili temel bilgileri verebileceği ve bir buluşma noktası haline gelebileceği.

[43] ...biyolojik çeşitlilik gibi zor ve geniş bir konuyu ormancılara yönelik olarak pratik ama anlamlı bie şekilde verebilmesi. Sıkıcı olabilecek ve kolayca karmaşaya dönüşebilecek bir yapıyı başarılı bir şekilde özetlemiş ve rahat okunur halde sunmuş olması.

[44] Ormancıların büyük kısmı biyolojik çeşitlilik konusunu kendi uygulama alanlarının dışında görmektedir...bu eğitim modülü fonksiyonel planlama sürecindeki eksikliği

gidermek için doğru bir zamanda devreye girmiştir. Özellikle önümüzdeki süreçte bu konudaki büyük ölçekli projelerin uygulanmaya başlanması ve uluslararası süreçlerin gerekliliklerinin yerine getirilmesinde bu eğitim modülü önemli bir yardımcı kaynak olacaktır.

[45] Elbette birçok yeni bilgi ediniliyor...bu bilgiler doğrudan ormancıların meslekleri ile ilişkili olduğundan kafalarda daha bir yerine oturuyor. Bir kitap okumadan farklı olarak da özellikle videoları konu içerisinde izleyerek, sunumların üzerinden giderek doğrudan eğitime benzer bir etki yaratılıyor. Bu da eğitimi alan ormancının bireysel olarak değil de bu konular üzerine düşünen daha geniş bir kitle birlikte oldukları duygusunu uyandırmaya yarıyor.

[46] Bu eğitim modülü orman mühendislerinin en az bilgili oldukları konu hakkında bir modül içermektedir. Bu yüzden de çok önemli bir boşluğu doldurmaktadır. Bu çevrimiçi eğitimi tamamlayan ormancılar bu konuda çok önemli bir adım atmış oluyorlar.

[47] Yüksek derecede inanıyorum. Ormancı olmama rağmen bazı eksik yanlarımı tamamladı.

[48] Dediğim gibi ben zaten bu konuya yatkın bir insanım yani. Yararlı olduğunu, çok iyi olduğunu düşünüyorum. Başarılı bir program. Umarım arkadaşlar da bu konuya eğilirler.

[49] Kesinlikle yani. Bakış açımın değiştiğini rahatlıkla söyleyebilirim. Ama daha önce dedediğim gibi uygulamaya geçtiği vakit daha somut olacak.

[50] Bence bir saat bu program için yeterli bir süre.

[51] Yani şimdi, tamamı ile değişti diyemem elbetteki ama bilgilerimin arttığını söyleyebilirim. Mesela daha önce yarım yamalak bildiğim şeylerin, yani konuların artık çoğunu biliyorum diyebilirim.

[52] Beni en çok motive eden kısım...ha, mesela videoları izlerken, daha fazla bilgi sahibi olabilmek için o konuları internetten araştırdım. bu gayet güzel bişeydi bence.

[53] Yani en çok, tabiki de işimle ilgili bilgiler beni motive etti diyebilirim.

[54] Benim açımdan forumlar çok iyi geldi motivasyonuma. yani çalışmanın o kısmını çok sevdim.

[55] Yani motivasyonumu düşürdü diyemem ama benim açından kullanıcı sayısının az olması hayal kırıklığıydı. Yani ben ilginin daha yüksek olmasını beklerdim, yani daha çok katılımcı olmasını beklerdim şahsen.

[56] Kesinlikle forumlar. Yani hem yeni şeyler öğrendim, ayrıca da çok eğlenceli vakit geçirdim forum zamanlarında.

[57] Normalde bu tür bilgilendirme seminerleri için çeşitli illerimizde toplantılar konferanslar düzenleniyor. Bütün bunlara internet üzerinden ulaşılabiliyor olması beni gerçekten sevindiren bir şey.

[58] Tam olarak [biyoçeşitlilik hakkında] bakış açımın değiştini söylemem çok da mümkün değil. Ama şunu kesinlikle söylebilirim ki daha önceden eksik bildiğim konularda veya ilgi duyup araştırmaya fırsat bulamadığım konuları öğrendim bu sayede. Bu da tutumumda iyi yönde bir değişikliğe neden oldu tabi.

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