Human Computer Interaction
CS449 – CS549

Week 10-1

User Based Usability Testing

KÜRŞAT ÇAĞILTAY

Today

- Information about term projects

- Usability Evaluation Methods
- User Based Evaluation

Assignment-4
Heuristics Testing

- Identify and explain usability problems of this game
- rate how serious those problems are
- propose a possible solution

- December 12th Tuesday

- Only ~40 registration ☹
- Please don’t ask extra time on due date!

Result Grid

oyuncuno	ADSOYAD	
1075	Bengü dene	
1065	Fawaz	
1055	ÖzgürArtok	
1063	Aydın Aydel	
1058	Burak Özkar	
1061	Atra Zeynep	
1051	Bengü Güla	
1070	Batuhan Soydeğer	2
1067	Saleh Alshurafa	2
1053	Zeynep Türkmen	2
1062	Şevki Aybars Türel	3
1056	Melis Özbarlas	3
1054	Zeynep Kurtulus	3
1052	Natasyia	3
1071	Ebru Bulgur	3
1072	Biray Öykü Akmaz	3
1073	Utku Alkan	3
1050	Mehmet Eren Karab…	3

Before Starting Today's Class

- Term Project Groups!!!
- Term Project Topics!!!

Term Project/Paper

- Empirical/Experimental report – Data collection from target group
- You may develop prototypes and analyze
- You may conduct a usability study on existing systems
- Generate data, Quantitative/Qualitative
- Suitable methodology : User – Heuristics - Model
- HCI relevant topic
  - Get my approval before you start working on it
  - Set as early as possible

Sample Term Project Topics

- Effectiveness of a new interaction method – e.g. Gestures
- Generative AI related studies - ChatGPT, Bard, Dall-e ***
- Computer games
- Design and test of new menu styles – e.g. Fish eye vs hierarchical
- Redesign and test of Web sites
- E-government, E-business, e-health usability
- Comparision of online banking/shopping systems
- Mobile interactivity
- Children/Elderly, blind/deaf users
- Security vs. Usability (e.g. Two-factor authentication)
- VR, AR studies

Some Previous Term Projects

The impact of Website cookie banner design decisions on user behavior

Comparison of cognitive modeling and user performance analysis for touch screen mobile interface design

The effect of apologetic error messages on computer users' performance

The role of visual coherence in graphical passwords

Aim, shoot, deplete: Playing video games depletes self-regulatory resources

Exploring the relationship between web presence and web usability for universities

Multimodal comprehension of language and graphics: Graphs with and without annotations

Design, development and usability of a storytelling toy

The Influence of a Trolling Game on Perception of Toxic Behavior

A Study on Usability and Design Aspects of Large Multitouch Interfaces

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Topics

Agile
Artificial Intelligence
Design Process
Ecommerce
Intranets
Navigation
Psychology and UX
Research Methods
Study Guides

Prompt Structure in Conversations with Generative AI

Summary: Most prompts contain a combination of the following components: request, framing context, format spe
external sources. There are
this structure: "Can you do

By Raluca Budiu, Feifei Liu, Amy Zha
Topics: Artificial Intelligence

Information Foraging with Generative AI: A Stud of 3 Chatbots

Summary: In a study of ChatGPT, Bard, and Bing Chat, users found these tools helpfu
and trustworthy. They expected these AI chatbots to aggregate information in a conc
fully considering contextual cues.

ionca, and Amy Zhang on September 24, 2023

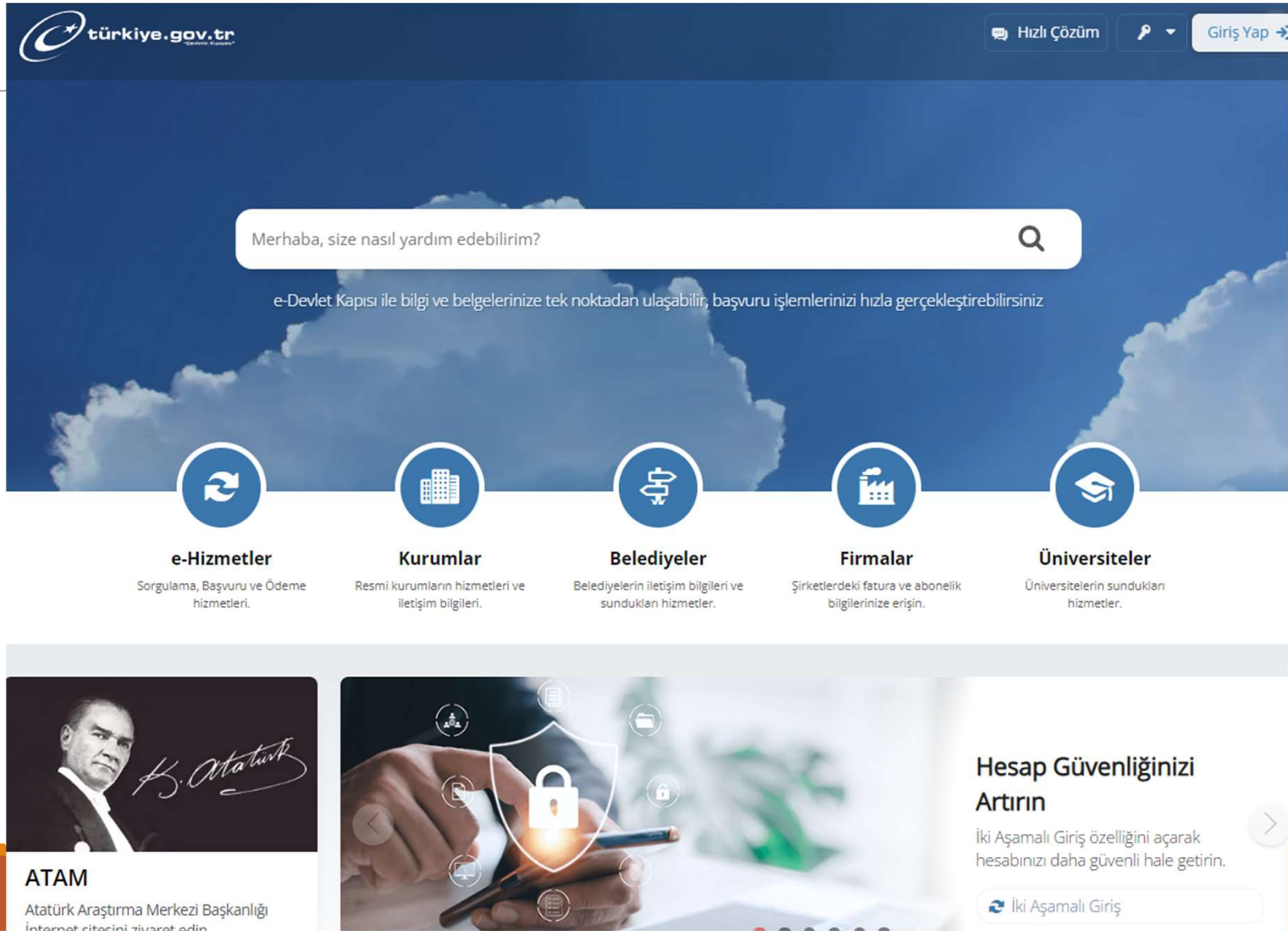
Share this a

Accordion Editing and Apple Picking: Early Generative-AI User Behaviors

Summary: Two new user behaviors are prevalent in interactions with text-based
chatbots. User research shows the iterative and often complex ways users engage
tools for productivity.

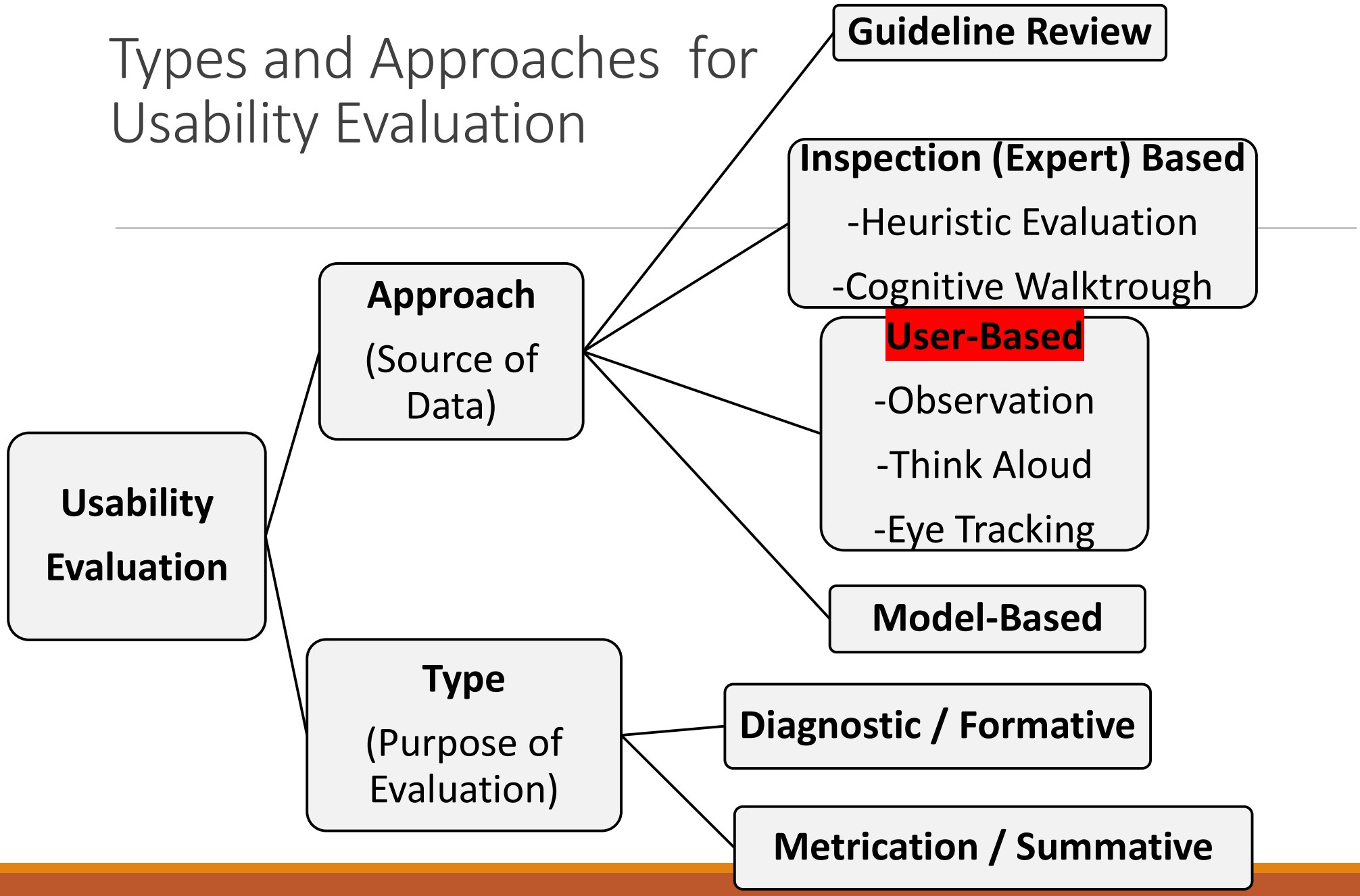
Turkiye.gov.tr – Usability?

- 60+ million users
- 7000+ services



User based usability testing

Types and Approaches for Usability Evaluation



User-based usability

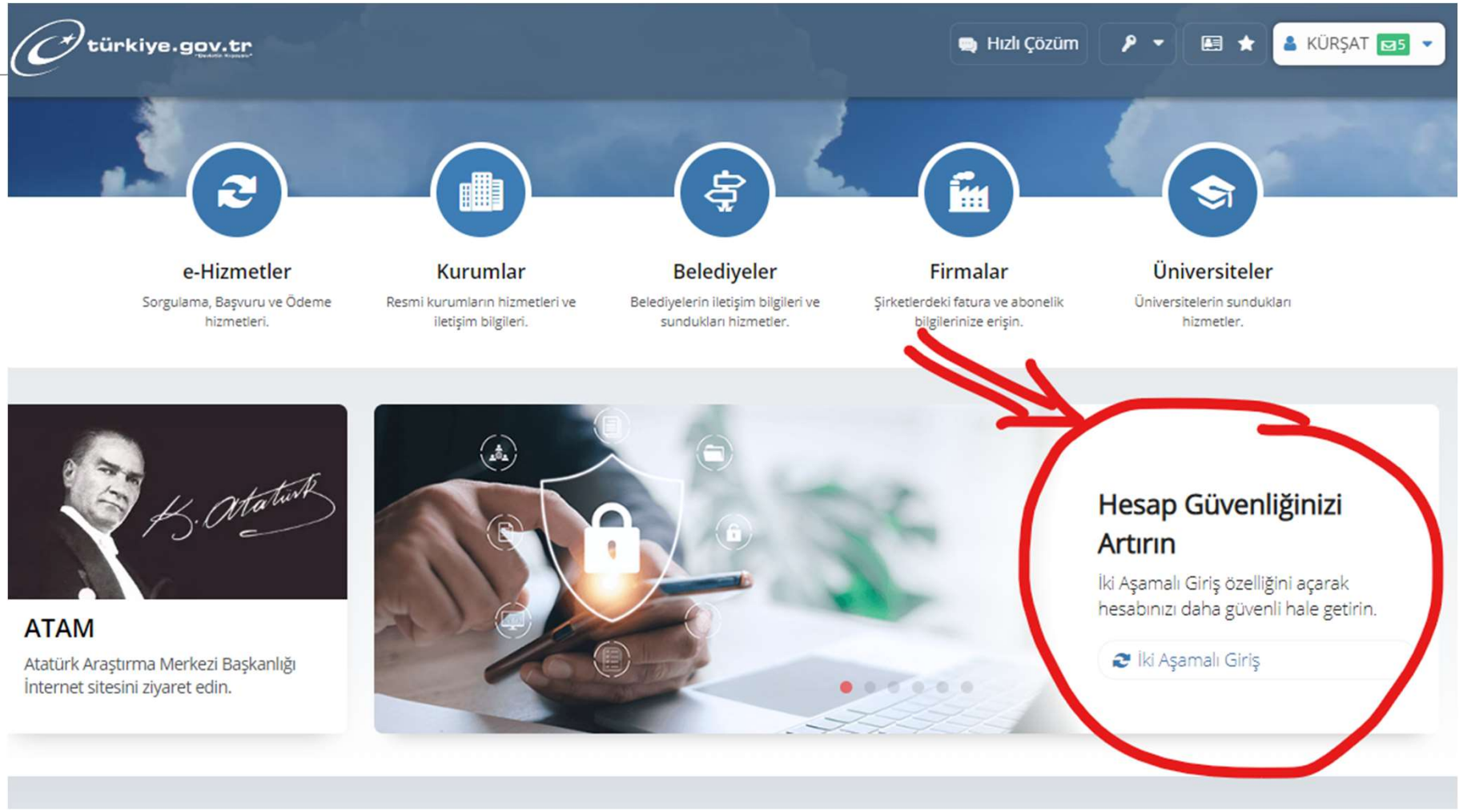
- Involves users
- Who complete tasks
- In an appropriate environment
- One or more UX experts

In formal usability tests, the user, task, and environmental characteristics (*contextual variables*) must match those in which the product will be used.

Usability Evaluation

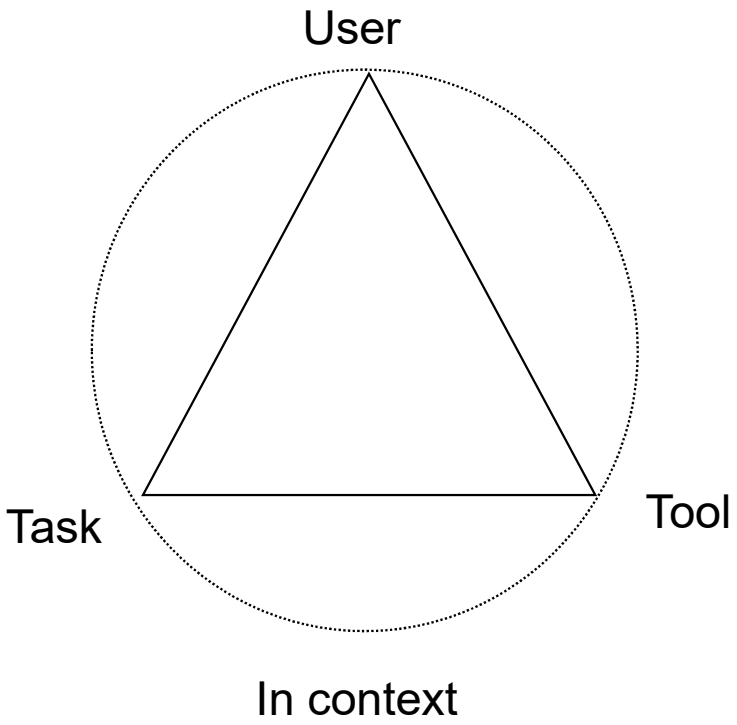
Turkiye.gov.tr – Usability & security

- 60 million users
- 7000 services



How are criteria derived?

- User analysis
- Task analysis
- Situation analysis



User analysis

- Determine key variables:
  - Demographics, work and task skills
  - computing experience
  - training
  - support
  - working practices
  - and many other variables
- Personas...

- Turkiye.gov.tr
- Two-factor authentication

ORTA DOĞU TEKNİK ÜNİVERSİTESİ - BİLGİ İŞLEM DAİRE BAŞKANLIĞI

İNSAN BİLGİSAYAR ETKİLEŞİMİ ARAŞTIRMA VE UYGULAMA LABORATUVARI

PERSONA1

Mehmet Demir

Yaş: 43

Cinsiyet: Erkek

İş: Teknisyen

Eğitim Seviyesi: Lise Mezunu

Bilgi: Mehmet 15 yıldır teknisyen olarak çalışıyor. Televizyonda izlediği haberlerden dolayı, e-Devlet sistemine giriş yapmak için kullanılan kimlik bilgileri ve şifresinin güvenlik için yeterli olmayabileceğini düşünüyor. Bilgilerinin korunması için sistem tarafından sağlanacak farklı yöntemlerin güvenlik seviyesini artıracağını düşünüyor.

Projeden Beklentileri: Mehmet bankacılık uygulamalarında olduğu gibi mobil cihazıyla e-Devlet sistemini kolayca kullanabilmek istiyor. Bu sebeple, geliştirilecek güvenlik yöntemlerini mobil cihazı ile birlikte kullanmak istiyor. Herhangi bir nedenle mobil cihazını değiştirirse, sistemde kayıtlı bilgilerini veya çipli kimlik kartını kullanarak güvenlik adımlarını tamamlayabilmeyi umuyor. Herhangi bir aşamada zorluk yaşarsa, sistem üzerinden kendisine yardım verilebileceğini düşünüyor.

Teknolojik Donanımı:

- Günlük işlerinde kişisel bilgisayar kullanmıyor ama vergi ve trafik cezalarını e-devlet mobil uygulaması üzerinden düzenli olarak kontrol ediyor.
- E-devlet mobil uygulamasını kullanarak sisteme giriş yapıyor ve arama kısmından ilgili işlemlerine erişebiliyor.
- E- devlet sistemi üzerinden verilen hizmetlere erişebilmek için ailesinden yardım alıyor.

PERSONA2

Ayşe Yılmaz

Yaş: 35

Cinsiyet: Kadın

İş: Sekreter

Eğitim Seviyesi: Lisans Mezunu

Bilgi: Ayşe 8 yıldır sekreter olarak çalışıyor. Sorgulama, başvuru ve ödeme hizmetlerine e-Devlet sistemi üzerinden ulaşabiliyor. Kişisel bilgilerinin dijital ortamda çalınmasından endişeli. Bir cihazının daha sisteme giriş için kaydedilmesiyle güvenliğinin artacağını tahmin ediyor.

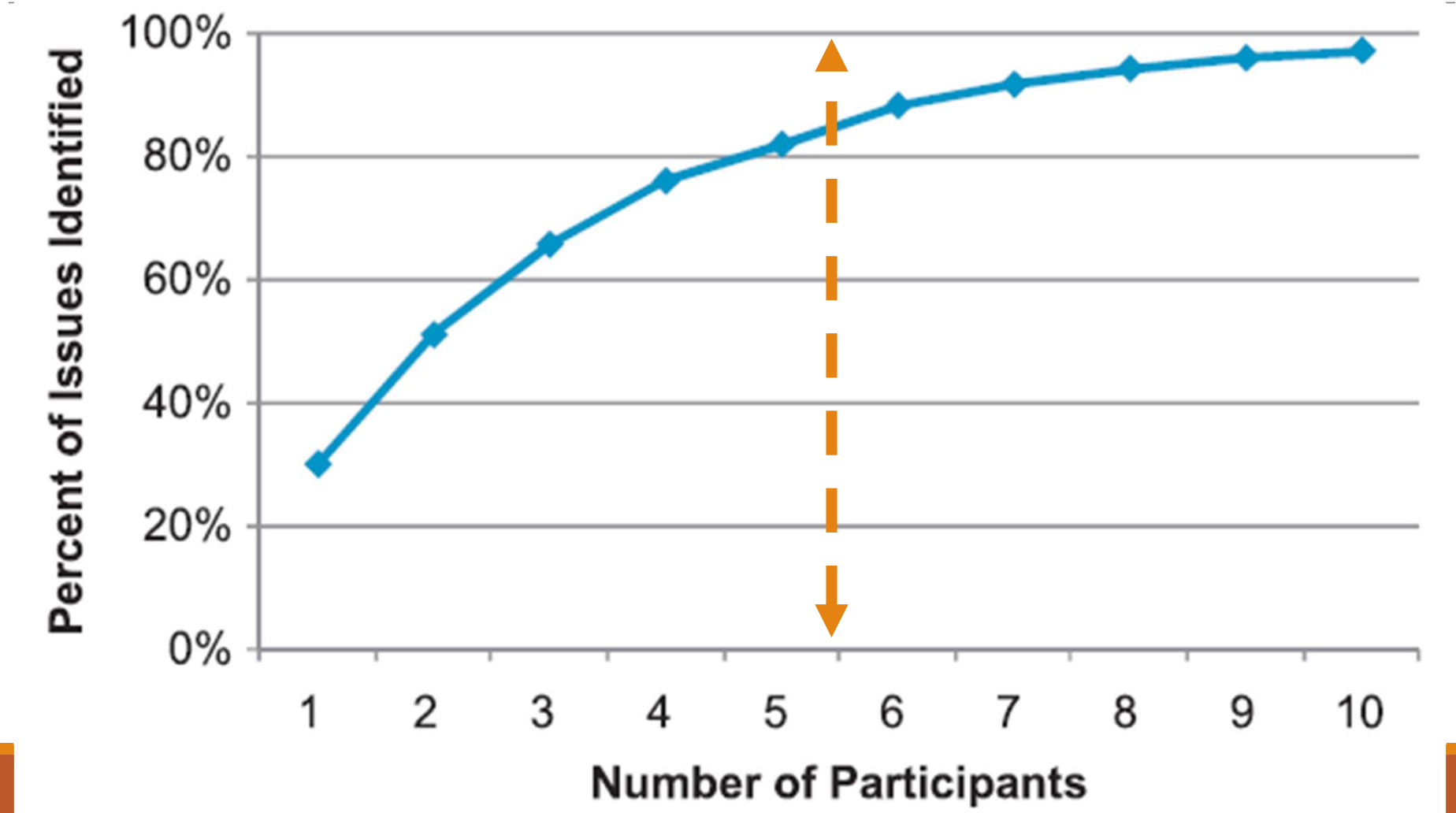
Projeden Beklentileri: Mobil cihazını çipli kimlik kartı ile e-Devlet sistemine kaydetmeyi hedefliyor. Kaydedilen mobil cihaz ile iki aşamalı giriş yöntemlerini kullanarak e-Devlet sistemine daha güvenli bir şekilde giriş yapabilmeyi umuyor. Ayrıca, e-Devlet sisteminde mobil cihazının ona ait olduğunu kısa ve güvenilir yolla kanıtlayabilmek istiyor.

Teknolojik Donanımı:

- İş yerindeki günlük işlerinden dolayı sıklıkla kişisel bilgisayar ve mobil cihaz kullanıyor.
- E-devlet mobil uygulamasını ve web sitesini kullanarak sisteme giriş yapabiliyor. Arama kısmından ilgili hizmete erişip bilgi almak için gerekli adımları tamamlayabiliyor.

How Many Users?

Usability Testing Participants - Nielsen



However, Faulkner, 2003 !

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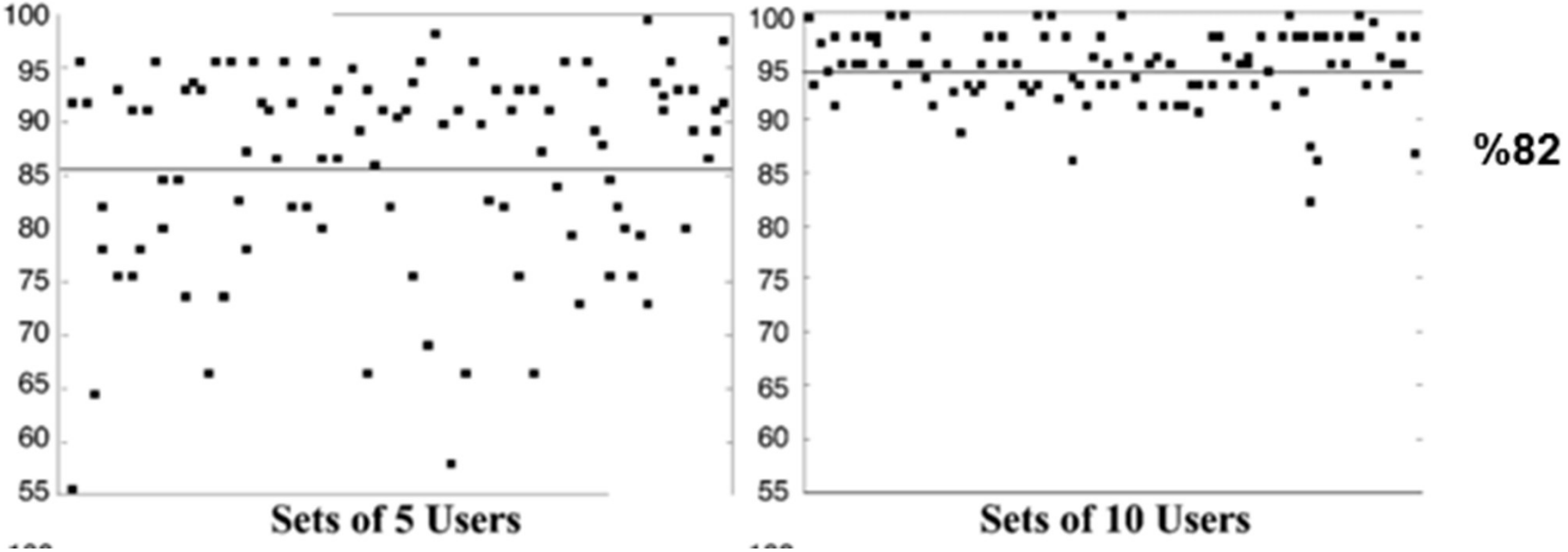

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However, Faulkner, 2003 !

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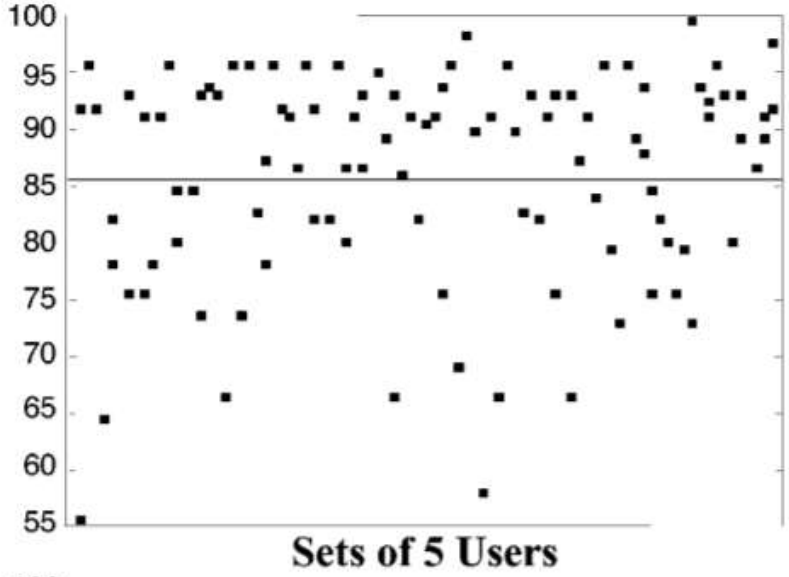

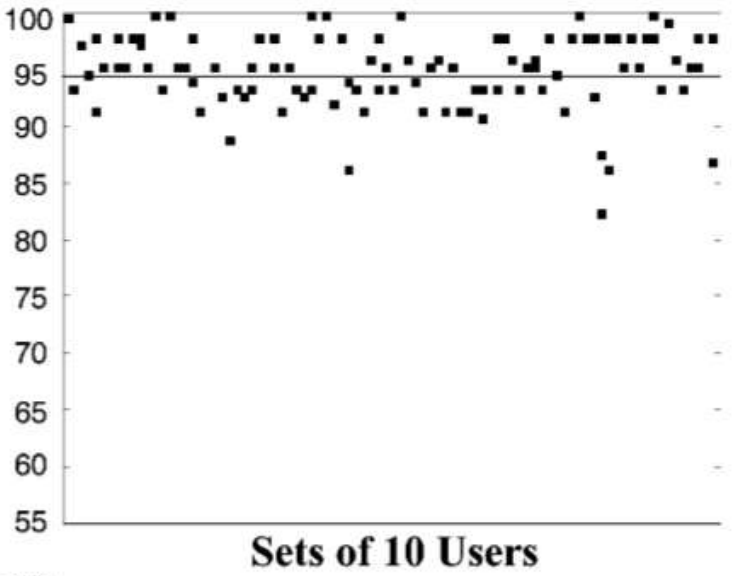

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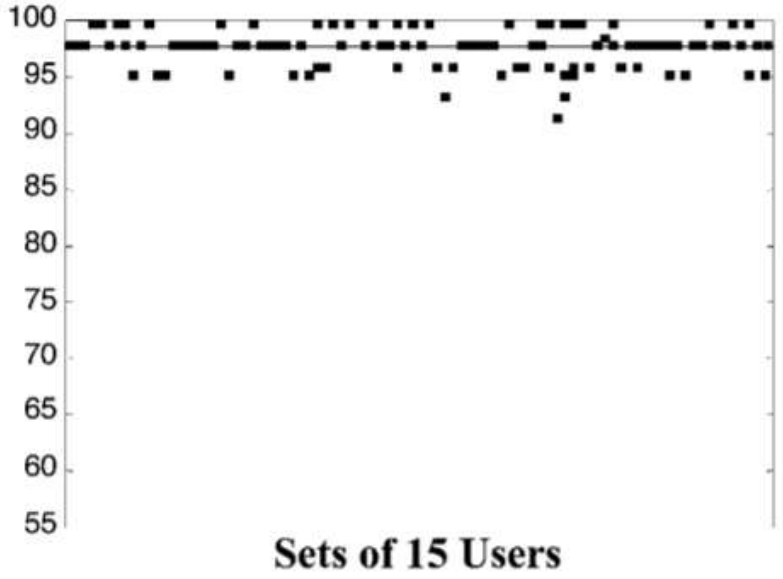
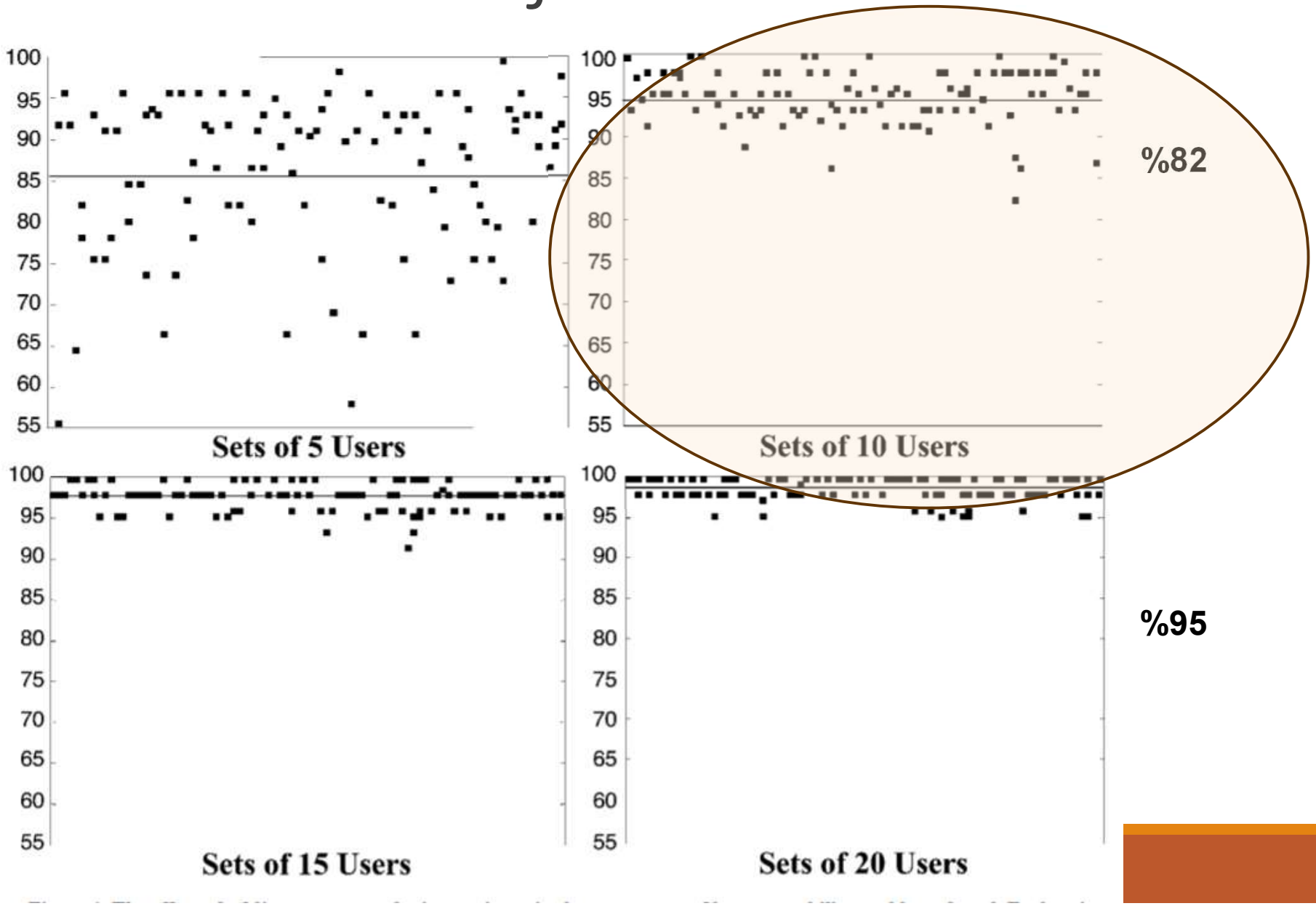


For Your Term Project!



Turkiye.gov.tr

5 female, 5 male and 1 total blind

8 Android, 2 iOS

Katılımcı	Age	Gender	Education	Occupation	Computer& Phone use	Phone
P01	45	Erkek	MYO (2 Yıl)	İşçi	Az	Android
P02	49	Kadın	Üniversite	Sekreter	İyi	Android
P03	42	Erkek	Lise	İşçi	Ortalama	Android
P04	23	Kadın	Lise	Öğrenci	İyi	Android
P05	21	Erkek	Lise	Teknisyen	Ortalama	Android
P06	47	Kadın	Üniversite	Memur	Ortalama	Android
P07	63	Kadın	İlkokul	İşçi	Az	Android
P08	58	Erkek	Üniversite	Muhasebe	Ortalama	Android
P09	30	Erkek	Üniversite	Mühendis	Çok İyi	iOS
P10	25	Kadın	Üniversite	Mimar	İyi	iOS

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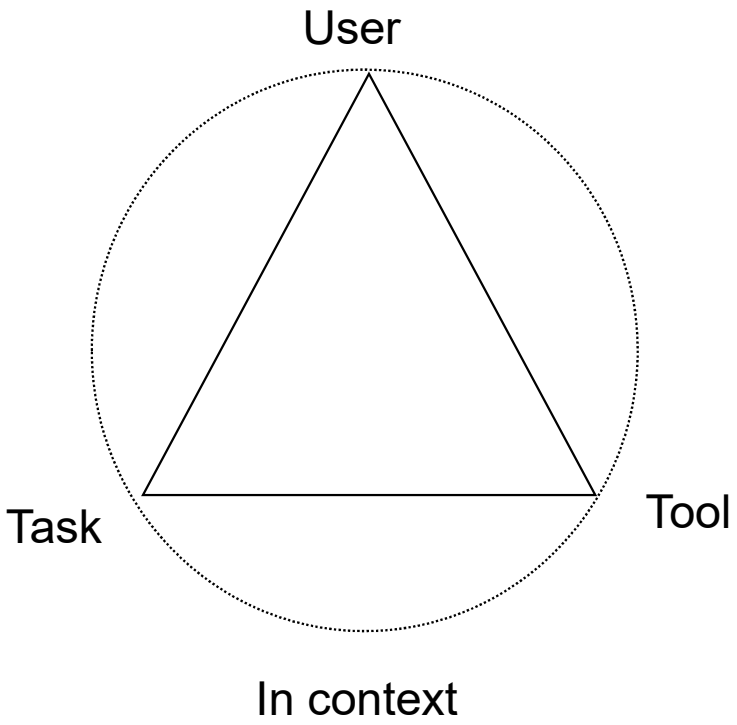
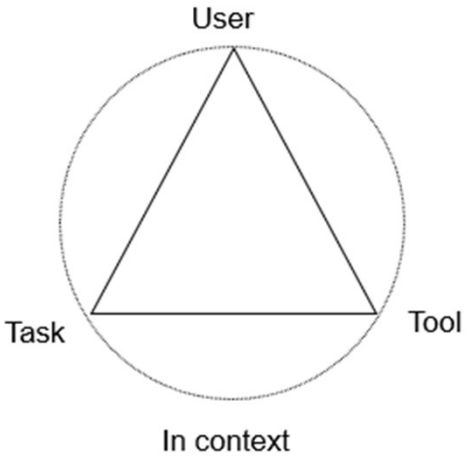
- Situation analysis



Task analysis



- The process of observing, describing, and decomposing tasks into their constituent components

- Key / Critical Tasks

Task analysis questions

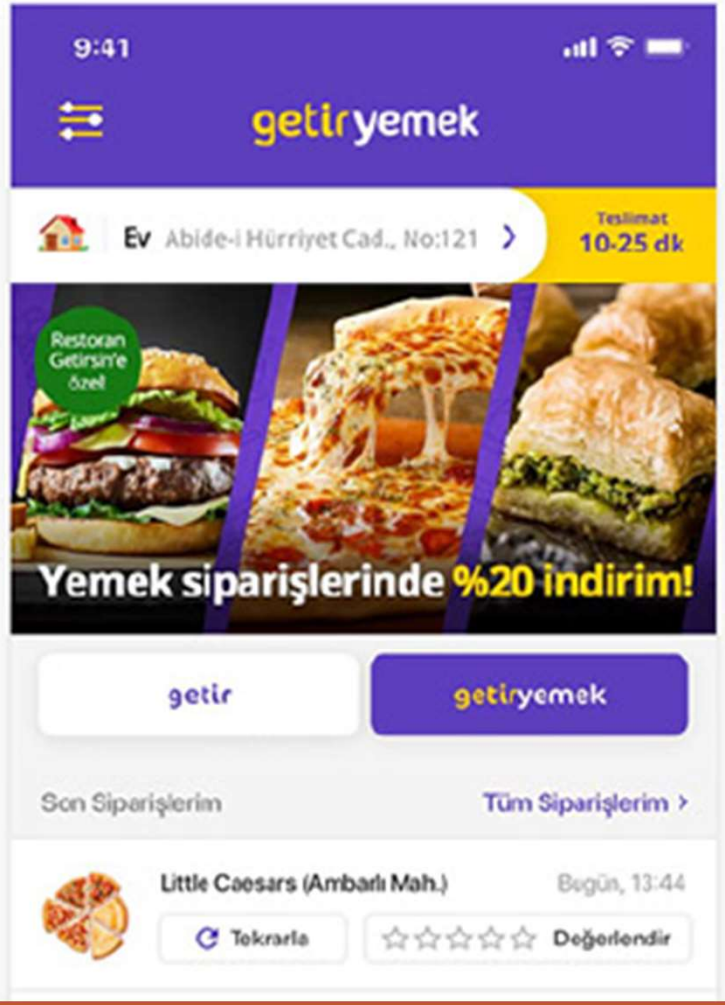
- What does the user see?
- What decisions does a user make?
- What must a user know?
- How does a user get help?
- How does a user recover from errors?
- What physical acts must be accomplished?

Getir Usability Study: Sample Task

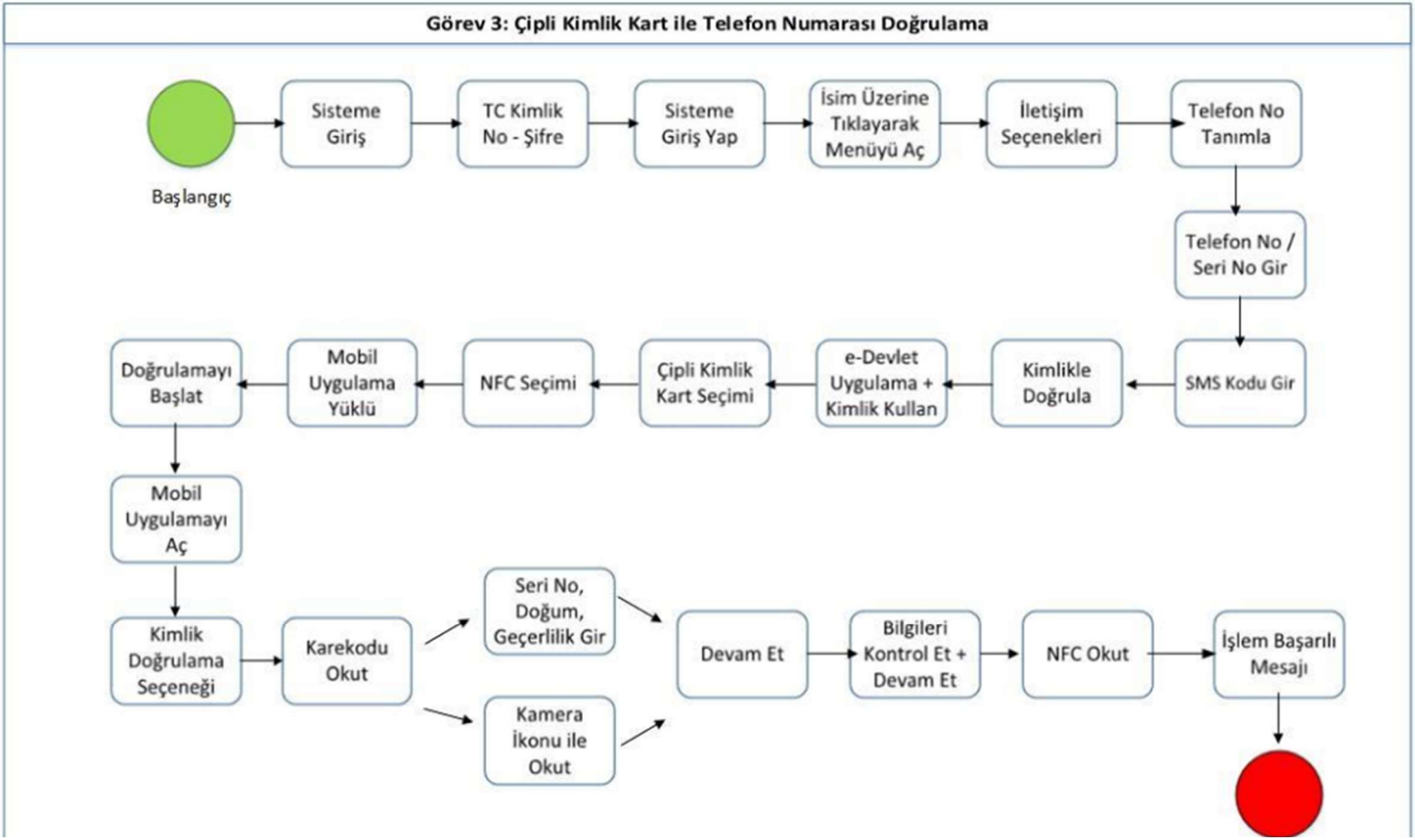
Last Orders & Repeat Orders

Getir Yemek (Getir Food) does not have the property to repeat the previous orders and to view last orders.

This property will be desired by an active user. A service based on fast order delivery must prevent time loss when a user places an order.

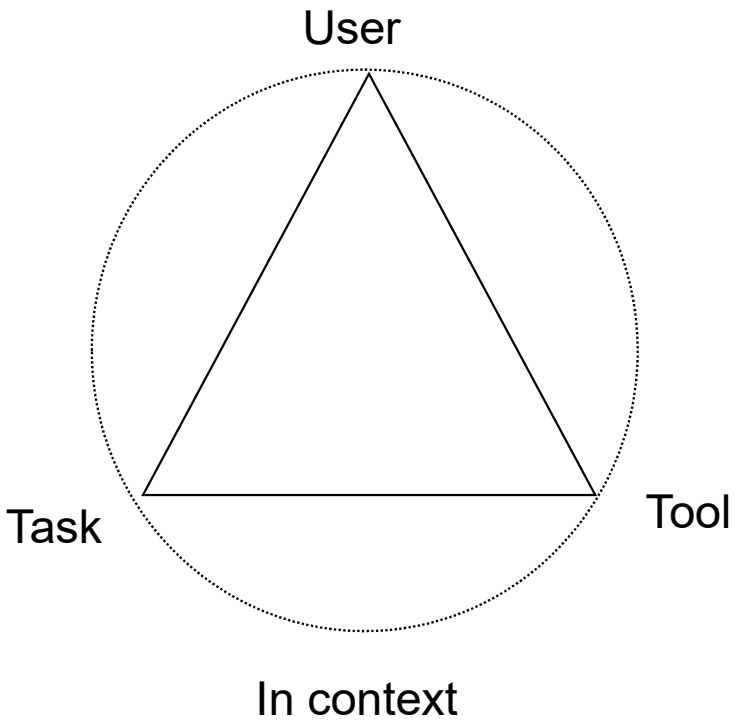


Turkiye.gov.tr 3-Phone Number Verification with Chip ID Card



How are criteria derived?

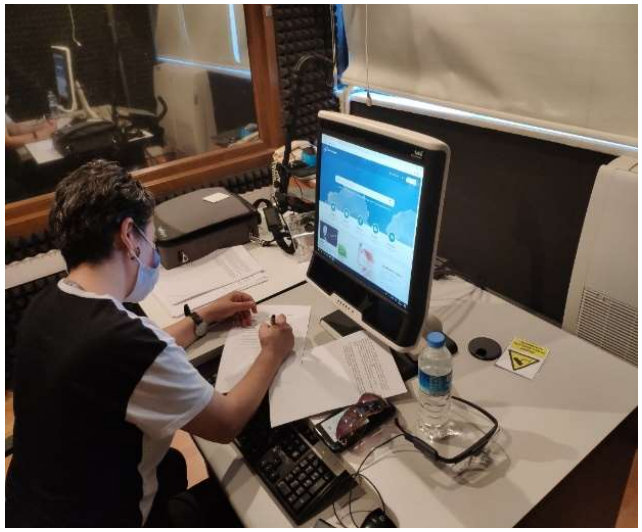
- User analysis
- Task analysis
- Situation analysis

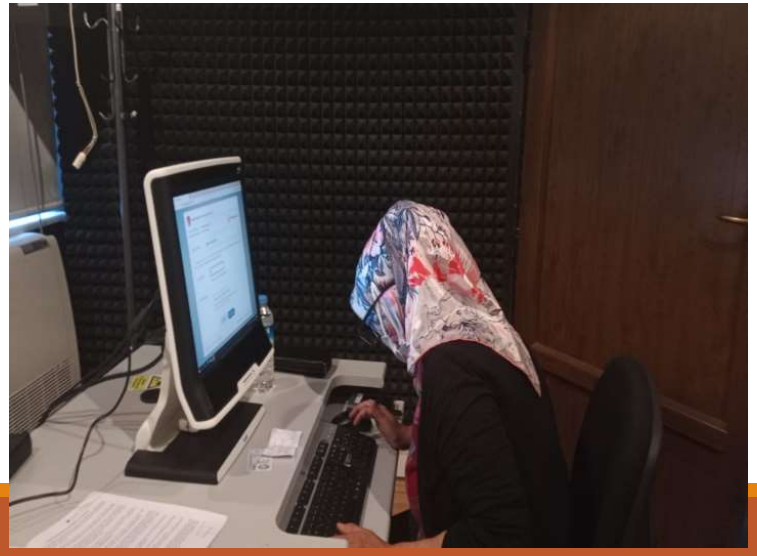


Situation-Context analysis

- Outlines the physical and social context of use:
  - Location
    - Home, office, shop, car, street etc.
  - Relationship to other users
    - Collaboration, recipient, passive/active
  - Socio-technical environment

Target Group & Tests

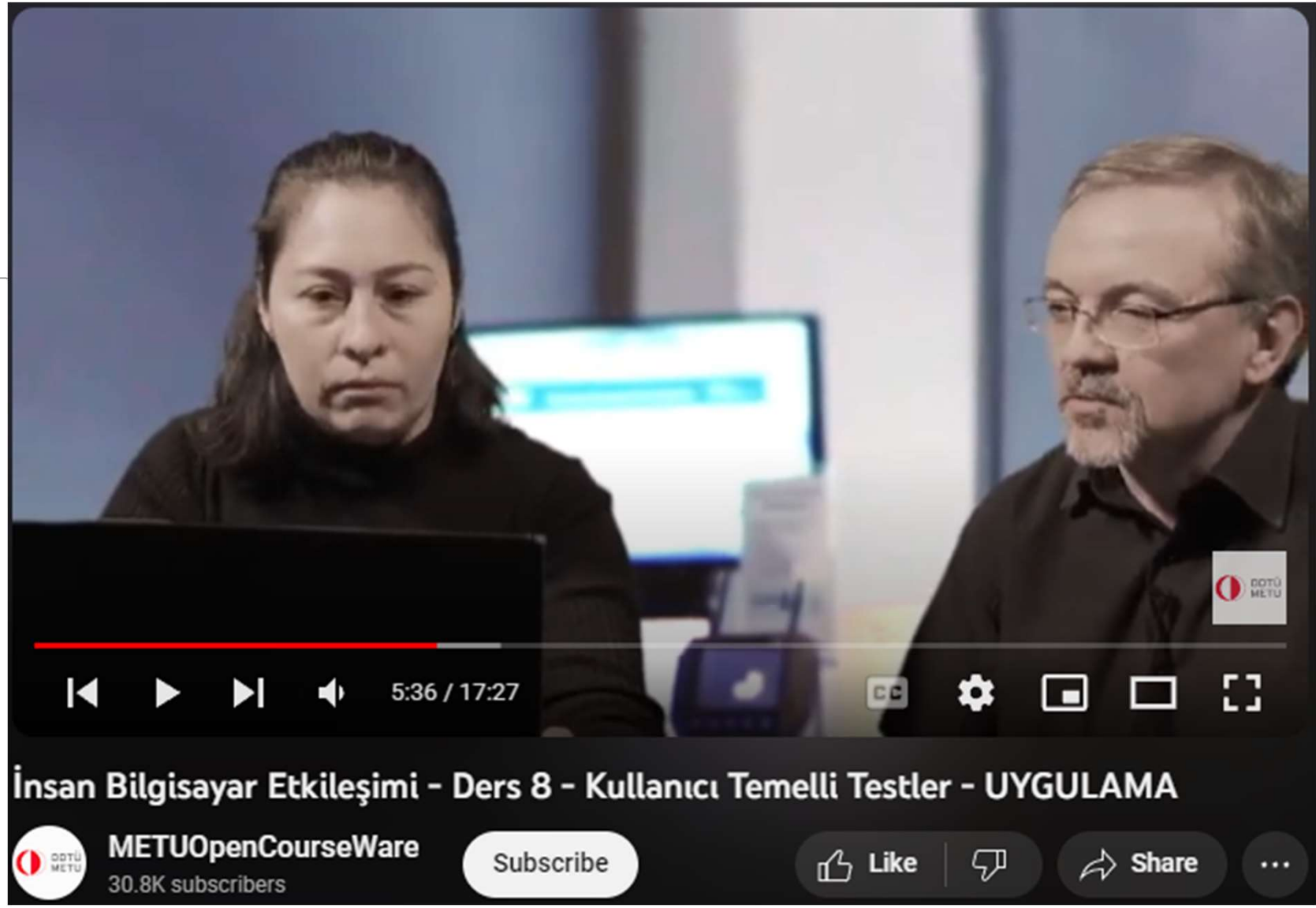




Output

- Scenarios of use
  - “Stories” of interaction in which users, tasks and contexts are described
- Scenarios form basis of decisions on
  - Effectiveness
    Efficiency
    Satisfaction
- And the training, tasks, and environment in which the tool will be used

Usability Testing session (In Turkish)



- https://youtu.be/d4vILkGUYFQ?si=-oAALB4PZJSeDjlA

Advantages of User-based Approach

- Most valid data (true measure of usability)
- Most reliable data (measure is stable)
- Provides the most convincing data
- Formative and Summative evaluation

Disadvantages of User-based approaches

- Can be expensive
  - Time
  - Resources
- Requires patience
- Must be planned (to be useful)
  - in terms of tasks, likely scenarios etc.
- Does not logically determine re-design

How to Conduct User Based Usability Test? Details

Conducting your test: Things to consider

- How many users?
- Length of test session?
- Where to conduct the session?
- Role of facilitator:
  - put participant(s) at ease (testing the material, not them)
  - observe and take notes
- Role, placement and responsibilities of other observers
- Verbal protocol (“think-aloud”)
- Token reward for participation (if appropriate)
- PILOT your method !!!

Data collection

- Quantitative data (Efficiency, Effectiveness)
  - Number of errors made using the system
  - Time required for activity(s)
  - Number of clicks, all other data
- Qualitative data (Satisfaction)
  - Ease of use – are materials convenient, easy to locate, to use?
  - Learners' reactions to materials, activities, evaluation
  - Questionnaires (will talk on Friday)

Analyzing & reporting your usability results

- Quantitative data
  - descriptive data (number of users, time spent, errors), statistical analysis
- Qualitative data
  - consolidate your observations (negatives and positives!)
  - Common & critical themes
  - determine solutions the problems
  - summarize and present your findings and solutions

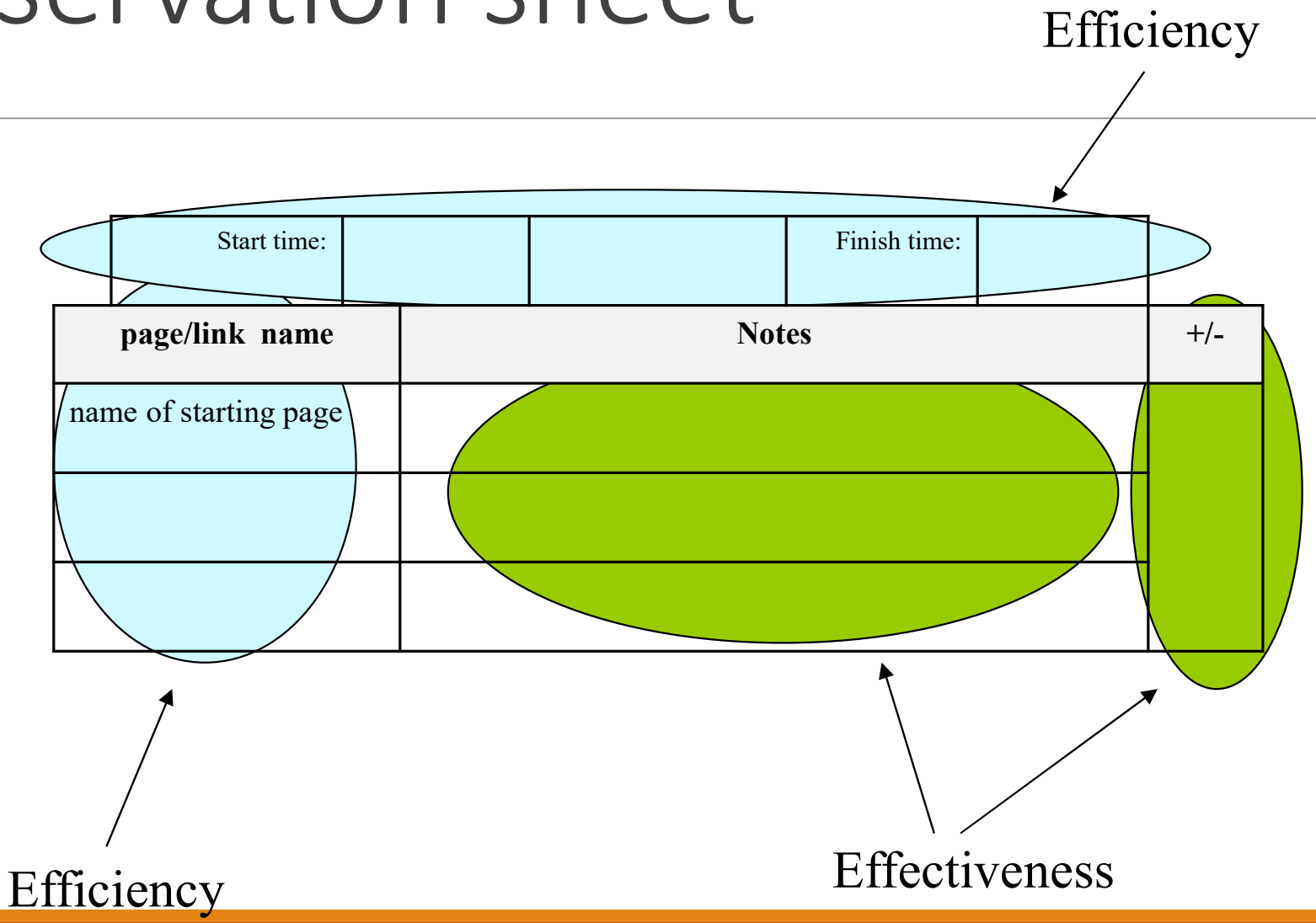
Analyzing & reporting usability results

Observations	Interpretation	Recommendation
- She couldn't find checkout icon - Did not like background music	- checkout icon too small - Music is too fast	- Redesign checkout icon - Replace music with a soft one

Protocol

- **Introduction**
  - **Thank you**...for agreeing to participate in this session.
  - **Product Description**... "An online shopping website... "
  - **Purpose of session**...is to make this product better.
  - This product does have problems.
  - Any problems you have or find with the product is with the product, not your fault.
- **Instructions**...
  - I'll be asking you do certain things with the program and watching and writing notes as you do them. That's just to help me remember how things went later on.
  - To help me do this, I'd like you to "think out loud" as you use the program and make your decisions to do certain things.
  - I'd like you to try and perform the given tasks on your own as best you can. If you're really stuck, I may be able to help, but I'd really like you to try it without my help.
  - At any time, you can quit a particular task and move on or you may choose to quit the entire session.

Observation sheet



Activity: Usability testing

- I need a volunteer
  - Protocol
  - Think aloud
  - Measuring efficiency, effectiveness and satisfaction
  - Reporting

Start time:	Finish time:

Page/link_name	Notes	+/-
Name of starting page		

Usability Test …

- Conduct a Web site usability test
- Go to Sabancı University Information Center (Library) web site

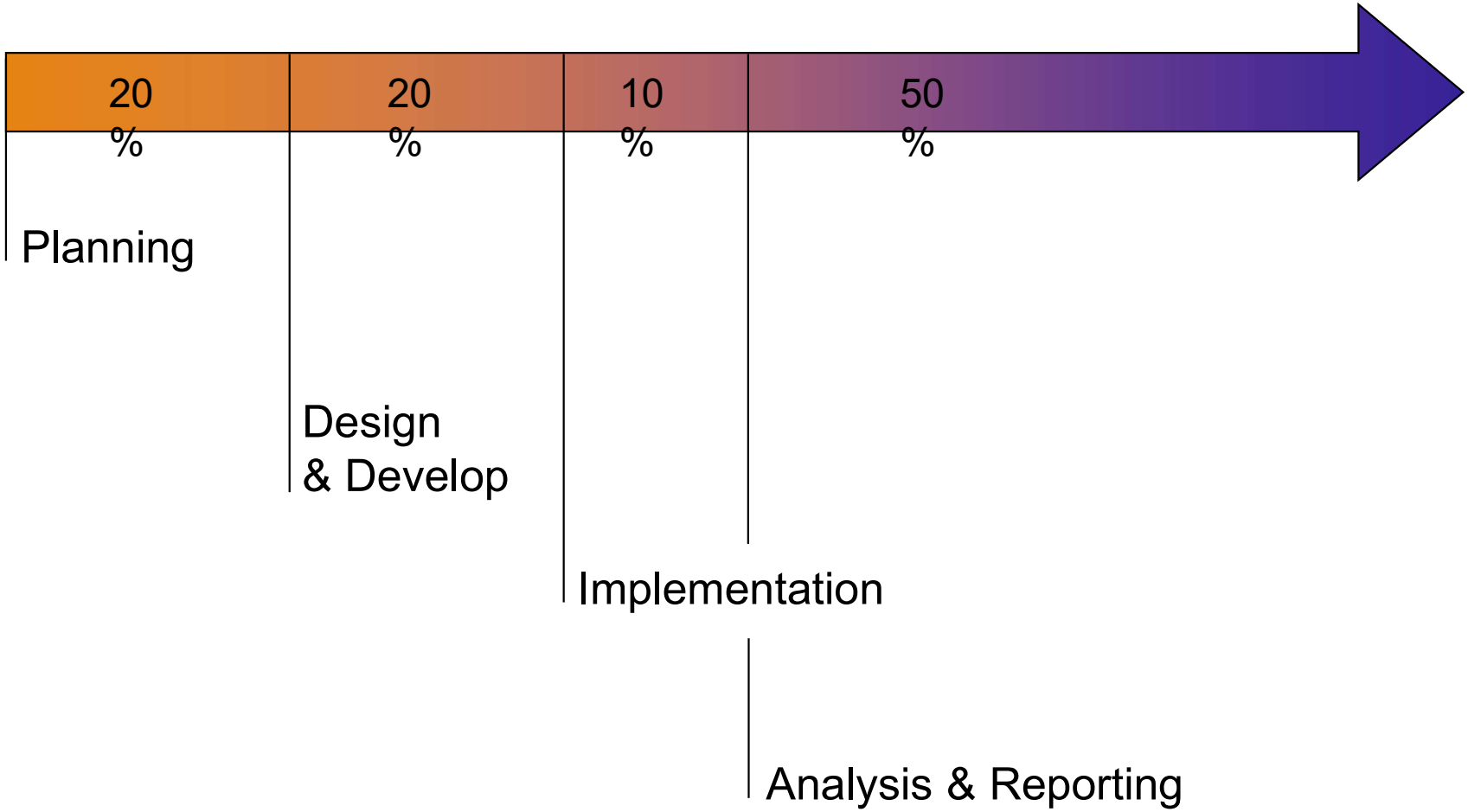
- Task-1 Check whether the book “Insan Bilgisayar Etkileşimi” written by Kürşat Çağıltay is available or not
- Task-2 You want to access library from your home. How?

Observations	Interpretation	Recommendation

Hawthorne Effect

- Named after identification at Hawthorne Works of Western Electrical in 1920s
- Productivity problem at the factory
- Workers were observed by researchers
- Improvements gained just by researchers' presence - workers felt they were cared for!
- But, after they left nothing has changed
- It is a method issue!

Usability Testing Methodology

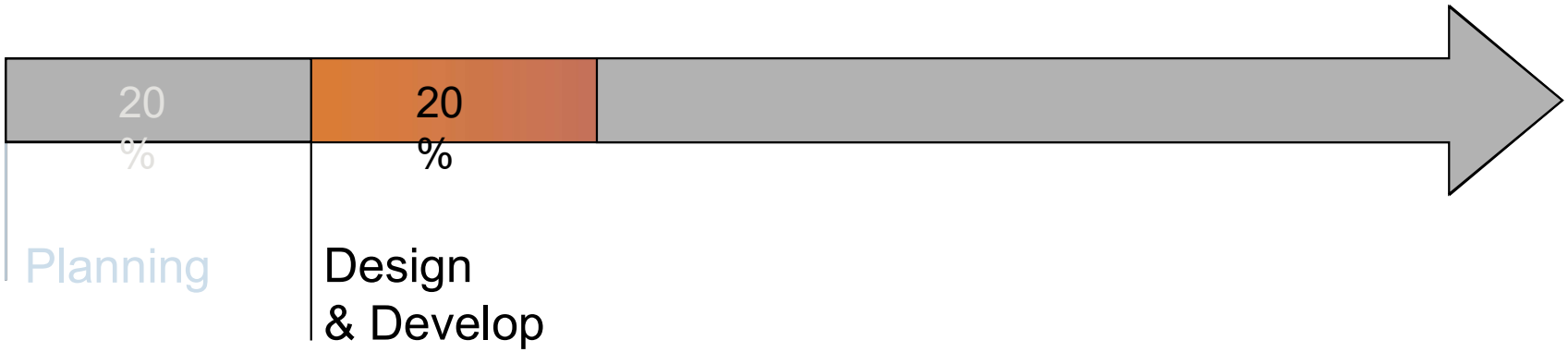


Usability Testing Methodology

Planning

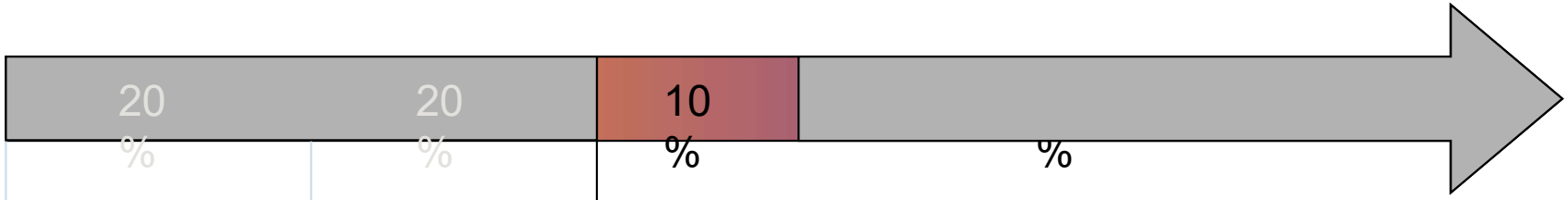
- Project background
- Goals of both user and client
- Audience
- Stakeholders
- System involved
- Client deliverables
- Budget
- Timeline

Usability Testing Methodology



- Identify core tasks for using the system
  - Server logs, help desk, task analysis
- Develop testing protocol
  - Determine recruitment & compensation for users
  - Develop the tasks for the test collaboratively
  - Design the study (# of users/tasks, length of session)
  - Create the pilot test materials

Usability Testing Methodology



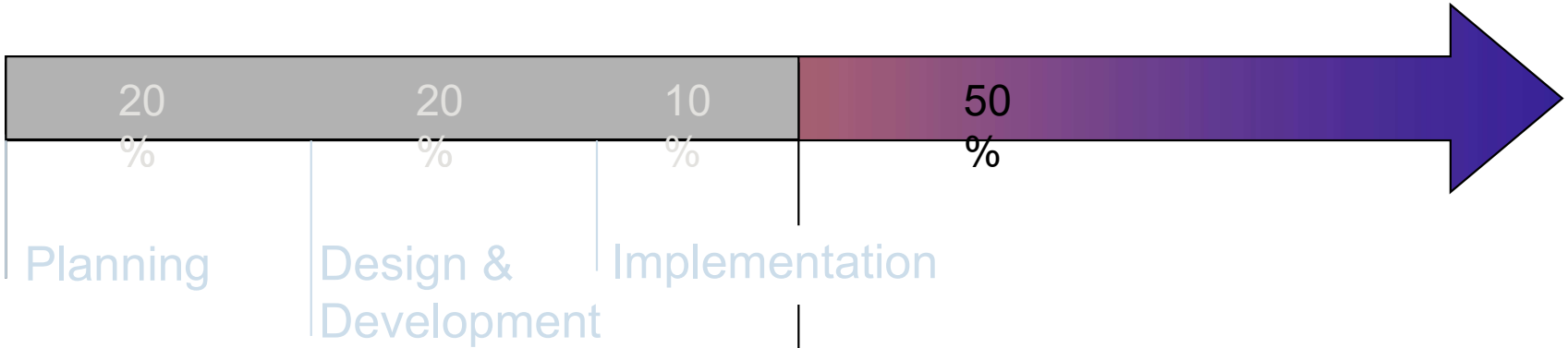
Planning

Design & Develop

Implementation

- Pilot test materials
- Recruit and schedule users
- Conduct evaluation sessions

Usability Testing Methodology



Analysis & Reporting

- Analyze data
  - Identify and prioritize problems
  - Generate recommendations
- Create report
- Deliver/present report findings

Before Finishing Today's Class

- Term Project Groups!!!
- Term Project Topics!!!

Term paper - structure

- Empirical
  - Gather data on an HCI topic
- Title

Abstract
Introduction
Method
Results
Discussion
References

Abstract

- A one paragraph summary
  - A statement on objective/purpose of the investigation
  - Description of participants
  - Brief description of what participants did
  - Summary of findings

Introduction

- Lit review
  - Background & rationale (previous research, what they found, what they identify as possible issues/questions)
  - Use: EBSCO, ScienceDirect, SCI, SSCI, etc.
- Statement of purpose
  - “The current study was conducted to evaluate the effect of X on Y” .... or ..... “to find out what are the factors that lead to Z” or “to determine the relationship between A and B..”

Method

- Enough detail for a reader to replicate
- Who participated (number, characteristics, volunteer or randomly selected)
- What materials were employed (systems, questionnaires - design, validity and reliability)
- What data was collected (dependent variables i.e. scores, ratings, responses)
- What were participants required to do (where, who, sequence of events - include instructions & tasks)

Results

- How have the data been treated?
- Text and graphs
- Statistics - descriptive/inferential
- Summarize the results

Discussion

- Interpretation-
  - what do the results mean in terms of your original question
  - why do you think they turned out like this
- Critique your study (limitations) and recommend improvements
- Suggestions for further research

Independent and dependent variables

- Independent (Input)- what the experimenter does to the subject e.g. exposed to an interface, training, mental model, or selected by age or gender
- Dependent (Output) - any behavior/performance/attitude of the subject which is measured as the ‘outcome’ e.g. scores on a test, type of knowledge

Credibility of the study

- Definition of the construct being measured
- Congruence between method & question
- Measurement
  - Bias: instruction & instrument (wording), administering
  - Reliability (stable/decision consistency)
    - consistency: e.g. adequate sample size to determine consensus
  - Validity

PILOT your method….

- Try your method before capturing data for real…..
  - Ask friends to answer your survey, take your test, perform your experiment etc.
  - look for issues that confuse them (or you!) - modify accordingly

Statistics (if you choose quantitative approach)

- Descriptive/Inferential
  - Mean (median, mode)
  - Range
  - Standard deviation
  - Run tests if you are comfortable

- Provide tabulated raw data if possible, (put in appendices if large)

Common pitfalls

- Rambling, unfocused style
  - Keep a question in mind as you write
- All claims and opinions, no evidence
  - Cite literature that supports your argument
- Misses relevant topics from class
  - Try to see how the readings and lectures fit
- NO PLAGIARISM !!